# LEVELS ISSUES IN THEORY DEVELOPMENT, DATA COLLECTION, AND ANALYSIS

KATHERINE J. KLEIN
University of Maryland, College Park
FRED DANSEREAU
State University of New York, Buffalo
ROSALIE J. HALL
University of Akron

Despite past entreaties to organizational theorists and researchers to address levels issues more carefully, levels issues continue to arouse confusion and controversy within the organizational literature. We highlight three alternative assumptions that underlie the specification of levels of theory throughout organizational behavior: (a) homogeneity within higher level units, (b) independence from higher level units, and (c) heterogeneity within higher level units. These assumptions influence the nature of theoretical constructs and propositions and should, ideally, also influence data collection, analysis, and interpretation. Greater attention to levels issues will strengthen organizational theory development and research.

Consider a levels-of-analysis issue arising in contemporary American politics: How should electoral college votes be allocated in the presidential election? Currently, electoral college votes are allocated at the state level in all but two states (Maine and Nebraska). Thus, in 48 states, the candidate who wins the state's popular vote wins all of that state's electoral college votes. Some states are now considering a shift to the congressional district level. Like Maine and Nebraska, these states may decide that the candidate who wins a congressional district's popular vote wins all of that district's electoral college votes. Is this shift in level of analysis from state to district a big deal? Yes, indeed. Had electoral college votes been universally allocated at the congressional district level of analysis, Nixon would have beaten Kennedy in 1960 and Ford would have beaten Carter in 1976 (Will, 1992).

Levels-of-analysis issues arising in contemporary organizational behavior are hardly this momentous. They will not change the course of

American history. But, as the conclusions of voting may differ as a function of the level of analysis, so too may the conclusions of research differ as a function of the level of analysis. This fact has dogged organizational research for decades. It has led to confusion and controversy regarding the appropriate level of analysis for, and thus the appropriate conclusions to be drawn from, research on topics as varied as performance appraisal, job design, training, pay, leadership, power, participation, communication, climate, culture, technology, organizational performance, and structure (Campion, 1988; Glick, 1985, 1988; Goodman, 1987; Klein, Ralls, & Douglas, In press; Kozlowski & Kirsch, 1987; Markham, 1988; Nachman, Dansereau, & Naughton, 1985; Ostroff & Ford, 1989; Pfeffer, 1982; Podsakoff & Schriescheim, 1985; Rousseau, 1983, 1985; Yammarino & Bass, 1991; Yammarino & Naughton, 1988).

Entreaties to organizational researchers to address levels issues more carefully and explicitly are not new (e.g., Behling, 1978; Dansereau, Alutto, & Yammarino, 1984; Glick & Roberts, 1984; Mossholder & Bedeian, 1983). Nevertheless, levels issues continue to be a source of ongoing debate within the organizational literature (e.g., George, 1990; Yammarino & Markham, 1992).

To help resolve the controversy and confusion that surrounds levels issues, we offer a framework that differs in four key respects from past work on levels issues in organizational theory and research. First, our framework highlights the primacy of theory in addressing levels issues. In contrast, the vast majority of the articles, chapters, and books on levels issues in organizational research focus primarily on statistical questions: how to justify aggregation, how to analyze data in accordance with the level of a theory, and/or how to analyze multilevel data (e.g., Bedeian, Kermery, & Mossholder, 1989; Bryk & Raudenbush, 1992; Dansereau et al., 1984; Firebaugh, 1978; Glick & Roberts, 1984; James, 1982; James, Demaree, & Wolf, 1984, 1992; Kenny & La Voie, 1985; Kozlowski & Hattrup, 1992; Lincoln & Zeitz, 1980; Mossholder & Bedeian, 1983; Tate, 1985).

One important exception to the emphasis on statistical questions is Rousseau's (1985) typology of mixed-level theories. Rousseau's (1985) chapter may, however, create the inadvertent impression that attention to levels is only a priority for scholars who undertake mixed-level theory. But, precise articulation of the level of one's constructs is an important priority for all organizational scholars whether they propose single- or mixed-level theories. Further, we go beyond Rousseau's typology to clarify the profound implications of specifying a given level or levels of a theory. Greater appreciation and recognition of these implications will, we show, enhance the clarity, testability, comprehensiveness, and creativity of organizational theories.

Second, we describe three alternative assumptions that underlie the specification of levels within organizational theory and research: (a) homogeneity of subunits within higher level units, (b) independence of subunits from higher level units, and (c) heterogeneity of subunits within

higher level units. In contrast, much of the existing work on levels issues within organizational theory and research highlights just two of these alternatives: homogeneity and independence (e.g., Glick, 1985; James et al., 1984; Kenny & LaVoie, 1985; Kozlowski & Hattrup, 1992). The third alternative of heterogeneity (also known as a frog-pond or parts effect) is recognized in some previous organizational work on levels issues (e.g., Dansereau, Graen, & Haga, 1975; Glick & Roberts, 1984), but its relevance and meaning within the organizational literature have been little explored. In discussing the meaning and implications of heterogeneity, we explicate a fruitful and relatively uncommon avenue for organizational theory building.

Third, by clarifying the assumptions that underlie the specification of levels of theory, we illuminate the underlying logic of statistical analyses designed to test the conformity of data to predicted levels of theory. Our discussion of these issues is deliberately nonquantitative. Instead, we use a pictorial approach to demonstrate the potential dangers of data analysis and interpretation when data do not conform to the level of theory. Thus, our treatment of these issues is (a) more broadly accessible than quantitative presentations of levels issues (e.g., Dansereau et al., 1984; Glick & Roberts, 1984; James et al., 1984) and (b) compatible with the variety of statistical indicators that may be used to test levels issues.

Finally, we demonstrate the importance of levels issues to topics spanning the range of organizational science. In contrast, much of the discussion of levels issues within the organizational literature has occurred within the context of a few topic areas, primarily climate (e.g., Glick, 1985, 1988; James, Joyce, & Slocum, 1988) and leadership (e.g., Yammarino & Bass, 1991).

We begin our presentation with a description of our terminology and a brief introduction to levels issues. We then present the framework, successively highlighting levels issues in theory development, data collection, and data analysis. We focus initially on single-level theory and research, examining multiple-level models in the final section of the article. Each section of the article stresses the importance of theory in resolving levels issues. Statistical approaches to levels issues have not rid the field of levels-related ambiguities, controversies, and critiques. A theory-based approach to levels issues may be helpful.

## A NOTE ON LEVELS TERMINOLOGY

The organizational literature on levels-of-analysis issues lacks a widely accepted terminology to describe levels issues. How, then, should authors describe levels issues? One approach is to use very broad terms, for example, to refer to "elements within sets" or "members within units" without specifying the exact nature of the elements, sets, members, or units. This approach highlights the commonality of levels issues across

organizational entities. However, the unfamiliar terminology may make it difficult for readers to grasp the substance of the presentation.

Accordingly, we have chosen to refer to a specific and familiar organizational context—individuals within groups—to present our points. Our argument is by no means intended to refer only to work groups, however. Rather, the term *group* may be interpreted to mean any higher level organizational entity, for example, a dyad, team, company, or industry. Similarly, the term *individuals* may be interpreted very broadly to refer to elements that are nested in, or members of, higher level entities, for example, members of a dyad, employees within a team, departments within a company, or companies within an industry.

As noted previously, we focus initially on single-level theories. Accordingly, in the opening sections of the article, we refer to "the level of a theory." However, some theories have more than one level. Further, two theories may use the same basic construct—or, at least, the same terminology—(e.g., technology, efficacy) to characterize different organizational entities. We recognize these nuances, but given the complexity and abstractness of levels issues, we find it helpful to speak of *the level of a theory* in the opening sections of this article, shifting later in the article to a more subtle and complex discussion of *the level of a construct* and *the levels of a theory*.

## AN INTRODUCTION TO LEVELS ISSUES

By their very nature, organizations are multilevel. Individuals work in dyads, groups, and teams within organizations that interact with other organizations both inside and outside the industry. Accordingly, levels issues pervade organizational theory and research. No construct is level free. Every construct is tied to one or more organizational levels or entities, that is, individuals, dyads, groups, organizations, industries, markets, and so on. To examine organizational phenomena is thus to encounter levels issues.

Levels issues create particular problems when the level of theory, the level of measurement, and/or the level of statistical analysis are incongruent. The level of *theory* describes the target (e.g., individual, group, organization) that a theorist or researcher aims to depict and explain. It is "the level to which generalizations are made" (Rousseau, 1985: 4). The level of *measurement* describes the actual source of the data—"the unit to which data are directly attached (e.g., self-report data are generally individual level, the number of group members is measured at the group level)" (Rousseau, 1985: 4). The level of *statistical analysis* describes the treatment of the data during statistical procedures. For example, if the level of measurement is the individual, but individual scores are aggregated by using the group means in data analysis, the level of statistical analysis is the group.

When levels of theory, measurement, and statistical analysis are not

identical, the obtained results may reflect the level of measurement or statistical analysis rather than the level of theory. Moreover, the obtained results may seriously misrepresent the relationships a researcher would have found if he or she had analyzed the data at the same level as the theory. In attributing the results to the level of the theory, a researcher may draw an erroneous conclusion or, in the language of levels, commit a fallacy of the wrong level (Galtung, 1967; Glick, 1988; Glick & Roberts, 1984; Haney, 1980; James et al., 1988; Kenny & La Voie, 1985; Mossholder & Bedeian, 1983; Pfeffer, 1982; Robinson, 1950; Rousseau, 1985).

## LEVELS ISSUES IN THEORY DEVELOPMENT: THE LEVEL OF THEORY

A critical first step in addressing levels issues is the specification of the level of one's theory. Rousseau, for example, wrote that "theories must be built with explicit description of the levels to which generalization is appropriate" (1985: 6). The implications of specifying a level of theory may not be well understood, however. In the following section, we show that in specifying a level of theory, one implicitly or explicitly predicts that members of a group are *homogeneous, independent,* or *heterogeneous* with respect to the constructs of the theory. Further, in specifying a level of theory, one predicts (again, implicitly or explicitly) that the relationships among the theoretical constructs are a consequence of differences between groups, differences between members independent of groups, or differences within groups (Dansereau et al., 1984).

### Specifying Homogeneity: The Group as a Whole

In specifying that the level of a theory is a group, a theorist predicts that group members are sufficiently similar with respect to the construct in question that they may be characterized as a whole. He or she need not refer to group members at all, but only to the group as a whole; a single value or characteristic is sufficient to describe the group. Objective group size is perhaps an extreme example; it is clearly invariant across the members of a group.

Homogeneity among the members of a group is commonly considered a prerequisite for asserting that the construct in fact applies to that group (Dansereau et al., 1984). Summarizing this view, Rousseau explained that "homogeneity within groups on X provides evidence of the meaningfulness of X at the unit level" (1985: 6). James suggested that "the use of aggregates [to describe environments in psychological terms] is predicated on demonstrating perceptual agreement because agreement implies a shared assignment of psychological meaning" (1982: 228). Mossholder and Bedeian commented that "if individual satisfaction is to be aggregated to represent group morale across groups being studied, there should be some degree of within-group agreement vis-à-vis satisfaction" (1983: 548).

In asserting that members of a group are homogeneous with respect

to a theoretical construct, a theorist predicts that group members' values on a given construct are identical. Further, in proposing relationships, he or she focuses on variation between groups, positing that differences between groups on one construct of the theory are related to differences between groups on other constructs of the theory (Dansereau et al., 1984).

Examples of the specification of homogeneity abound in the organizational literature. They include Ashford and Tsui's (1991) research on feedback seeking among managers (in which each manager's subordinates are conceptualized and studied as a homogeneous group), Klein's (1987) research on employee ownership (in which each company's employees are conceptualized and studied as a homogeneous unit), and Michel and Hambrick's (1992) and Wiersema and Bantel's (1992) studies of top-management teams (in which demographic and other team characteristics are conceptualized and studied as homogeneous within teams).[1] In each of these studies, the target unit is conceptualized as a single, whole unit and described by a single value.

The studies address diverse organizational entities, but they are united by their assertion of homogeneity within each of their target entities. We comment on this to underscore the point that numerous organizational entities or levels may be conceptualized as homogeneous.[2] To anticipate a later point, we should also note that many of the studies above are effectively cross-level studies; they predict that higher level organizational properties (e.g., the characteristics of a company's employee ownership plan) influence, and render homogeneous, lower level organizational properties (e.g., employee attitudes toward their company).

## Specifying Independence: Individuals Free of Group Influence

If the theorist specifies that the level of a theory is the independent individual, he or she predicts that, with respect to the constructs of interest, individual members of a group are independent of that group's influence. Thus, the value of a construct for an individual member of a group is independent of the value of the construct for other members of the same group. Because group membership is irrelevant to the theory's constructs, the distinction of within-group and between-group variation is also

---

[1] Michel and Hambrick (1992), Wiersema and Bantel (1992), and other organizational demographers (e.g., Jackson et al., 1991; Tsui & O'Reilly, 1989; Wagner, Pfeffer, & O'Reilly, 1984) used a measure of within-group variance (the coefficient of variation) to describe the extent of demographic variability within groups. Because this measure of variability is used to describe a property of each group *as a whole*, that is, the extent to which each group, as a whole, is composed of similar or diverse members, the measure is, in our terminology, *a homogeneous measure*.

[2] Clearly, dyads, groups, organizations, and other *higher level entities* may be conceptualized as homogeneous. So may individuals. Some psychologists, for example, study the variability within and relationships among individuals' multiple characteristics. Further, some psychologists also examine individuals over time.

irrelevant (Dansereau et al., 1984). Variation in the constructs is conceptualized simply as between-individual variation (e.g., the product of individual differences). In conceptualizing the relationship between two constructs at this level, one thus suggests that between-individual variability in a construct is related to between-individual variability in another construct.

Examples of this level of theory also abound in the organizational literature. Recent examples include Chen and Spector's (1991) study of employee negative affectivity (independent of job or organization effects, for example); Whitely, Dougherty, and Dreher's (1991) research on managers' early career progress (independent of job or organization effects); Gregersen and Black's (1992) study of employee commitment to a parent company and a foreign operation (independent of company effects); and Govindarajan and Fisher's (1990) study of strategic business unit performance (independent of firms and industries).

In the first three examples, the focal entity is the individual employee. In the fourth example, the focal entity is the strategic business unit. The examples are united, however, by their underlying prediction of independence. We include Govindarajan and Fisher's (1990) study to underscore the point that, as above, numerous organizational entities—not just individuals—may be conceptualized as independent.

## Specifying Heterogeneity: Individuals Within Groups

The level of some theories is neither the individual, nor the group, but the individual within the group. Relatively uncommon within the organizational literature, theories of this sort focus on individual attributes relative to the group average for this attribute. These theories describe *frog-pond effects* (Firebaugh, 1980), also known as *within-group effects* (Glick & Roberts, 1984) or *parts effects* (Dansereau et al., 1984). The term *frog pond* perhaps best captures the comparative or relative effect that is central to theories of this type: depending upon the size of the pond, the very same frog may be small (if the pond is large) or large (if the pond is small).

Theories of this type have two distinctive features, intimated above. First, they predict that the effects of an independent variable (X) on a dependent variable (Y) are context dependent. More specifically, "individuals' scores on Y . . . depend not only on their scores on X, but also on the size of the X relative to those of others in the social group" (Firebaugh, 1980: 46). Thus, the same X value may yield different Y values in different contexts. Within one context, a given X value may be *relatively* large. Within a second context, the same X value may be *relatively* small. Relative, not absolute, value is predictive.

Second, a comparative process is at the heart of individual within-the-group theories. Theories of this type predict that individuals are compared or ranked in some way. There is thus a compensatory or zero-sum quality to the predictor construct. Not everyone is high on the pre-

dictor. Not everyone is low. With respect to the constructs of interest, individuals vary within the group.

In asserting that the level of a theory is the individual within the group, the theorist thus implicitly or explicitly asserts that group members are neither homogeneous nor independent of the group, but heterogeneous. Although group members are assumed to vary with respect to the theory's construct, the group is deemed a meaningful entity. Knowledge of the group context is not only informative but necessary to interpret an individual's placement or standing in the group. Accordingly, users of theories of this type posit that within-group variability on one construct (i.e., each individual's standing on a construct relative to the group average for that construct) is related to within-group variability on another construct.

To clarify this description, we outline three exemplars of heterogeneity from the organizational literature. Each one suggests that the effects of the central construct are context dependent. According to vertical dyadic linkage (VDL) theory, the first exemplar, leaders divide subordinates into an in-group and an out-group based in part upon the subordinates' relative performance (e.g., Dansereau et al., 1975; Graen & Cashman, 1975). Thus, in the context of one group of subordinates, an employee may be a relatively high performer and an in-group member. In the context of a different group of subordinates, the same employee, performing at the same absolute level, may be a relatively poor performer and, thus, an out-group member. Performance relative to the group mean—not absolute performance—determines in-group and out-group status.

Rafaeli and Sutton's (1991) work on emotional contrast strategies among criminal interrogators and bill collectors provides an intriguing qualitative example of heterogeneity. Analyzing "good cop—bad cop" strategies, Rafaeli and Sutton (1991) suggested that a cop's effectiveness depends not upon his or her absolute and independent level of "goodness" or "badness," but upon the contrast effect—how good or bad the cop appears relative to his or her partner. Indeed, a cop acting *the same way* may be the good cop in one setting (relative to his or her worse cop partner) and the bad cop in another setting (relative to a different, better cop partner).

A final example comes from the strategy literature (e.g., Porter, 1980, 1985). This literature highlights the context dependence of firm performance. Indeed, by definition, a firm's competitive advantage is a function of its competence relative to its competitors. Accordingly, a single firm may be a superior performer (relative to its competitors) in one market and an inferior performer (relative to its competitors) in a second market. Phillip Morris provides an apt example (Gupta, personal communication, 1993). After this company bought Miller Beer, the beer changed from the seventh most popular to the second most popular beer in the United States. Phillip Morris had no such luck when it bought Seven-Up. Relative

to its competitors in the beer industry, Phillip Morris is superior at marketing. Relative to Coke and Pepsi, Phillip Morris is not.

Thus, numerous organizational entities may be conceptualized as heterogeneous. We should also note that theories of this type are often categorized as cross-level theories (e.g., see Rousseau, 1985) because the focus on such theories is not just the individual, but the individual in context: the individual within the group.

### An Example: Participation and Performance—Homogeneous, Independent, or Heterogeneous?

An example may clarify the distinction among the three assumptions of variability. This example also illustrates how a given construct may, depending upon the nature of the specific theory in question, be conceptualized as homogeneous, independent, or heterogeneous.

Consider the relationship of participation and performance. Both participation and performance may be conceptualized as homogeneous within groups. A theorist may, for example, define participation as the extent to which decision making is shared among the members of the group (a global characterization of the group) and examine its relation to the performance of a group as a whole.

Alternatively, both participation and performance may be conceptualized as independent of the group. For example, a theorist may posit that the propensity to participate in decision making is an individual-level characteristic, as is individual performance, independent of group influence. (Perhaps both participation and performance are a function of individual assertiveness or intelligence.) Group membership is thus irrelevant to the relationship of participation and performance; individual differences determine participation and performance.

Finally, participation and performance may be conceptualized as heterogeneous; the better the individual's performance compared to his or her peers in the group, the more confident he or she may feel to participate in group decision making. In this case, the same individual may participate a great deal in one group (because he or she is a high performer in this group), but he or she may participate very little in a second group (because he or she is a low performer in this group). Thus, participation is a function of individual performance relative to average group performance.

As we shift from homogeneity to independence to heterogeneity, the meaning of the constructs and of their relationship to one another changes: Although each conceptualization is plausible, each one evokes a different explanatory mechanism, suggests a different strategy for data collection and analysis, and anticipates a different intervention strategy. (See Yammarino & Bass, 1991, for an illustration of this point with reference to the leadership literature.) No wonder, then, that the failure to specify explicitly a precise level of theory may lead to confusion and controversy

regarding the meaning of the theory and conclusions to be drawn from tests of the theory.

Before describing the implications of the previous discussion for organizational theory building, we examine the applicability of the three assumptions of variability to diverse topics and subdisciplines within the organizational literature. In addition, we consider a recent theoretical model that, despite its creativity and thoughtfulness, illustrates the ambiguity that may arise as a result of insufficient attention to levels issues.

## Homogeneity, Independence, and Heterogeneity Across Organizational Entities and Organizational Subdisciplines

Predictions of homogeneity, independence, or heterogeneity are not limited to theories and studies of individuals and groups, but, in fact, they underlie the specification of levels throughout organizational theory and research. Thus, for example, companies may be conceptualized as homogeneous within industries, independent of industries, or heterogeneous within industries.

A second example—observations of individuals over time—is more unusual, thus offering an illustration of the flexibility and generalizability of the homogeneity-independence-heterogeneity framework (see also Dansereau et al., 1984). Observations of each individual may be conceptualized as homogeneous. In this case, observations of a given individual are identical, or stable, over time, but observations of different individuals vary significantly on the observed characteristic—a classic personality or dispositional effect (Staw, Bell, & Clausen, 1986). Alternatively, observations may be conceptualized as independent. Here, observations of each individual are, in fact, independent of the individual—the product, for example, of situational influences. Finally, observations may be conceptualized as heterogeneous. In this case, observations of each individual over time vary predictably about the mean for each individual. Physical activity over time provides an example; for every period of high physical activity (running), an individual is likely to have a corresponding period of low physical activity (resting).[3] In Table 1, we summarize and list examples of the application of the homogeneity-independence-heterogeneity framework to diverse organizational entities.

As the three assumptions of variability cross organizational entities, so they cross the parent disciplines of organizational inquiry. For

---

[3] The concept of individual heterogeneity across time (or heterogeneity within a single individual) is similar but not identical to ipsative concepts and measures. An ipsative approach compares an individual's standing on a given construct or measure with the same individual's average standing on other constructs or measures. In specifying heterogeneity within an individual over time, the researcher compares the value of a particular construct for a given individual at a particular time with the average value of the same construct for that individual over time.

## TABLE 1
### Assumptions of Variability Across Organizational Entities

| Entities | Assumptions of Variability | | |
|---|---|---|---|
| | Homogeneity | Independence | Heterogeneity |
| Individuals over time | Observations of each individual are homogeneous over time (e.g., dispositional effect) | Observations of each individual are independent over time (e.g., situational effect) | Observations of each individual are heterogeneous over time (e.g., relative level of physical activity over time) |
| Individuals within groups | Group members are homogeneous within each group (e.g., stage of group development) | Group members are independent of groups (e.g., group member perceived work-family conflict) | Group members are heterogeneous within each group (e.g., relative power of each individual within the group) |
| Groups within organizations | Groups are homogeneous within each organization (e.g., group performance standards set by the organization) | Groups are independent of organizations (e.g., frequency with which group members socialize as a group outside of work) | Groups are heterogeneous within each organization (e.g., relative performance of each sales team within each organization) |
| Organizations within industries | Organizations are homogeneous within each industry (e.g., nature of organization's products) | Organizations are independent of industries (e.g., organizational provision of family-oriented benefits such as parental leave) | Organizations are heterogeneous within each industry (e.g., relative market share of each organization within an industry) |

example, within differing theories of organizational behavior, psychologists characterize individuals as (a) independent of organizations, (b) homogeneous within organizations, and (c) heterogeneous within organizations. Organizational sociologists typically characterize individuals as homogeneous within organizations. Beyond this, however, differing theories of organizational sociology describe organizations as (a) independent of industries, (b) homogeneous within industries, and (c) heterogeneous within industries. Entities (individuals versus organizations)—not assumptions of variability—distinguish the parent disciplines of organizational inquiry.

### Ambiguity in the Specification of Level(s) of Theory: An Example from the Organizational Literature

The failure to specify the level(s) to which a theory applies leads, almost invariably, to imprecision within the theory and confusion during data collection and analysis to test the theory. These problems are

apparent in Lawless and Price's (1992) recent theoretical analysis of technology champions. Their model is fresh and insightful, but it would, unfortunately, prove difficult to test.

Building on agency theory, Lawless and Price (1992) examined the roles that technology champions and users play during innovation adoption. The term *champion* is clearly and explicitly defined (Lawless & Price, 1992: 342). The term *user* is not. As a result, it is unclear whether the authors conceptualize users as independent individuals or as the homogeneous members of technology-adopting groups or organizations. Is the model designed to explain between-individual, between-group, or between-organization differences in technology adoption? Should the model be tested within a single organization or across organizations? Lawless and Price's presentation of the model leaves these questions unanswered.

The model's propositions do little to resolve these ambiguities. In some propositions, the authors appear to assume homogeneity within organizations: "Nonmonetary rewards and sanctions, dispensed by organizations and their members can enhance the availability and performance of champions" (Lawless & Price, 1992: 350). This proposition suggests a between-organization comparison of the availability and performance of champions. In some propositions, the authors appear to assume individual independence: "Champions' and users' preferences are likely to diverge due to personal orientations and perceived net benefits from technology implementation" (Lawless & Price, 1992: 351). Surely, individuals, not groups and organizations, have "personal orientations." Finally, in some propositions, the authors appear to assume heterogeneity within the champion-user relationship: "The greater the variance between champion and user skills," [the more likely champions are to] "impose their preferences on users" (Lawless & Price, 1992: 347). This proposition suggests that the extent to which champions impose their preferences on users is a function of neither user skills alone, nor champion skills alone, but their relative disparity.

Multilevel models of organizational processes as complex as innovation adoption are both plausible and apt, but they require (even more than single-level theories) explicit and thorough explications of the authors' assumptions of variability, a point to which we return at the conclusion of this article. Had Lawless and Price devoted greater attention to levels issues, their rich model would have been still more impressive and more testable.

## Implications for Theory Development

Based on the previous discussion, we propose the following four guidelines.

> 1. *Theory building is enhanced by explicit specification and explication of the level of a theory and its attendant assumptions of homogeneity, independence, or*

*heterogeneity. This specificity increases the clarity of organizational theories.*

The level of a theory shapes the fundamental nature of the constructs of the theory, determining whether they are to be viewed as descriptors of homogeneous groups, independent individuals, or heterogeneous groups. Further, the level of theory establishes the expected nature of the relationships among the constructs of the theory: Is between-group, between-individual, or within-group variability in one construct of the theory predicted to be associated with between-group, between-individual, or within-group variability in a second construct of the theory? These are the direct and inevitable consequences of specifying a level of theory *whether or not these consequences are explicitly highlighted within the theory.* Thus, we encourage authors to specify explicitly the level or levels of their theories.

*2. Theory building may be enhanced by specification and discussion of the sources of the predicted homogeneity, independence, or heterogeneity of the constructs. Attention to these issues increases the depth and comprehensiveness of organizational theories.*

Given the importance of the level of a theory, theorists should include in their specification of the level(s) of their theory an explication of the underlying assumptions of variability. In short, *why* are group members expected to be homogeneous, independent, or heterogeneous? Answering this question yields a more comprehensive and convincing theory.

The *organizational* literature provides a rich source of concepts to justify and explain predictions of homogeneity, independence, or heterogeneity. Authors predicting homogeneity might, for example, allude to a variety of organizational practices and processes expected to engender homogeneity within groups, including attraction and selection processes (similar individuals are attracted to and selected into a group), socialization (group members receive similar training and indoctrination and, thus, come to respond in a similar fashion), social information processing (individuals are subject to common social influences or commitment processes), and common experience (group members experience the same group events) (e.g., Pfeffer, 1977; Salancik & Pfeffer, 1978; Schneider, 1987; Schneider & Reichers, 1983; Thomas & Griffin, 1989). Authors predicting independence might allude to individuals' distinctive personal characteristics, individuals' diverse experiences at work, or individuals' lack of interaction with other group members (e.g., Staw et al., 1986). Finally, authors predicting heterogeneity might allude to formal ranking procedures within a group (e.g., a within-group performance ranking system), organizational processes that require supervisors to differentiate among their subordinates, zero-sum-game properties of the focal construct, contrast effects, or social comparison processes (e.g., Dansereau et al., 1975; Firebaugh, 1980).

*3. Theory building may be enhanced by explicit consideration of alternative assumptions of variability. Explicit consideration of alternative assumptions of variability may increase the creativity of organizational theories.*

Although many organizational constructs can only be conceptualized as homogeneous or as independent or as heterogeneous, others—like participation and performance—can be meaningfully conceptualized in each of these ways. In such cases, theorists may find that it refines their thinking and spurs their creativity to speculate about alternative conceptualizations of their constructs. In asking, for example, "When is this construct not independent but homogeneous?" a theorist may gain new insight into the assumptions that underlie his or her theory. Further, he or she may generate new propositions to be pursued in future theory building and research. Ostroff's (1992) research on the satisfaction-performance relationship at the organizational, rather than individual, level of analysis exemplifies the potential benefits of examining familiar constructs at less familiar levels of theory. So, too, does Barley and Knight's (1992) theoretical analysis of the prevalence of stress complaints among, not individuals, but specific societal time frames, subcultures, occupations, and roles. Speculation regarding alternative assumptions of variability may provide the initial spark for the development of multiple-level theories, a topic to which we return at the conclusion of the article.

*4. In clarifying and explicating the level or levels of their theories, organizational scholars may discover a new synergy among the diverse subtopics of the field.*

The previous discussion suggests that assumptions of homogeneity, independence, and heterogeneity span the parent disciplines of organizational theory and research. Thus, despite the sharp differences that separate them (cf. Cappelli & Sherer, 1991; House & Rousseau, 1992; Pfeffer, 1982), the varying traditions and perspectives of organizational theory and research share common underlying elements of logic and structure. This commonality suggests that even theorists who differ in focus and orientation may have something to learn from one another if they make common assumptions of variability. For example, a theory that predicts that organizations are homogeneous within industries (e.g., Aldrich, 1979) may be of interest and use to a theorist who predicts that individuals are homogeneous within organizations (e.g., Schneider, 1987). In this way, greater attention to levels issues and assumptions of variability may have a synergistic effect upon the field, allowing scholars to recognize the common elements that link their works.

Next, we examine levels issues in data collection. Again, we focus on single-level theories, taking up the more complex case of multiple-level theory at the end of this article.

## LEVELS ISSUES IN DATA COLLECTION: THE LEVEL OF MEASUREMENT

When the level of a theory is precisely specified and explicated, researchers testing the theory may collect data in a way that ensures the conformity of the data to the level of theory (e.g., they may collect global, group-level data that varies only between groups to test a theory specifying within-group homogeneity). This is an optimal strategy when the level of a theory is certain, we suggest. When the level of a theory is open to question, however, researchers may find it advantageous to use alternative data-collection strategies that allow them to test, rather than simply ensure, the fit of the data to the level of theory. We explore these level-of-measurement issues in the following sections.

### Data-Collection Strategies Ensuring Conformity to Predictions of Variability

Researchers wishing to test theories that predict within-group homogeneity are commonly advised (a) to use research measures that (like the theory) focus on the unit as a whole and (b) to maximize between-group variability in the research sample (Glick, 1985; Rousseau, 1985). Thus, to test a homogeneous-group theory, a researcher might collect data from numerous groups, using an objective measure or expert ratings to obtain a single score representing each group as a whole. In this way, the homogeneity of the data within groups is ensured.

Researchers wishing to test theories that predict individual independence from groups are advised (a) to use measures that (like the theory) draw attention to each individual's unique experiences and characteristics and (b) to maximize between-individual variability. Thus, for example, a researcher might employ survey measures, focusing on each individual's unique experiences and characteristics, in a sample of diverse and independent individuals. The independence of the data from groups is thus fostered.

Finally, researchers wishing to test theories that predict within-group heterogeneity are advised (a) to use measures that (like the theory) highlight the position of each individual relative to the group mean and (b) to maximize within-group variability. Thus, for example, a researcher might collect data across a number of groups asking an expert on each group to use a forced choice scale to rank order the members of each group with respect to the construct(s) of interest (e.g., leadership, power, performance). In this way, the heterogeneity of the data within groups is ensured.

### To Ensure Conformity or Test Predictions?

In using the data-collection strategies outlined above, a researcher makes the assumption that his or her predictions of homogeneity, independence, or heterogeneity are correct. If, for example, a researcher has

used a global measure to characterize a group, he or she lacks the data needed to test whether members are, indeed, homogeneous within groups on the variables of interest. If a researcher has used a survey instrument to collect data from individuals within a single group, he or she cannot test empirically whether group members' scores are, indeed, independent of group membership.

In cases in which the level of the theory is beyond question, ensuring the conformity of data to the level of the theory in this fashion appears completely appropriate. Surely a researcher need not ask the members of each group how large their group is if the construct of interest is objective group size. Further, some constructs may have no meaningful analogue at a lower level of theory. For example, a group's stage of development or internal process (e.g., Gersick, 1988, 1989, 1991) may only be conceptualized and assessed as a homogeneous property of each group.

In some cases, however, the level of organizational constructs is open to debate. Organizational climate (Glick, 1985), participation (Klein, Ralls, & Douglas, In press), leadership (Glick & Roberts, 1984), affect (George, 1990), and technology (Rousseau, 1983, 1985), for example, may be conceptualized and measured at more than one level. In such cases, a failure to test empirically the assumptions of the theory regarding the homogeneity, independence, or heterogeneity of the constructs may leave the conclusions of the research open to question and criticism.

We hasten to add, however, that no data-collection strategy is "level neutral." For example, survey and observational measures presuppose a level of theory insofar as they necessarily direct respondents' attention to (a) group homogeneity (e.g., "In general, how do the members of your group feel about X?"); (b) individuals independent of groups (e.g., "How satisfied are you personally with X?"); or (c) group heterogeneity (e.g., "Compared to the other members of your group, how great is your X?") (cf. Schneider, 1990).

Sampling strategies also presuppose a level of theory insofar as they (a) allow or prohibit testing a theory's predictions of homogeneity, independence, or heterogeneity and (b) maximize or minimize within-group or between-group variability. If a researcher collects survey data from a single organization, for example, this precludes assessment of between-organization differences in survey responses. Less obviously, data collection across organizations within a single industry may minimize observed between-organization differences if organizations are homogeneous within industries with respect to the variables of interest.

## Implications for Data Collection

Based on the discussion above, we offer the following guideline.

> *5. If the level of a theory is certain, researchers may enhance the fairness and rigor of their research by employing data-collection strategies that ensure the*

> conformity of the data to the level of the theory. If the
> level of a theory is open to question, however, research-
> ers may enhance the fairness and rigor of their research
> by employing data-collection strategies that simulta-
> neously (a) direct respondents' attention to the predicted
> level of theory, (b) maximize the variability predicted by
> the theory, and (c) allow one to test empirically the the-
> ory's predictions of homogeneity, independence, or het-
> erogeneity. In all cases, the use of multiple, diverse
> measures is ideal.

This guideline suggests a resolution of seemingly contradictory advice
to (a) collect data in a manner that ensures the congruence of level of theory
and measurement (Rousseau, 1985) and (b) collect data at a level below
the target level of theory—data that can then be aggregated to the level
of the theory (Burstein, 1980). The ideal approach, however, is to employ
multiple and varied measures of the constructs of a theory. When diverse
measures of a construct demonstrate the variability predicted for the con-
struct, researchers' confidence in the level of the construct is enhanced.

The previous guideline also draws attention to the importance of
maximizing the variability predicted by the theory, whatever the re-
searcher's data-collection strategy. A researcher needs ample between-
individual variability to test a theory that predicts individual indepen-
dence; ample between-group variability to test a theory that predicts
within-group homogeneity; and ample within-group variability to test a
theory that predicts within-group heterogeneity. Anything less invites
range restriction.

These are fundamental research concerns. They may make or break
a study. George's (1990) research on group affect, for example, has been
criticized for failure to evidence significant between-group variance and
covariance (Yammarino & Markham, 1992). Arguably, the focus on statis-
tics is misplaced. Contrary to the level of her theory, George's measures
assessed individual affect, not group members' assessment of the typical
affect displayed by group members. Further, her sample came from one
organization, not a sample likely to maximize between-group variability.
Had George's data collection strategy matched the guideline above, her
data might well have shown significant between-group variance and co-
variance.

In sum, the choice of a data-collection strategy is a judgment call
informed in part by (a) the precision and rigor of the underlying theory's
specification and explication of the level of the theory, (b) the researcher's
confidence and the confidence of others in the field in the underlying
theory's assertions of the level of theory, and (c) a careful analysis of the
assumptions of variability contained within potential measurement and
sampling strategies. Matching one's data-collection strategy to the spe-
cifics and certainty of the level of one's theoretical constructs is in no way

"cheating." Rather, this procedure fosters the construct-level validity of one's measures.

## LEVELS ISSUES IN DATA ANALYSIS: THE LEVEL OF STATISTICAL ANALYSIS

Levels scholars have commonly urged researchers to align their data-analysis strategies with the level of theory. In this section, we suggest that researchers may enhance the quality of their research not only by aligning their analyses to the level of theory, but also by examining the fit or conformity of the data to the theory's predictions of homogeneity, independence, or heterogeneity. If data have been collected in such a way as to ensure the conformity of the data to the level of theory, there is clearly no need for analyses of this kind. Accordingly, in this section, we assume that data are, in fact, available to test the conformity of the data to the level of theory. Further, as mentioned previously, we focus on single-level theories, examining multiple-level theoretical models following this section.

### Aligning Level of Analysis and Level of Theory

As we have noted, scholars (e.g., Glick & Roberts, 1984; Pfeffer, 1982; Rousseau, 1985) commonly advise researchers to align the level of their statistical analyses with the level of their theory. If the level of the theory is the homogeneous group, researchers are advised to use global, group-level scores, or individual-level scores aggregated to the group in their analyses. If the level of the theory is the independent individual, researchers are advised to use unaggregated, individual scores to test the theory. Finally, if the level of theory is the individual within the group, researchers are advised to use deviation scores (or to control for between-group differences in some other way) to test the theory.

Although we concur with this advice, we demonstrate in the following section that if the level of statistical analysis matches the level of theory, yet *the data do not conform to the predicted level of theory, a* researcher may draw erroneous conclusions from the data. The importance of conformity of the data to theories predicting within-group homogeneity is relatively well known and well understood. We demonstrate next that conformity of data to a theory's predictions of heterogeneity or independence is equally important.

### Conformity of Data to the Level of a Theory

To specify a level of theory, we have shown, is to predict first that the members of a group are homogeneous, independent, or heterogeneous with respect to the constructs of a theory. Second, it is to predict that the relationships among the constructs of the theory are a function of such homogeneity, independence, or heterogeneity. If data measuring the constructs of a theory support these two predictions, the data conform to the level of the theory.

Figure 1 is designed to clarify the meaning and implications of conformity of data to the level of theory. The figure presents hypothetical data depicting the relationship of two measures (X and Y) representing 60 employees organized into six work groups of 10 employees each. The three rows of the figure depict near-perfect conformity of data to predictions of homogeneity, independence, and heterogeneity, respectively. Figure 1 thus illustrates an ideal. In most cases, real-world data are far messier and far more challenging to interpret, a point to which we will return.

Each column of the figure depicts a bivariate scatterplot of the observed X and Y values. The scatterplots in column 1 depict individual observations; 60 ungrouped individual data points are shown. The scatterplots in column 2 depict individual observations arranged around group means; the mean values of X and Y for each of the six groups are shown, as well as the variability of the individual scores around each mean. The scatterplots in column 3 depict the six group means only. Finally, the scatterplots in column 4 depict the relationship of the X and Y values among the individuals within a single prototypical group. Thus, column 1 represents the individual level, unaggregated correlation; column 2 the extent of variability within and between groups; column 3 the correlation of the mean scores; and column 4 a simplified representation of the correlation of the within-group deviation scores.

Row 1 of the figure depicts conformity of data to predictions of within-group homogeneity. As predicted by the level of theory, the measures are homogeneous within groups, showing greater within-group homogeneity than would be expected by chance (column 2). Further, the relationship of the measures reflects the correlation of between-group differences (column 3). Indeed, within a single group, the correlation of individual measures of X and Y is near zero (column 4). If the level of the researcher's theory is the homogeneous group, analyses of the group mean scores (column 3) provide an appropriate assessment of the relationship of the measures.

Row 2 *illustrates conformity to predictions of individual independence from groups.* The data lack the within-group homogeneity depicted in row 1; the values of X and Y for individual observations are independent of groups. Individual observations are effectively randomly distributed across groups. The group means vary as would be expected by chance (column 2).[4] Accordingly, the correlation of the group means

---

[4] The data in row 2 of the figure depict some between-group variability even though between-group differences are expected to be nonsignificant when data conform to predictions of independence. Only if a researcher sampled extraordinarily large groups of independent individuals would he or she expect to find no between-group variability. (In such a case, however, within-group variability would not exceed what the researcher would expect by chance.) The variability of group means, when individuals are in fact independent of groups, sets the stage for ecological fallacies because the correlation of group means often misrepresents the disaggregate correlation of the measures.

**FIGURE 1**
Conformity of Data to the Level of the Theory

(column 3) approximates (but may misrepresent) the correlation between the two measures within groups (column 4) and across groups (column 1). If the level of the researcher's theory is the independent individual, the disaggregate data (column 1) provide an appropriate assessment of the relationship of the measures.

The data depicted in row 3 conform to predictions of heterogeneity within groups. The measures are heterogeneous within groups (column 2). As frog ponds differ in size, so the groups show mean differences on the predictor (depicted along the horizontal access) (column 3). However, the dependent variable (depicted along the vertical access) varies only within groups, showing more heterogeneity than expected by chance. The relationship of the two measures is thus entirely within groups. Group membership must be taken into account in order to get a true representation of the relationship. Accordingly, the correlation of the measures within any single group (column 4) is significant, whereas the correlation of the group mean scores is not (column 3). If the level of the researcher's theory is the individual within the group, the correlation of the within-group deviation scores provides an appropriate assessment of the relationship of the two measures.[5] (Other analyses of the individual $X$ and $Y$ scores that control for group mean differences on the independent variable also may be appropriate.)

## Nonconformity of Data to the Level of Theory

When data do not conform to the level of the theory, analysis and interpretation of the data in accordance with the level of theory invites erroneous conclusions (Robinson, 1950). If the results are significant, a researcher may conclude that his or her theory is supported, when in fact the data, in their entirety, do not support the predicted level of theory. We turn again to Figure 1 to illustrate this risk.

If the theory postulates homogeneous groups, yet the data do not

---

[5] Our portrait of heterogeneity differs from that suggested by Dansereau and his colleagues' (1984) portrait of "parts." In the ideal parts condition described by Dansereau et al., *both X and Y* show minimal between-group variability. In contrast, we suggest that in a heterogeneous data set, only one measure, not both, varies solely within groups. The difference between the two portraits may reflect differing assumptions about the nature of the measures in a heterogeneous data set. Consider an organization in which bonus pay is awarded to each employee as a function of his or her performance relative to his or her group mean. In this case, if performance is measured on an absolute scale, the observed relationship will match that depicted in row 3 of the figure. If the performance measure instead ranks individuals within each group, the observed relationship will match Dansereau and his colleagues' (1984) predictions. In either case, the interpretation of the heterogeneous pay-performance relationship is identical.

conform to this level of theory, an observed relationship between the mean scores may prove misleading (see Ostroff, 1993). If the data conform to the independent individual level of theory, the correlation of the mean scores (row 2, column 3) may be significant, yet attributing the results to between-group differences is inappropriate; the data provide no evidence that the measures capture meaningful, homogeneous group-level characteristics.

If the level of theory is the individual independent of groups, yet the data do not conform to this level of theory, examining the disaggregate correlation alone also may prove misleading. If the data conform to predictions of homogeneity, the disaggregate correlation (row 1, column 1) may be significant, although the data provide no evidence for the assertion that the measures assess individual characteristics, independent of groups. Similarly, if the data conform to predictions of heterogeneity, the disaggregate correlation (row 3, column 1) may be significant, although the data do not in fact show individual independence of groups.[6]

Finally, if the level of one's theory is the individual within the group, yet the data do not conform to this level of theory, examining the correlation of the deviation scores alone may prove misleading. If the data conform to predictions of independence, the correlation of the deviation scores (row 2, column 4) may be significant, although the data provide no evidence of systematic heterogeneity within groups.

In sum, aligning the level of one's data analyses with the level of theory is insufficient to prevent levels fallacies; conformity of data to the level of theory is critical. When data do not conform to the level of the theory, data analyses that are performed at the predicted level of theory yield artifactual results. These results may well support the substantive hypotheses of the research (e.g., that $X$ predicts $Y$). Nevertheless, such results rest upon a house of cards blown asunder by closer examination of the data.

## Testing the Conformity of Data to the Level of Theory: Statistical Indicators

Statistical tests of the predicted homogeneity, independence, or heterogeneity of a measure fall into two rough categories: (a) those that assess the extent of agreement within a single group and (b) those that assess the extent of agreement (or reliability) by contrasting within- and between-group variance. James, Demaree, and Wolf's (1984) $r_{wg}$ typifies

---

[6] Because the third row of Figure 1 depicts near-perfect conformity of data to predictions of heterogeneity, the disaggregate correlation appears likely to be zero. With real-world data that conform, albeit less perfectly, to predictions of heterogeneity, the disaggregate correlation may in fact be non-zero and statistically significant.

the first category. The second category includes analysis-of-variance models and their related measures of association such as eta-squared (Dansereau et al., 1984) and different forms of the intraclass correlation (Glick, 1985; Kenny & La Voie, 1985; Maxwell, Camp, & Arvey, 1981). Although they employ differing criteria, these indicators are designed to answer a common question: Does the variability within groups differ from what would be expected by chance?

A number of statistical indicators also are available to test whether the relationship between measures is a function of homogeneity, independence, or heterogeneity (see, for example, Boyd & Iversen, 1979; Dansereau et al., 1984). Using Dansereau and colleagues' (1984) procedures, for example, a researcher can examine the relative magnitude of (a) the correlation of $X$ and $Y$ based upon raw score, disaggregate data; (b) the correlation of the group means for $X$ and $Y$ (i.e., the raw score data aggregated to the group level); and/or (c) the correlation of the within-group deviation scores for $X$ and $Y$.

Numerous questions remain regarding the various statistical indicators listed previously. What are the strengths and weaknesses of the various tests? How are the tests related? How do the size of the sample, the sampling strategy, and the characteristics of the data-collection instrument (e.g., the wording of questionnaire items) affect the results of these tests? How should a researcher proceed when, as is often the case, the results of the tests provide marginal, not strong, support for the predicted level of theory? Further, how should he or she proceed if the tests yield different conclusions regarding the conformity of data to the level of theory? (See, for example, George, 1990; Yammarino & Markham, 1992).

Resolution of the questions posed above is clearly very important for the future of organizational research. Such a resolution requires further research and mathematical analysis beyond the scope of this article (see, however, Hall, 1988; Kozlowski & Hattrup, 1992; Markham, 1988; Ostroff, 1993; Yammarino & Markham, 1992). Pending such research and analysis, we can only encourage researchers (a) to recognize the fundamental predictions of homogeneity, independence, and heterogeneity that the indicators outlined above are designed to test and (b) to use multiple indicators of homogeneity, heterogeneity, and independence in their own work.

## Implications for Data Analysis

> 6. *When the level of a theory is uncertain and data are*
> *available to test the conformity of the data to the pre-*
> *dicted level of theory, testing the conformity of the data*
> *to the level of theory enhances the clarity of the results*
> *and reduces the risk of a levels fallacy.*

This guideline recapitulates our discussion. The guideline effectively encourages additional tests of the construct validity of one's measures: tests of their construct *level* validity. When researchers do not test the conformity of their data to the level of their theory, they render the proper

interpretation of their results uncertain: Are the results meaningful or spurious? Ostroff's (1992) generally very impressive study of the relationship of aggregate teacher satisfaction and school performance illustrates this risk. Ostroff (1992) tested the within-school homogeneity of her predictor variables (e.g., teacher satisfaction) using two formulas for intraclass correlations. All but two of the dependent measures of school performance were global measures, varying exclusively between schools. She naturally did not (indeed, could not) test the within-school homogeneity of these measures. Nor, however, did Ostroff test the within-school homogeneity of the two performance measures that were not global measures: student satisfaction and teacher turnover intentions. Ostroff aggregated these two measures to the school level to assess their relationship with teacher satisfaction. The school-level relationship of teacher satisfaction and teacher turnover intentions was by far the strongest of the observed satisfaction-performance relationships. These results raised the possibility, noted by Ostroff (1992: 969), that the results were spurious—due to aggregation inflation and response-response bias. Had Ostroff performed tests of the predicted homogeneity of *all* of her aggregate measures, much of this ambiguity might have been resolved. (See, however, Ostroff's [1993] discussion of comparing correlations based on individual-level and aggregated data.)

As Ostroff's (1992) study suggests, the above guideline is generally, although not perfectly, upheld with regard to tests of predicted homogeneity prior to aggregation. Figure 1 and our previous discussion suggest that tests of predicted independence and heterogeneity are equally important. Additional research is needed to explore the likelihood and consequences of accepting and rejecting predictions of independence and of heterogeneity.

> 7. *Testing the conformity of the data to the level of theory should build upon, not substitute for, precise specification and explication of the level of theory and careful development of data-collection procedures.*

The data analyses we have described are designed to test a theory's predictions of homogeneity, independence, or heterogeneity. In the absence of sound theory (in which the level of theory is clearly specified and explicated) and data collection based upon such theory, however, the results of these analyses are extremely difficult to interpret. Suppose, for example, that a researcher's data conform to the independent individual level of theory. Should the researcher conclude that this *is* the level of the phenomenon of interest? Perhaps the results instead reflect characteristics of the measurement strategy or the sample. Unless research is clearly exploratory, specification and explication of the level of theory should precede and guide data collection and analysis, not vice-versa. As always, theory (as well as theory-based judgments of the quality of one's measure and sample) must inform the interpretation of data.

Dean and Snell's (1991) ambitious study of the relationship of integrated manufacturing and job design illustrates the importance of clear specification of the level(s) of theory for data interpretation. In the theoretical introduction to their study, Dean and Snell suggested that integrated manufacturing practices within a plant are most likely to be efficacious if job characteristics within the plant are high in complexity, variety, and interdependence. Further, they posited that the relationship between integrated manufacturing practices and job characteristics is moderated by source of organizational inertia (e.g., plant size). The study's implied level of theory is thus the plant.

Data analyses were, however, conducted at the unit level, not the plant level. That is, Dean and Snell (1991) assessed the effects of plant-level integrated manufacturing upon job characteristics within three units (operations, production control, and quality) in each plant. Prior to these analyses, the authors tested the conformity of the manufacturing practices to the plant level and the conformity of the job characteristics data to the unit level using the procedures of James and his colleagues (1984). Thus, their data analyses were statistically appropriate. However, Dean and Snell provided no theoretical rationale for their shift from the plant to the unit level of theory. Nor did they provide a theoretical justification for their assumption of job characteristics' homogeneity within plants (as implied in the theoretical introduction to the study) or within units within a plant (as operationalized in the data analyses). In the absence of a theoretical model predicting homogeneity of job characteristics within units and predicting between-unit (within-plant) differences in job characteristics in response to the same plant-level manufacturing practices, Dean and Snell's (1991) complex research results are difficult to interpret. In short, statistical tests and analyses should build upon, not substitute, for theory.

## MULTIPLE-LEVEL THEORY AND RESEARCH

In 1985, Rousseau issued an eloquent call for greater attention to multiple-level theory and research—theoretical models and empirical studies that are used to simultaneously examine two or more organizational entities (e.g., groups and organizations). Interest in this topic has grown through the publication of Bryk and Raudenbush's (1992) book detailing new statistical procedures for the analysis of multiple-level data.

In the following sections, we explore four multiple-level models: (a) cross-level models, (b) mixed-effects models, (c) mixed-determinants models, and (d) multilevel models.[7] In each case, we highlight the

---

[7] Unfortunately, the terminology used in the organizational literature to describe models spanning multiple levels is inconsistent. We have adopted Rousseau's (1985) definitions of cross-level and multilevel models. Note, however, that others (e.g., Behling, 1978; Dansereau et al., 1984) use these terms somewhat differently.

assumptions of variability that underlie each model. The key point in this section is that careful attention to levels issues facilitates, rather than prohibits, the formulation and testing of such models. Multiple-level theory and research often require scholars to span at least two subdisciplines (e.g., strategy and micro-organizational behavior). Attention to levels issues may help scholars recognize and address both common and differing assumptions within the subdisciplines.

## Cross-level Models

Cross-level theories describe "the relationship between independent and dependent variables at different levels" (Rousseau, 1985: 20). Organizational cross-level theories most commonly describe the impact of group or organizational factors on individual behavior and attitudes.

If a theory predicts that individual group members respond to a characteristic of the group in a comparable or homogeneous fashion, this cross-level theory predicts, in our lexicon, within-group homogeneity. That is, the theory predicts that both the group characteristic (the independent variable) and individual behavior (the dependent variable) are homogeneous within groups. Our previous recommendations for theory development, data collection, and data analysis are completely applicable to this kind of theory.

Some cross-level theories instead predict, implicitly or explicitly, that individual group members respond to a group-level characteristic in a disparate, rather than homogeneous, fashion. Here, the theory's independent variable is homogeneous within groups, but the dependent variable is not; it varies both within and between groups. However, both conceptually and statistically, a homogeneous group-level characteristic cannot predict within-group variance. The predictive power of a homogeneous group-level characteristic is necessarily limited to the percentage of between-group variance in the dependent measure.

Further specification and explication of the level of the theory may overcome limitations of this kind. Particularly helpful may be careful identification of the source of variability in group members' responses to the homogeneous group characteristic. A theorist might, for example, posit that an independent or heterogeneous characteristic of group members moderates the relationship of the group characteristic to individual behavior. Group members for whom the moderator is high respond to the group characteristic in one way, whereas group members for whom the moderator is low respond in a different fashion (see Bedeian et al., 1989; Bryk & Raudenbush, 1992; Tate, 1985). The interaction term expressing the combined effects of the homogeneous group characteristic and the heterogeneous or independent individual characteristic varies both within and between groups. Accordingly, it can predict within-group variability in the dependent measure. The theoretical clarity and explanatory power of the theory are thus enhanced.

Recent empirical examples of this approach include Klein and Hall's

(1988) research in which employee values are hypothesized to moderate the effects that employee ownership has on employee attitudes; Oldham, Kulik, and Stepina's (1991) research in which employee skills and job characteristics are hypothesized to moderate the effects of environmental characteristics on employee reactions; and Chatman's (1991) person-organization fit research in which employee values are, effectively, hypothesized to moderate the effects that organizational values have on employees' attitudes and behaviors.

Studies of this kind require precise specification of their moderated cross-level hypotheses. Such precision is rare, we have found, in purely theoretical multilevel models. Consider Woodman, Sawyer, and Griffin's (1993) interactionist, multilevel theoretical model of organizational creativity. One of their key propositions (Woodman et al., 1993: 310) states that:

> The creative performance of individuals in a complex social setting is a function of salient individual characteristics, social influences that enhance or constrain individual creativity (e.g., group norms), and contextual influences that enhance or constrain individual creativity (e.g., organizational reward structure).

Do individual characteristics thus moderate the impact of social and contextual forces? This proposition and others designed to amplify it are ambiguous. Greater specificity in addressing levels issues would have augmented the clarity and testability of this complex, integrative model.

Despite the difficulty of articulating precise cross-level moderated theoretical models, data collection and analyses to test these models are relatively straightforward. Here, the level of each construct (rather than the level of the theory as a whole) guides data collection and analysis. For example, measurement of the independent variable is designed to ensure or test its homogeneity, measurement of the dependent variable is designed to ensure or test its independence, and measurement of the moderator is designed to ensure or test its independence or heterogeneity (depending upon the level of the construct).

**Mixed-Effects Models**

Mixed-effects theories suggest that a single organizational intervention may have effects at multiple levels of the organization. For example, an organization's shift from a piece rate to a group-based incentive system may engender changes in (a) the image of the organization to outside observers, (b) the dynamics of intergroup cooperation within the organization, and (c) employee job satisfaction, as a function of individual need for affiliation and need for achievement. Again, the approach to levels issues that we have outlined above may suggest helpful guidelines for theory development and testing at each level of the theory. For example, the approach clarifies the nature of each hypothesis. The first hypothesis

represents a homogeneous level of theory (i.e., homogeneous images of the organization among observers of each organization). The second also represents a homogeneous level of theory (i.e., homogeneous group dynamics within organizations characterized by homogeneous incentive plans). The third hypothesis represents a cross-level, moderated level of theory (i.e., the effects of an incentive plan on individual satisfaction vary as a function of individual characteristics). Explicit recognition of these predictions may enhance further development and testing of such a mixed-level theory.

## Mixed-Determinants Models

Mixed-determinants models suggest that predictors at a variety of levels may influence a criterion of interest. For example, market characteristics (e.g., the availability of jobs), group characteristics (e.g., diversity within the group), and individual characteristics (e.g., job satisfaction) have all been hypothesized to influence turnover (e.g., Hulin, Roznowski, & Hachiya, 1985). As mentioned previously, careful specification and explication of the level(s) of such a theory may clarify how best to develop and test such theory. We explore three possibilities.

First, specification and explication of the level of the theory may suggest that the relationship among the measures is primarily a function of individual perceptions; perhaps an individual's decision to leave an organization is a function of his or her *perceptions* of (a) the current job market, (b) the extent to which he or she fits into his or her work groups, and (c) his or her job characteristics. In such a case, the theory is perhaps best conceptualized and tested as an independent, individual-level theory.

Second, specification and explication of the level of the theory may suggest that, in fact, a moderated cross-level theory (as described above) best captures the phenomenon of interest. Perhaps, for example, individual turnover decisions are influenced by the *interaction* of a homogeneous organizational characteristic (e.g., the organization's policy for promotion from within) *and* a heterogeneous individual within the group characteristic (e.g., relative expertise). In this case, as above, the interaction term, like the dependent variable, varies both within and between groups.

Finally, a researcher may instead seek to examine the additive effects on individual turnover of (a) a homogeneous organization-level characteristic (e.g., organizational culture), (b) a heterogeneous characteristic of the individual within the organization (e.g., an individual's relative tenure within the organization), and (c) an individual characteristic independent of organizations (e.g., individual disposition). Here, the issues parallel those described in our discussion of cross-level theory: Both theoretically and statistically, a variable that is homogeneous within organizations cannot predict variance within organizations. A variable that

is heterogeneous within organizations cannot predict variance between organizations.

The complexity of such research is compounded, however, insofar as the predictors may be intercorrelated (perhaps as a result of common measurement error), making identification of "pure" homogeneous, heterogeneous, or independent effects impossible.[8] Interpretation of such analyses is thus difficult, but may be aided through (a) the careful specification of the levels of the theory's constructs, (b) the use of multiple measures of the theory's constructs, and (c) the use of multiple statistical indicators to test the predicted variability of the measures.

## Multilevel Models

Multilevel models "specify patterns of relationships replicated across levels of analysis" (Rousseau, 1985: 22). Here, the relationship between the independent and dependent variables is generalizable across organizational entities. For example, Staw, Sandelands, and Dutton (1981) hypothesized that individuals, groups, and organizations each may respond to threats with rigid, overlearned behaviors that are often inappropriate for the current situation. Within this theory, individuals, groups, and organizations each are conceptualized as homogeneous and independent of higher level units. Each of the three basic hypotheses stems from the same multilevel theory and, of course, each may be true. Multilevel theories are thus uniquely powerful and parsimonious. An analysis of the assumptions of variability underlying each hypothesis (and target entity) clarifies the theory and suggests ideal data-collection and analysis strategies for each hypothesis.

## Implications for Multiple-Level Theory and Research

The previous discussion suggests the following guideline.

> *8. When the assumptions of variability are comparable for both the independent and dependent variables, that is, when both the independent and dependent variables are conceptualized to vary solely between groups (homogeneity), or solely within groups (heterogeneity), or both within and between groups (independence or an interaction effect), the precision and rigor of multiple-level theories, and tests of such theories, are enhanced.*

The previous discussion highlights the fundamental observation that both theoretically and statistically, constructs or variables that are

---

[8] Perfectly homogeneous predictors that vary only between groups will be uncorrelated with perfectly heterogeneous predictors that vary only within groups. However, both may be correlated with an independent predictor that varies both between and within groups. Further, if the homogeneous and heterogeneous predictors are not, in fact, completely homogeneous and heterogeneous, respectively, then each of the three predictors may, in fact, be correlated with the other two to some extent.

homogeneous within groups can predict only between-group variability and constructs or variables that are heterogeneous within groups can predict only within-group variability. This observation suggests that the explanatory power of a theory is enhanced when the assumptions of variability underlying both the independent and dependent variables are comparable.

This, as we have shown, by no means obviates the development and testing of multiple-level theories. Cross-level theories easily conform to this guideline; both homogeneous cross-level models and cross-level models that specify moderators readily meet this standard, as we have shown. So, too, do mixed-effects models and multilevel models. Potentially more problematic are mixed-determinants models, although in many cases these, too, may conform to the guideline we suggest.

Given the complexity and subtlety of the issues inherent in multiple-level theory and research, particularly careful theory development, data collection, and analysis are required during the development and testing of these models. New statistical procedures facilitate the statistical analysis of multiple-level data, but in no way do they obviate questions of theory and data collection. Bryk and Raudenbush's (1992) statistical procedures may, for example, be used to assess the correlates of the slopes and intercepts of regressions performed within organizations. The numbers are relatively easy to obtain; making sense of them is harder. Theory, in which levels assumptions are precisely specified, is critical.[9]

## SUMMARY AND CONCLUSION

The level of a theory defines the properties of a theory's constructs and the relationship between the constructs: Are the theory's constructs to be conceptualized as homogeneous, independent, or heterogeneous? Is the relationship of the constructs presumed to be a function of between-group differences, between-individual differences, or within-group differences? These questions underlie and unite theories across the entities, topics, and subdisciplines of organizational inquiry. The failure to answer these questions renders theories imprecise, open to misinterpretation, and ripe for controversy.

Too often, levels issues are considered the domain of statisticians. We have tried to show that they are not; first and foremost, levels issues are the domain of theorists. Greater attention to levels issues will increase the clarity, testability, comprehensiveness, and creativity of organizational theories.

Levels issues set the stage for data collection and data analysis. Two alternative strategies are commonly prescribed to address levels issues

---

[9] It is important to note that Bryk and Raudenbush's (1992) procedures are not designed to test the conformity of data to the level of theory. Hence, tests of the conformity of data to the level of theory should thus ideally precede hierarchical linear analysis.

during data collection: ensure the fit of the data to the level of theory or test the fit of the data to the level of theory. The certainty of the level of theory should, we suggest, determine which strategy a researcher should adopt.

Researchers are commonly advised to align their data analyses with the level of theory. This alignment alone will not prevent researchers from inadvertently drawing unfounded conclusions from their data, however. If the conformity of the data to the level of the theory is not ensured, we argue, it should be tested.

The development and testing of multiple-level theories magnifies these concerns. The strength of multiple-level theories is their complexity; they do not oversimplify organizational realities (Burstein, 1980). Specifying the level of each construct within a multiple-level theory aids theorists and researchers in managing such complexity. So, too, do efforts to align the assumptions of variability underlying the independent and dependent constructs.

Can any part of this discussion illuminate the mysteries of the American electoral college to which we alluded in the opening paragraph? Perhaps a little. Theory first, we have argued. What is the theory of the electoral college? The theory is written in the U.S. Constitution. Preserve and equalize the power of the states, the founding fathers urged. This is what the electoral college does. It preserves and equalizes—a bit—the power of the states. The electoral college gives the largest states less, and the smallest states more, influence than prescribed by the relative size of their respective voting populations. (States have as many electoral votes as they have U.S. Senators and Representatives. Thus, California—the most populous state—has 54 electoral college votes to Alaska's—the least populous state's—3 votes. This 18:1 ratio is much smaller than the ratio of the states' respective voting-age populations: 22 million to 378,000 or 58:1.) Further, states are inviolate; they are recognized and honored in the Constitution. Congressional districts are not. They are subject to political shenanigans and whims. Theory first? In the absence of a compelling opposing theory, keep the electoral college and preserve the state-, not Congressional district-, level of theory and analysis.

Would that we were all theoreticians of the caliber of the founding fathers.

## REFERENCES

Aldrich, H. E. 1979. *Organizations and environments.* Englewood Cliffs, NJ: Prentice Hall.

Ashford, S. J., & Tsui, A. S. 1991. Self-regulation for managerial effectiveness: The role of active feedback seeking. *Academy of Management Journal,* 34: 251–280.

Barley, S. R., & Knight, D. B. 1992. Toward a cultural theory of stress complaints. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior,* vol. 14: 1–48. Greenwich, CT: JAI Press.

Bedeian, A. G., Kemery, E. R., & Mossholder, K. W. 1989. Testing for cross-level interactions: An empirical demonstration. *Behavioral Science,* 34: 70–78.

Behling, O. 1978. Some problems in the philosophy of science of organizations. *Academy of Management Review*, 3: 193–201.

Boyd, L. H., & Iversen, G. R. 1979. *Contextual analysis: Concepts and statistical techniques.* Belmont, CA: Wadsworth.

Bryk, A. S., & Raudenbush, S. W. 1992. *Hierarchical linear models.* Newbury Park, CA: Sage.

Burstein, L. 1980. The analysis of multilevel data in educational research and evaluation. In D. C. Berliner (Ed.), *Review of research in education*, vol. 8: 158–233. Washington, DC: American Educational Research Association.

Campion, M. A. 1988. Interdisciplinary approaches to job design: A constructive replication with extensions. *Journal of Applied Psychology*, 73: 467–481.

Cappelli, P., & Sherer, P. D. 1991. The missing role of context in OB: The need for a meso-level approach. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 13: 55–110. Greenwich, CT: JAI Press.

Chatman, J. A. 1991. Matching people and organizations: Selection and socialization in public accounting firms. *Administrative Science Quarterly*, 36: 459–484.

Chen, P. Y., & Spector, P. E. 1991. Negative affectivity as the underlying cause of correlations between stressors and strain. *Journal of Applied Psychology*, 76: 398–407.

Dansereau, F., Alutto, J. A., & Yammarino, F. J. 1984. *Theory testing in organizational behavior: The varient approach.* Englewood Cliffs, NJ: Prentice Hall.

Dansereau, F., Graen, G., & Haga, W. J. 1975. A vertical dyad linkage approach to leadership within formal organizations: A longitudinal investigation of the role making process. *Organizational Behavior and Human Performance*, 13: 46–78.

Dean, J. W., Jr., & Snell, S. A. 1991. Integrated manufacturing and job design: Moderating effects of organizational inertia. *Academy of Management Journal*, 34: 776–804.

Firebaugh, G. 1978. A rule for inferring individual-level relationships from aggregate data. *American Sociological Review*, 43: 557–572.

Firebaugh, G. 1980. Groups as contexts and frogponds. In K. H. Roberts & L. Burstein (Eds.), *Issues in aggregation*: 43–52. San Francisco: Jossey-Bass.

Galtung, J. 1967. *Theories and methods of social research.* New York: Columbia University Press.

George, J. M. 1990. Personality, affect, and behavior in groups. *Journal of Applied Psychology*, 75: 107–116.

Gersick, C. J. G. 1988. Time and transition in work teams: Toward a new model of group development. *Academy of Management Journal*, 31: 9–41.

Gersick, C. J. G. 1989. Marking time: Predictable transitions in task groups. *Academy of Management Journal*, 32: 274–309.

Gersick, C. J. G. 1991. Revolutionary change theories: A multilevel exploration of the punctuated equilibrium paradigm. *Academy of Management Review*, 16: 11–36.

Glick, W. H. 1985. Conceptualizing and measuring organizational and psychological climate: Pitfalls in multilevel research. *Academy of Management Review*, 10: 601–616.

Glick, W. H. 1988. Organizations are not central tendencies: Shadowboxing in the dark, Round 2. *Academy of Management Review*, 13: 133–137.

Glick, W. H., & Roberts, K. 1984. Hypothesized interdependence, assumed independence. *Academy of Management Review*, 9: 722–735.

Goodman, P. S. 1987. Understanding groups in organizations. In L. L. Cummings & B. M.

Staw (Eds.), *Research in organizational behavior,* vol. 9: 121–173. Greenwich, CT: JAI Press.

Govindarajan, V., & Fisher, J. 1990. Strategy, control systems, and resource sharing: Effects on business-unit performance. *Academy of Management Journal,* 33: 259–285.

Graen, G., & Cashman, J. F. 1975. A role making model of leadership in formal organizations: A developmental approach. In J. G. Hunt & L. L. Larson (Eds.), *Leadership frontiers.* Kent, OH: Kent State University Press.

Gregersen, H. B., & Black, J. S. 1992. Antecedents to commitment to a parent company and a foreign operation. *Academy of Management Journal,* 35: 65–90.

Hall, R. J. 1988. *A level of analysis approach to construct validity and relationship issues in perceived climate and job satisfaction measures.* Unpublished doctoral dissertation, University of Maryland, College Park.

Haney, W. 1980. Units and levels of analysis in large-scale evaluation. In K. H. Roberts & L. Burstein (Eds.), *Issues in aggregation:* 1–16. San Francisco: Jossey-Bass.

House, R. J., & Rousseau, D. 1992. On the bifurcation of OB or if it ain't meso it ain't OB. Unpublished manuscript, The Wharton School, The University of Pennsylvania, Philadelphia.

Hulin, C. L., Roznowski, M., & Hachiya, T. 1985. Alternative opportunities and withdrawal decisions: Empirical and theoretical discrepancies and an integration. *Psychological Bulletin,* 97: 233–250.

Jackson, S. E., Brett, J. F., Sessa, V. I., Cooper, D. M., Julin, J. A., & Peyronnin, K. 1991. Some differences make a difference: Individual dissimilarity and group heterogeneity as correlates of recruitment, promotions, and turnover. *Journal of Applied Psychology,* 76: 675–689.

James, L. R. 1982. Aggregation bias in estimates of perceptual agreement. *Journal of Applied Psychology,* 67: 219–229.

James, L. R., Demaree, R. J., & Wolf, G. 1984. Estimating within-group interrater reliability with and without response bias. *Journal of Applied Psychology,* 69: 85–98.

James, L. R., Demaree, R. J., & Wolf, G. 1992. $r_{wg}$: An assessment of within-group interrater agreement. *Journal of Applied Psychology,* 78: 306–309.

James, L. R., Joyce, W. F., & Slocum, J. W., Jr. 1988. Comment: Organizations do not cognize. *Academy of Management Review,* 9: 722–735.

Kenny, D. A., & La Voie, L. 1985. Separating individual and group effects. *Journal of Personality and Social Psychology,* 48: 339–348.

Klein, K. J. 1987. Employee stock ownership and employee attitudes: A test of three models. *Journal of Applied Psychology Monograph,* 72: 319–332.

Klein, K. J., & Hall, R. J. 1988. Correlates of employee satisfaction with stock ownership: Who likes an ESOP most? *Journal of Applied Psychology,* 73: 630–638.

Klein, K. J., Ralls, S. R., & Douglas, C. In press. Power and participation in the workplace: Lessons for empowerment theory, research, and practice. In J. Rappaport & E. Seidman (Eds.), *Handbook of community psychology.* New York: Plenum.

Kozlowski, S. W. J., & Hattrup, K. 1992. A disagreement about within-group agreement: Disentangling issues of consistency versus consensus. *Journal of Applied Psychology,* 77: 161–167.

Kozlowski, S. W., & Kirsch, M. P. 1987. The systematic distortion hypothesis, halo, and accuracy: An individual-level analysis. *Journal of Applied Psychology,* 72: 252–261.

Lawless, M. W., & Price, L. L. 1992. An agency perspective on new technology champions. *Organizational Science,* 3: 342–355.

Lincoln, J. R., & Zeitz, G. 1980. Organizational properties from aggregate data: Separating individual and structural effects. *American Sociological Review,* 45: 391–408.

Markham, S. E. 1988. Pay-for-performance dilemma revisited: Empirical example of the importance of group effects. *Journal of Applied Psychology,* 73: 172–180.

Maxwell, S. E., Camp, C. J., & Arvey, R. D. 1981. Measures of strength of association: A comparative examination. *Journal of Applied Psychology,* 66: 525–534.

Michel, J. G., & Hambrick, D. C. 1992. Diversification posture and top management team characteristics. *Academy of Management Journal,* 35: 9–37.

Mossholder, K. W., & Bedeian, A. G. 1983. Cross-level inference and organizational research: Perspectives on interpretation and application. *Academy of Management Review,* 8: 547–558.

Nachman, S., Dansereau, F., & Naughton, T. J. 1985. Levels of analysis and the vertical dyad linkage approach to leadership. *Psychological Reports,* 57: 661–662.

Oldham, G. R., Kulik, C. T., & Stepina, L. P. 1991. Physical environments and employee reactions: Effects of stimulus-screening skills and job complexity. *Academy of Management Journal,* 34: 929–938.

Ostroff, C. 1992. The relationship between satisfaction, attitudes and performance: An organizational level analysis. *Journal of Applied Psychology,* 77: 963–974.

Ostroff, C. 1993. Comparing correlations based on individual-level and aggregated data. *Journal of Applied Psychology,* 78: 569–582.

Ostroff, C., & Ford, J. K. 1989. Assessing training needs: Critical levels of analysis. In I. L. Goldstein & Associates (Eds.), *Training and development in organizations:* 25–62. San Francisco: Jossey-Bass.

Pfeffer, J. 1977. The ambiguity of leadership. *Academy of Management Review,* 2: 104–112.

Pfeffer, J. 1982. *Organizations and organization theory.* Cambridge, MA: Ballinger.

Podsakoff, P. M., & Schriescheim, C. A. 1985. Field studies of French and Raven's bases of power: Critique, reanalysis, and suggestions for future research. *Psychological Bulletin,* 97: 387–411.

Porter, M. E. 1980. *Competitive strategy.* New York: Free Press.

Porter, M. E. 1985. *Competitive advantage.* New York: Free Press.

Rafaeli, A., & Sutton, R. I. 1991. Emotional contrast strategies as means of social influence: Lessons from criminal interrogators and bill collectors. *Academy of Management Journal,* 34: 749–775.

Robinson, W. S. 1950. Ecological correlations and the behavior of individuals. *American Sociological Review,* 15: 351–357.

Rousseau, D. 1983. Technology in organizations: A constructive review and analytical framework. In S. E. Seashore, E. E. Lawler, III, & C. Cammann (Eds.), *Assessing organizational change:* 229–253. New York: John Wiley.

Rousseau, D. 1985. Issues of level in organizational research: Multilevel and cross-level perspectives. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior,* vol. 7: 1–37. Greenwich, CT: JAI Press.

Salancik, G. R., & Pfeffer, J. 1978. A social information processing approach to job attitudes and task design. *Administrative Science Quarterly,* 23: 224–253.

Schneider, B. 1987. The people make the place. *Personnel Psychology,* 40: 437–453.

Schneider, B. 1990. The climate for service: An application of the climate construct. In B.

Schneider (Ed.), *Organizational climate and culture:* 393–412. San Francisco: Jossey-Bass.

Schneider, B., & Reichers, A. E. 1983. On the etiology of climates. *Personnel Psychology,* 36: 19–39.

Staw, B. M., Bell, N. E., & Clausen, J. A. 1986. The dispositional approach to job attitudes: A lifetime longitudinal test. *Administrative Science Quarterly,* 23: 224–253.

Staw, B. M., Sandelands, L. E., & Dutton, J. E. 1981. Threat-rigidity effects on organizational behavior: A multilevel analysis. *Administrative Science Quarterly,* 26: 501–524.

Tate, R. L. 1985. Cross-level interaction in multilevel models. *The Journal of Applied Behavioral Science,* vol. 21: 221–234.

Thomas, J. G., & Griffin, R. W. 1989. The power of social information in the workplace. *Organizational Dynamics,* 18(2): 63–75.

Tsui, A. S., & O'Reilly, C. A., III. 1989. Beyond simple demographic effects: The importance of relational demography in superior-subordinate dyads. *Academy of Management Journal,* 32: 402–423.

Wagner, W. G., Pfeffer, J., & O'Reilly, C. A., III. 1984. Organizational demography and turnover in top management groups. *Administrative Science Quarterly,* 29: 74–92.

Wiersema, M. F., & Bantel, K. A. 1992. Top management team demography and corporate strategic change. *Academy of Management Journal,* 35: 91–121.

Whitely, W., Dougherty, T. W., & Dreher, G. F. 1991. Relationship of career mentoring and socioeconomic origin to managers' and professionals' early career progress. *Academy of Management Journal,* 34: 331–351.

Will, G. R. 1992. Balkanizing democracy. *Washington Post,* June 21: C7.

Woodman, R. W., Sawyer, J. E., & Griffin, R. W. 1993. Toward a theory of organizational creativity. *Academy of Management Review,* 18: 293–321.

Yammarino, F. J., & Markham, S. E. 1992. On the application of within and between analysis: Are absence and affect really group-based phenomena? *Journal of Applied Psychology,* 77: 168–176.

Yammarino, F. J., & Bass, B. M. 1991. Person and situation views of leadership: A multiple levels of analysis approach. *Leadership Quarterly,* 2: 121–139.

Yammarino, F. J., & Naughton, T. J. 1988. Time spent communicating: A multiple levels of analysis approach. *Human Relations,* 41: 655–676.

**Katherine J. Klein** received her Ph.D. from the University of Texas. She is an associate professor of psychology at the University of Maryland. Her current research interests include level-of-analysis issues, the dynamics of computerized technology implementation, and the determinants and consequences of voluntary part-time work.

**Fred Dansereau** received his Ph.D. from the University of Illinois. He is an associate professor of organization and human resources at the State University of New York at Buffalo. His current research interests include multiple-level theories, leadership, and motivation.

**Rosalie J. Hall** received her Ph.D. from the University of Maryland. She is an assistant professor at the University of Akron. Her current research interests include organizational socialization and training and level-of-analysis issues.