

## **Putting Typologies to Work: Concept-Formation, Measurement, and Analytic Rigor**

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### **Abstract**

Typologies are a well-established analytic tool in the social sciences. Working with typologies contributes decisively to forming concepts, exploring dimensionality, establishing measurement categories, and grouping cases. Yet some critics—basing their arguments on what they believe to be the relevant norms of quantitative measurement—consider typologies to be an old-fashioned and unsophisticated mode of analysis. We show that this critique is methodologically unsound. The use of typologies can and should proceed according to high standards of rigor. We offer a basic template for constructing typologies and show how they can be “put to work” in refining concepts and measurement, examining underlying dimensions, and organizing explanatory claims and causal inference. The conclusion presents guidelines for careful work with typologies.

## 1. Introduction

Typologies—defined as organized systems of types<sup>1</sup>—are a well-established analytic tool in the social sciences. They make crucial contributions to diverse analytic tasks: forming and refining concepts, drawing out underlying dimensions, creating categories for classification and measurement, and sorting cases.

Older, well-known typologies include Weber's (1978) distinction among traditional, charismatic, and rational authority; Dahl's (1971) analysis of polyarchies, competitive oligarchies, inclusive hegemonies, and closed hegemonies; Krasner's (1977) discussion of makers, breakers, and takers in the formation of international regimes; and Carmines and Stimson's (1980) distinctions among non-issue, easy-issue, hard-issue, and constrained-issue voters.

Recent typologies play an important role across diverse areas of research. This includes work focused on union-government interactions (Murillo 2000); state responses to women's movements (Mazur 2001); national political economies (Hall and Soskice 2001); post-communist regimes (McFaul 2002); social policy (Mares 2003); time horizons in patterns of causation (Pierson 2003); transnational coalitions (Tarrow 2005); state economic intervention (Levy 2006); political mobilization (Dalton 2006); national unification (Ziblatt 2006); personalistic dictatorships (Fish 2007); contentious politics (Tilly and Tarrow 2007); vote buying (Nichter 2008); and types of nation-states (Miller 2009). An illustrative list of over 100 typologies, covering nine subfields of political science, is presented in the Appendix (online).<sup>2</sup>

This article develops two arguments, the first addressing skepticism about typologies. Some critics—basing their position on what they understand to be the norms of quantitative measurement—consider typologies and the categorical variables from which they are constructed to be old-fashioned and unsophisticated. We show that this critique is methodologically unsound and is based on a misleading comparison of qualitative and quantitative approaches. This perspective underestimates the challenges of conceptualization and measurement in quantitative work, and it fails to recognize that quantitative analysis is built in part on qualitative foundations. The critique also fails to consider the potential rigor and conceptual power of qualitative analysis, and it likewise does not acknowledge that typologies can provide new insight into underlying dimensions, thereby strengthening both quantitative and qualitative research.

A second set of arguments examines the contribution of typologies to rigorous conceptualization and measurement. We offer a basic template for careful work with typologies that

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<sup>1</sup> A *typology* is thus a coordinated set of categories that establishes theoretically important distinctions. A *type* is understood as an analytic category which may be (but is not necessarily) situated in, and defined by, a typology.

<sup>2</sup> See David Collier's website [http://polisci.berkeley.edu/people/faculty/person\\_detail.php?person=230](http://polisci.berkeley.edu/people/faculty/person_detail.php?person=230).

can advance such rigor, drawing on the ideas about categorical variables and measurement presented in the first part of the article. Our discussion examines errors and missed opportunities that can arise if the template is not followed and explore how typologies can be “put to work” in refining concepts and measurement, and also in organizing explanatory claims and causal inference. The conclusion presents guidelines for creating and refining typologies that are both conceptually innovative and rigorous.

Before we proceed with the discussion, key distinctions should be underscored.

(a) A central focus here is on *multidimensional* typologies, which deliberately capture multiple dimensions and are constructed by cross-tabulating two or more variables. *Unidimensional* typologies organized around a single variable—for example, Krasner’s makers, breakers, and takers in regime formation noted above—also receive some attention, and many norms for careful work with typologies apply to both.

(b) Given the concern with conceptualization and measurement, our attention centers on what may be called *conceptual* typologies.<sup>3</sup> These may also be termed descriptive typologies which establish a “property space” (Barton 1955), thereby distinguishing them from *explanatory* typologies (Elman 2005; Bennett and Elman 2006). In a conceptual typology, the cell types are defined by their position vis-à-vis the rows and columns. In an explanatory typology, the cells types are the outcomes to be explained, and the variables that establish the rows and columns are hypothesized (or established) explanations.

(c) It is useful to distinguish *classificatory* typologies, which place the names of cases—for example, countries, wars, or elections—in the corresponding cells. This sorting of cases may occur with either a conceptual or an explanatory typology. Finally, *numerical cross-tabulations* are simply classificatory typologies in which the cells contain numerical counts of cases and often percentages, rather than cases identified by names.

Other definitions and distinctions relevant to this discussion are presented in the annotation at the end of this article.<sup>4</sup>

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<sup>3</sup> Earlier statements on conceptual typologies include Barton (1955), McKinney (1966), Stinchcombe (1968), and Tiryakian (1968). More recent discussions are offered in a number of sources cited below, as well as in Bailey (1994).

<sup>4</sup> The following further definitions and distinctions are relevant here.

i. *Measurement* is the process of making empirical observations that operationalized a given concept. In some definitions and certainly in this article, this includes—in addition to quantitative measurement—the scoring of cases based on categorical variables.

ii. An *indicator* is a specific procedure for measurement.

iii. A *variable* is an organized system of attributes.

iv. A *scale* consists of the numbers or other symbols that designate the attributes of a variable.

v. *Measurement scale* is another term for a scale.

vi. *Levels of measurement* summarize, among other things, the amount of information contained in a particular scale.

## 2. Criticisms of Categorical Variables and Typologies

Typologies, and the categorical variables on which they are often constructed, have been subject to sharp criticism. Both these critiques and our response hinge in part on issues of scale types and definitions of measurement. We therefore build on and extend prior treatments of these topics.

### 2.1. Point of Departure: Scale Types and Measurement

An important point of reference here is the familiar framework of nominal, ordinal, interval and ratio scale types.<sup>5</sup> We add two further types: the *partial order*, which has order among some but not all the categories<sup>6</sup>; and the *absolute* scale, which is a “count” of individuals or entities that fall in a given category—for example, the number of voters in different cities.<sup>7</sup> These types are summarized in Table 1.

Controversies about scale types focus centrally on four alternative criteria for evaluating desirability and utility. First, traditional distinctions between *lower and higher levels of measure-*

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vii. A *concept* is an abstract idea that offers a point of view for understanding some aspect of our experience; an idea of a phenomenon formed by combining its attributes; and a mental image that, when operationalized, helps to organize the data analysis. These perspectives may seem quite different, but elements of all three routinely enter into work with concepts.

viii. A *term* is a word that designates a concept.

ix. The *kind hierarchy* is a basic feature of a conceptual system. Many concepts are understood as “a kind of” in relation to other concepts. This is a basic characteristic of conceptual structure—both in social science and in ordinary usage—and a central contribution of typologies is to make explicit and refine kind hierarchies.

x. *Qualitative v. quantitative* is a common heuristic distinction, usefully understood in terms of four overlapping criteria: level of measurement, a large versus small N, whether statistical tests are employed, and whether the analysis is thin (more limited amount of information on a larger number of cases) or thick (detailed information about fewer cases). As noted at the beginning of Section 2.2 below, in differentiating qualitative and quantitative work, some scholars focus on the distinction between nominal scales and all higher levels of measurement, and some on nominal and ordinal together, versus the remaining higher levels of measurement.

<sup>5</sup> On the wide influence of this framework, see (Michell 1997: 360). Some analysts—even in recent publications have accepted these scale types without commentary; others have criticized them sharply. See, for example, Marks (1974: chap. 7); Borgatta and Bohrnstedt (1980); Duncan (1984: chap. 4); Michell (1990: chap. 1); Narens (2002: 50–60); Teghtsoonian (2002); Shively (1980, 2009); and Gill (2006: 330–34).

<sup>6</sup> Davey and Priestley (2002: chap. 1). For a political science discussion of scales located between the nominal and ordinal levels, see Brady and Ansolabehere (1989).

<sup>7</sup> An absolute scale should not be confused with the absolute measure of temperature developed by Kelvin, which incorporates a true or absolute zero that corresponds to the absence of heat. In fact, a Kelvin scale is a ratio scale.

**Table 1**  
**Overview of Scale Types**

Scale Type	1. Level of Information	2. Permissible Statistics <sup>1</sup>	3. Corresponding Definition of Measurement <sup>1</sup>
<b>Nominal</b>	Equal/not equal <sup>2</sup>	Cell count, mode, contingency correlation	Assignment of numerals based on rules
<b>Semi-Ordered</b>	Order among some but not all categories	Cell count, mode, contingency correlation	
<b>Ordinal</b>	Order among all categories	Median, percentiles	
<b>Interval</b>	Equal intervals	Mean, standard deviation, correlation and regression	Measurement as quantification
<b>Ratio</b>	Meaningful zero		
<b>Absolute</b>	Numerical count of entities in a given category	Mean, standard deviation, correlation, some forms of regression <sup>3</sup>	

<sup>1</sup>The differences among scale types presented in Columns 2 and 3 are disputed, as discussed in the text. Those in Column 1 are also debated, and the idea of “scaling up” between these levels is an important theme in research on measurement. However, for present purposes the distinctions in Column 1 are not treated as problematic.

<sup>2</sup>The categories are thus collectively exhaustive and mutually exclusive.

<sup>3</sup>Because an absolute scale consists entirely of integers (i.e., whole numbers), according to a strict understanding of permissible statistics only certain forms of regression analysis are appropriate.

*ment* are anchored in the idea that higher-level scales contain more information, which is formalized in the idea of mathematical group structure.<sup>8</sup> This perspective provides valuable distinctions, yet closer examination reveals that the relationship between scale types is complex. For example, the meaning of higher levels of measurement depends on lower levels, as we will show below.

<sup>8</sup> The mathematical group structure entails the transformations that can be performed on each scale type without distorting the information it contains (Marks 1974: 245–49; Narens 2002: 46–50). With the absolute scale, the information in the scale is lost if any transformation is performed—for example, multiplication by a constant. Nominal scales, by contrast, can be subjected to the widest range of mathematical transformations. Correspondingly, absolute scales are considered the highest level of measurement and nominal scales the lowest.

A second criterion is *appropriate statistics*—i.e., the statistical procedures that can and should be employed with each scale type. Higher levels of measurement traditionally were seen as amenable to a greater range of procedures, which led many scholars to consider categorical variables less useful. However, some of these earlier distinctions have broken down, and complex forms of statistical analysis are now routinely applied to nominal scales.

Third, alternative *definitions of measurement* are crucial in evaluating scale types. A classic and highly influential definition, dating back at least to the physicist N. R. Campbell (1920), treats measurement as the quantification of physical properties. Measurement in this sense can be achieved with a yardstick (Michell 1999: 121). In this framework, the definition corresponds to the standard understanding of a ratio scale, thus privileging order, *plus* a unit of measurement, *plus* a real zero.

Alternatively, measurement has been defined as “the assignment of numerals to objects or events according to rules.”<sup>9</sup> Such assignment corresponds to standard practice with higher levels of measurement, where scores are expressed numerically and provide a “metric.” According to this alternative definition, if each category in a nominal or ordinal scale is designated with a numeral, this also constitutes measurement. Relatedly, conceptually meaningful terms (i.e., verbal labels) are routinely employed in typologies to designate the categories and correspondingly, this may also be understood as measurement. In our view, the idea of measurement should not be reified, and the central issue is the kind of information contained in a scale and how well it serves the goals of the researcher.

A fourth criterion concerns the cutpoint between qualitative and quantitative measurement. Some analysts (Vogt 2005: 256) consider a scale qualitative if it is organized at a nominal level and quantitative if the level is ordinal or higher—thereby privileging whether order is present. By contrast, others (e.g., Porkess 1991: 179; Young 1981: 357; Duncan 1984: 126, 135–6) treat ordinal versus interval as the key distinction, thus focusing instead on whether categories, as opposed to a unit of measurement, are employed. An even more demanding cut point—strongly embraced by some social scientists—derives from the tradition of Campbell and requires both a unit of measurement *and* a real zero.

As we will see, contention over these criteria is central to debates on typologies.

## 2.2. The Critiques

Both recent commentaries and an older generation of methodologists have sharply criticized categorical variables and typologies.<sup>10</sup> Yet many of these critiques reflect an outdated understanding of scale types. We review these arguments to bring into focus issues that must be confronted so as to advance the understanding of typologies.

Gill’s (2006: 334) mathematics textbook for political scientists states that nominal scales have the least “desirability” among levels of measurement. Similarly, the *Encyclopedia of Measurement and Statistics* (Salkind 2007) adopts the fairly standard line that the ratio level of measurement “provides the richest information about the traits it measures” (826); among

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<sup>9</sup> Stevens (1946: 677, 1975: 46–47). See also Narens (2002: 46–50).

<sup>10</sup>Although these critiques have been advanced by quantitative methodologists, many methodologists in the quantitative tradition do not hold these views.

the scale types, “nominal is considered the ‘weakest’ or least precise level of measurement...and one should use a more precise level of measurement whenever possible” (683). Teghtsoonian (2002: 15106) asserts that “contemporary theorists find the nominal scale of little interest because it imposes no ordering on the measured entities.”

Some of the earlier critiques by prominent scholars are exceptionally harsh. In his seminal article, Stevens argues that nominal scales are “primitive” (1946: 679). Blalock maintains that “one of the most important roadblocks to successful conceptualization in the social sciences has been our tendency to . . . rely very heavily on categorical data and discussions of named categories... (1982: 109). He argues that scholars who work with nominal scales suffer from “conceptual laziness,” and he expresses dismay that so much attention has been given to “categorical data and classificatory schemes” (1982: 110). Young is similarly harsh in the opening sentence of his Presidential Address for the Psychometric Society, published as the lead article in *Psychometrika* (1981: 357): “Perhaps one of the main impediments to rapid progress in the development of the social, behavioral, and biological sciences is the omnipresence of qualitative data,” by which he means data involving nominal or ordinal scales. He thus groups nominal and ordinal together.

Duncan, a pioneer in the development of path analysis and structural equation modeling, likewise rejects nominal and ordinal scales on the ground that they are not a form of measurement, given that “the purpose of measurement is to quantify” and the goal is to establish “degrees” (1984: 126). Thus, “the implication that all classifications are tantamount to a crude form of measurement is obfuscatory” (135), and Duncan argues that with many presumably ordinal scales, the demonstration of order is questionable, and if one applies a strong standard, there are many fewer meaningful ordinal scales than is often believed (136).

Skepticism about nominal scales also derives from the concern that they obscure multidimensionality and fail to produce unidimensional measures, which are seen as critical to good research. Blalock states that “one of the most important roadblocks to successful conceptualization in the social sciences has been our tendency to rest content with descriptions and data analyses that do not grapple with the assessment of dimensionality but instead rely heavily on categorical data and discussions of named categories that are multidimensional” (1982: 109). Shively emphasizes that terms and concepts from ordinary language, which are routinely used in designating the categories in nominal scales, are especially likely to hide multidimensionality (1980: 31; also Shively 2007: chap. 3). Jackman similarly states that the variables employed in research “are supposed to be unidimensional” (1985: 169); and Bollen (1980), and Bollen and Jackman (1985), likewise underscore the importance of arriving at unidimensionality, arguing that if multiple dimensions are hidden, then measurement is inadequate and causal inferences are misleading.

Some critics of categorical variables specifically criticize typologies. Duncan, for instance, laments sociologists’ “addiction to typology” (1984: 136). In their widely noted book, King, Keohane, and Verba are less emphatic, though still dubious: “... typologies, frameworks, and all manner of classifications, are useful as temporary devices when we are collecting data....” However, these authors “encourage researchers *not* to organize their data this way” (1994: 48, italics in original).

### 3. A Misleading Comparison: Rebalancing the Discussion

These critiques of typologies and lower levels of measurement arise from a misleading comparison of qualitative and quantitative methods, and some of these authors have simply “jumped off the rails” in their condemnations. The discussion urgently needs to be rebalanced, based on a better understanding of the limitations of quantitative approaches to measurement, the strengths of qualitative approaches, and the fact that quantitative reasoning about measurement in important respects rests on qualitative foundations.

#### 3.1. The Achilles’ Heel of Quantitative Measurement: Meeting the Assumptions

Interval and ratio scales are often considered more valuable because, in principle, they contain more information than nominal and ordinal scales. They are also seen as more amenable to achieving unidimensional measurement. However, these advantages depend on complex assumptions about the empirical relationships found in the data, assumptions that may not be valid for a given application. Political and social attributes are not always quantifiable, and there is always the temptation to treat data as if it contains information that may not be there. Of course, categorical data also depends on assumptions, but because these “lower” levels of measurement posit less complex empirical relationships (Table 1), the assumptions are simpler.

Psychometricians have devoted great attention to the problem of assumptions. Michell (2008) suggests that in his field, “the central hypothesis (that psychological attributes are quantitative) is accepted as true in the absence of supporting evidence.... Psychometricians claim to know something that they do not know and have erected barriers preserving their ignorance. This is pathological science...” (2008: 10). Barrett (2008: 79) points out that paradoxically, maintaining the pretense of a higher level of measurement can distort—rather than add to—the valuable information about the real world contained in data at a lower level of measurement.

These questions about assumptions are highly salient to political science, given both the wide influence of psychometrics in political research (Poole 2008) and the common presumption that political phenomena are indeed quantifiable.

Questions about assumptions arise, for example, in discussions of structural equation modeling with latent variables (SEM-LV)—a key analytic tool intended to establish higher levels of measurement, as well as to remove measurement error. This technique can build on ordinal or dichotomous nominal data to estimate unobserved quantitative variables.

Unfortunately, given the large number of untestable or hard-to-test assumptions that go into SEM-LV, many scholars question its contribution.<sup>11</sup> Among these are assumptions about the

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<sup>11</sup> Loehlin’s book on SEM-LV reports some of the sharp critiques (2004: 230–34). Thus, Freedman argues that “nobody pays much attention to the assumptions, and the technology tends to overwhelm common sense” (1987a: 102; see also 1987b: e.g., 221). Cliff (1983: 116) warns that these models may “become a disaster, a disaster because they seem to encourage one to suspend his normal critical faculties.” These concerns parallel the view of prominent political science methodologists who challenge the standard regression practices that underlie SEM-LV (e.g., Achen 2002). Steiger (2001) laments the widespread and uncritical use of

distributions of unobservable variables, the number and dimensionality of such variables, the structure of measurement relations among the observable and unobservable variables, and the causal relations among the unobservable variables.

Item-response theory (IRT) has emerged as an alternative to SEM-LV for creating indicators at a higher level of measurement and removing measurement error. Notwithstanding differences in emphasis and procedure, the two families of techniques have fundamentally similar assumptions (Takane and de Leeuw 1987; Reckase 1997; Treier and Jackman 2008: 205-6). Hence, IRT likewise does not escape from concerns about assumptions in quantitative measurement.

In sum, quantitative scholars' hopes and expectations about these tools may surpass actual accomplishments. These researchers may face major challenges in meeting the critiques of quantitative measurement advanced by scholars like Michell.

### **3.2. Higher Levels of Measurement Rest in Part on a Foundation of Nominal Scales**

Some critiques of nominal scales imply that scholars who work with higher-level scales escape the confines of this lowest level of measurement. This is incorrect. In their effort to give conceptual meaning to higher levels of measurement, scholars routinely build on nominal dichotomies.

Establishing an absolute scale requires a nominal dichotomy, which provides the basis for identifying the specific entities counted by the scale. The need for this dichotomy is illustrated, as noted above, by the challenge of counting the number of voters in different cities. Performing such a count depends on a dichotomous understanding of which voters are in each city and which are not, and also on a dichotomy that identifies the subset of people who count as voters. This points to an important observation: working with the *highest* level of measurement requires the *lowest* level of measurement. Nominal scales are crucial here.

In seeking to establish partial orders—as well as ordinal, interval, and ratio scales—scholars sometimes simply create an indicator without engaging in careful conceptualization, and proceed to treat it as if it satisfies this level of measurement. Yet to give the indicator conceptual content, it is productive to establish what it means for the phenomenon being measured to be “absent”—involving what Goertz (2006: 30-35) calls the negative pole of the concept (see also Sartori 1970, 2009). This stands in contrast to being “present,” and as the analyst works with the entire scale, this dichotomy of present-absent provides a foundation for reasoning about “More of what?” Obviously, present-absent is a nominal dichotomy, and we thus see the interplay between the full range of values on the scale and this simple nominal distinction.

As an example, take Sniderman's (1981) ordinal measure of government support, in which the lowest category is “disaffection.” It is essential to establish here whether disaffection is simply the absence of government support, or if it includes active opposition—an important

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SEM by scholars lacking the needed mathematical and statistical background—which we see as one aspect of the misplaced self-confidence of too many quantitative researchers about their own analytic tools.

conceptual distinction. Again, a dichotomous understanding of the presence or absence of support is essential to addressing this issue.

Of course, scholars do sometimes follow poor measurement practices and—without carrying out this conceptual work—construct “indicators” (i.e., specific procedures for scoring cases) and treat the resulting variable as if it was at one or another of these levels of measurement. Yet indicators should be constructed to measure “something,” and careful conceptual work is essential to establishing what that something is. Nominal scales are central to the reasoning required, and this key contribution is another reason why it is inappropriate to denigrate nominal scales.

### **3.3. Revised Norms for “Permissible Statistics”: Nominal Scales in Quantitative Analysis**

An important source of concern about nominal scales had been their presumed incompatibility with regression analysis, and more broadly the conviction that fewer statistical tools are appropriate for nominal/typological variables than for higher-level variables.

However, this norm has in important respects been superseded. Nominal scales have increasingly been used in regression analysis as independent and dependent variables—i.e., with the use of dummy variables, as well as logit and probit models. Typically these nominal scales are simple dichotomies, but one also finds the use of multinomial scales (i.e., multicategory nominal scales; Freedman 2005: 97–99). In political science and sociology, a count of articles in leading journals shows that these tools were little used in the 1970s and became widespread by the 1990s—a trend that has subsequently continued.

In working with logit, probit, and dummy variables, scholars in practice rarely worry about dimensionality. When dichotomies are entered into regression analysis (for example, party identification versus independence), the analyst routinely does *not* do a scaling analysis to test whether the dichotomy taps an underlying dimension, and the dimensionality of the underlying reality is not a key assumption of the analysis. Even though party identification is a multifaceted and multidimensional concept, it is still valuable to learn if age cohorts differ in their party identification. The quest for unidimensionality thus often falls aside.

A variety of new or recently-developed tools for quantitative causal inference also rely centrally on nominal variables and, here again, attention to dimensionality has receded as a concern. Matching methods, for example, attempt to estimate the causal effect in observational data of two alternative “treatments” by comparing cases drawn from two groups that are as similar as possible on a set of conditioning variables (Rubin 2006). These techniques essentially require that the causal variable of interest be categorical; if it is continuous, the definition of treatment groups is ambiguous and some sort of threshold or cut-point (i.e., dichotomization) must be imposed.

This use of categorical independent variables is an echo of the best-practices design for causal inference: the randomized experiment. While experiments can use randomization to assign different values of a treatment measured as a continuous variable, by far the more common approach in the social sciences is to employ discrete treatments based on a categorical variable. As with matching methods and the models discussed in the previous paragraph, discussions of the dimensionality of treatment assignments in experimental designs are rarely at the center of attention.

### 3.4. Placing Multidimensionality in Perspective

An important earlier criticism of typologies and nominal scales was that they fail to address multidimensionality. Skeptics charged that, lurking behind what might appear to be clear concepts and compelling classifications, one too often finds multiple dimensions and a jumbled sorting of cases. These analysts saw higher levels of measurement as far more compatible with achieving unidimensionality.

This critique needs to be rebalanced. First, as shown repeatedly in Parts 4 to 7 below, the construction and refinement of typologies has made sophisticated contributions to addressing multidimensionality. To an important degree, this is “conceptual work,” and it should become clear below that carefully crafted typologies contribute decisively to such work. Hence, far from obstructing the careful treatment of dimensions, typologies can play a critical role in that endeavor.

Second, dealing with dimensions in quantitative research often proves more complicated, ambiguous, and inconclusive than was previously recognized. Jackman’s mandate (noted above) that “variables are supposed to be unidimensional” represents an admirable goal and an important assumption in many forms of analysis, yet it routinely is not achieved. This has occurred in part because, as just discussed in Section 3.1, some of the most important tools for extracting dimensions have fallen well short of their promise.

Third, unidimensionality is not a well-defined “end state” in research. It is better understood as involving a series of iterations and approximations that emerge as research proceeds. Consider standard measures of political democracy. These may include (1) free and fair elections, (2) respect for political rights and civil liberties, (3) universal suffrage, and (4) whether elected leaders to a reasonable degree possess effective power to govern (Collier and Levitsky 1997: 433–34). Some scholars combine these attributes by creating simple additive measures of democracy, and others use a spectrum of alternative tools.

Yet each of these component indicators can hide multidimensionality. For example, the concept of civil liberties is certainly multidimensional, including freedom of association, the right to *habeas corpus*, and freedom of expression—attributes that by no means necessarily vary together. Freedom of expression, in turn, is multidimensional in that it includes freedom of the press, freedom of broadcast media, uncensored use of the Internet, and other aspects of freedom to express political views. Each of these components, in turn, is certainly also multidimensional. Further, an indicator that appears to yield unidimensional measurement for a given set of cases may not do so with additional cases, and there may also be heterogeneity vis-à-vis subsets of cases. These problems involve basic ideas about the contextual specificity of measurement validity that have received substantial acceptance in psychology.<sup>12</sup>

The issue, therefore, is not that quantitative analysis arrives successfully at unidimensionality and qualitative analysis has great difficulty in doing so. Moving beyond multidimensionality is an issue at all levels of measurement—and for higher levels it is not necessarily resolved by complex scaling techniques. The challenge for both qualitative and quantitative measurement is to find the scope of comparison and level of aggregation—i.e., the degree to which

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<sup>12</sup> This perspective is summarized in Adcock and Collier 2001: 534–36.

indicators are broken down into their constituent elements—best suited to the analytic goals of the study.

#### **4. The Template: Concept-Formation and the Structure of Typologies**

We now analyze the role of typologies in concept-formation and develop a template for rigorous construction of typologies. Our central concern is with multidimensional conceptual typologies, yet many elements of the template are also relevant to unidimensional and explanatory typologies.

##### **4.1. Concept Formation**

Conceptual typologies make a fundamental contribution to concept-formation in both qualitative and quantitative research. Developing rigorous and useful concepts entails four interconnected objectives:<sup>13</sup> (a) clarifying and refining their meaning; (b) establishing an informative and productive connection between these meanings and the terms used to designate them; (c) situating the concepts within their semantic field, i.e., the constellation of related concepts and terms; and (d) in particular, identifying and refining the hierarchical relations among concepts, involving *kind hierarchies*.<sup>14</sup> Thinking in terms of kind hierarchies brings into focus crucial features of conceptual structure, addresses challenges such as conceptual stretching, and it productively organizes our thinking as we work with established concepts and seek to create new ones.

A central point must be underscored: The cell types in a conceptual typology are related to the overarching concept through a kind hierarchy. Understanding this hierarchy helps to answer the key question: What establishes the meaning of the cell types, i.e., of the concept that corresponds to each cell? The answer is twofold. (a) Each cell type is indeed “a kind of” in relation to the overarching concept around which the typology is organized; and (b) the categories that establish the row and column variables provide the core defining attributes of the cell type.

##### **4.2. The Basic Template**

Building on these ideas, we now propose a template for constructing multidimensional typologies. We illustrate our framework with Nichter’s (2008: 20) typology of the allocation of rewards in electoral mobilization (Table 2), which is central to his larger analysis of clientelism. While our template might appear straightforward, the literature in fact lacks a clear, didactic presentation of the building blocks in the template. Moreover, scholars too often limit the value of their typologies—and sometimes make serious mistakes—by failing to follow this template.

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<sup>13</sup> This summary draws on diverse sources, among them Sartori (1970, 1984); Collier and Mahon (1993); Goertz (2006); and Collier and Gerring (2009).

<sup>14</sup> Sartori (1970) called this a ladder of “abstraction,” and Collier and Mahon (1993) sought to clarify the focus by calling it a ladder of “generality.” We are now convinced that it is more self-explanatory to call it a kind hierarchy (Collier and Levitsky 2009), an interpretation that fits the examples discussed in these earlier studies. See also Goertz 2006, chaps. 2 and 9.

**Table 2**  
**Targeting Rewards in Electoral Mobilization**

		<b>Party Preference of Recipient vis-à-vis Party Offering Reward</b>	
		<b>Favors Party</b>	<b>Indifferent or Favors Opposition</b>
<b>Reward Recipient Inclined to Vote or Not Vote</b>	<b>Vote</b>	Rewarding Loyalists	Vote Buying
	<b>Not Vote</b>	Turnout Buying	Double Persuasion

(Nichter 2008)

The building blocks of typologies may be understood as follows:

- (a) **Overarching concept.** This is the concept measured by the typology. In Nichter, the overarching concept is the allocation of rewards. This concept should be made explicit and should be displayed as the title in the diagrammatic presentation of the typology.<sup>15</sup>
- (b) **Row and column variables.** The overarching concept is disaggregated into two or more dimensions, and the categories of these dimensions establish the rows and columns in the typology. These dimensions capture the salient elements of variation in the concept, so the plausibility and coherence of the dimensions vis-à-vis the overarching concept are crucial. In Nichter, the row variable is whether the prospective recipient of the reward is inclined to vote; its component categories define the rows. The column variable is whether the prospective recipient favors the party offering the reward.

Row and column variables in a typology need not be limited to nominal or ordinal scales, but may be interval or ratio scales that establish the property space in which the types are located.

- (c) **Matrix.** Cross-tabulation of the component categories of these dimensions creates a matrix, such as the familiar 2 x 2 array employed by Nichter. The challenge of creating a matrix can push scholars to better organize the typology, tighten its coherence, and think through relations among different components.

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<sup>15</sup> Occasionally, the title instead names the variables that are cross tabulated (e.g. Dahl 1971: 7); other times, the matrix simply lacks a title (O'Donnell and Schmitter 1986: 13). It is better to state the overarching concept directly.

In presenting typologies with three or more dimensions, scholars adopt diverse formats:

(i) The familiar 2 x 2 matrix may simply be presented twice, once for each of two subgroups of cases that correspond to the third dimension—as in Leonard (1982: 32–33) on decentralization and Vasquez (1993: 320) on war.

(ii) One of the categories in a row and/or column variable may be further differentiated into subcategories—as in Collier and Collier (1991: 504) on incorporation periods.

(iii) One category in a row and/or column variable may be further differentiated with an interval or ratio scale—as in O'Donnell and Schmitter (1986: 13) on democratization.

(iv) Additional dimensions can be introduced through a branching tree diagram—as in Gunther and Diamond (2003: 8) on political parties.

(v) The additional dimension may be represented by a cube, with the cell types placed at different locations in the cube—as in Linz (1975: 278) on authoritarianism.

(d) **Cell types.** These are the concepts and associated terms located in the cells. The cell types are “a kind of” in relation to the overarching concept measured by the typology. The conceptual meaning of these types derives from their position in relation to the row and column variables, which—crucially—should provide consistent criteria for establishing the types. In Nichter's typology, the terms in each cell and the concepts evoked by the terms nicely capture the constellations of attributes defined by the conjuncture of each row and column variable: rewarding loyalists, vote buying, turnout buying, and double persuasion.

Even when the typology is based on interval or ratio variables, scholars may identify cell types. These may be *polar* types located in the corners of the matrix, or *intermediate* types.<sup>16</sup>

Sometimes the analyst does not formulate a concept that corresponds to the cell types; rather, the names of the categories in the corresponding row and column variables are simply repeated in the cell. For example, in a typology that cross-tabulates governmental capacity and regime type, the terms in the cells are “high-capacity democratic,” etc. Here, the typology is valuable, but this potential further step in concept-formation is not taken.<sup>17</sup>

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<sup>16</sup> Dahl's typology of regimes illustrates polar types; Bratton and Van de Walle on regimes in sub-Saharan Africa (1997: 78) illustrates intermediate types.

<sup>17</sup> This typology is found in Tilly and Tarrow's book on contentious politics (2007: 56, Fig. 3.2). A similar form of typology is found in Rogowski's analysis of commerce and coalitions (1989: 8, Fig. 1.2). Both are creative and deservedly influential studies, but the typologies could have been pushed one step further.

## 5. Errors and Missed Opportunities

This template, combined with the clarity of the Nichter example, might lead readers to conclude that constructing conceptual typologies is easy. Yet failing to follow the template can lead to errors, as well as to missed opportunities for improving conceptualization and measurement.

Some errors are simple—such as confusing conceptual typologies with explanatory typologies, a problem found in Tiryakian and Nevitte’s (1985) analysis of nationalism. Though their stated goal is to conceptualize nationalism, their discussion suggests that this is partly a conceptual typology of nationalism, partly a conceptual typology of different combinations of nationalism and modernity, and partly an explanatory typology concerned with the causal relationship between the two concepts. Their concern with causal relations is clear from the beginning of the article, where they maintain that “cases can be cited to support the contention that nationalism is a *consequence* of modernity, but it can also be argued that nationalism is an antecedent *prerequisite* of modernity” (57, italics added).

Another straightforward error—confusing of typologies and numerical cross-tabulations—has led to mistaken skepticism about typologies as an analytic tool. In one of the most widely used undergraduate methodology textbooks in the social sciences today, Babbie (2010: 183-85) offers a strong warning about typologies. Yet his focus is in fact on potential error in calculating and reading the percentages in a numerical cross-tabulation. Far from pointing to a major concern about typologies, his critique reflects confusion about the distinction between typologies and numerical cross-tabulations.

The use of non-equivalent criteria in formulating the cell types is also problematic.<sup>18</sup> This error is found in the initial version of Gabriel Almond’s (1956) famous typology of political systems, which Kalleberg (1966: 73) criticized as “confused.” Almond distinguished among Anglo-American (including some Commonwealth states), Continental European (excluding the Scandinavian states and the Low Countries), and preindustrial and/or partially industrialized countries outside of the European-American area, and finally totalitarian countries. These types are based on different criteria. Almond’s typology was subsequently reformulated, but the revised version also raised concerns.<sup>19</sup>

In some instances, authors are refreshingly explicit about the problem of establishing analytic equivalence among cell types. Hall and Soskice’s (2001) typology of European political economies categorizes countries as liberal market, coordinated market, and Mediterranean economies. They emphasize that they found it difficult to establish an analytically equivalent term for the third type (2001: 21), and the labels do not reflect consistent criteria for sorting cases.<sup>20</sup> Similarly, Carmines and Stimson (1980: n. 5), in presenting their typology of issue orientation and vote choice, express misgivings about their category of “constrained issue

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<sup>18</sup> Of course, in an analysis that spans extremely different contexts, distinct criteria might be employed. Of course, this practice—and its rationale—should be made explicit in the discussion.

<sup>19</sup> See, for example, Almond and Powell (1966: 308) and Lanning (1974: 372-73, n. 15).

<sup>20</sup> Hall has subsequently addressed these issues in Hall and Gingerich (2009).

voters,” suggesting that the label “constrained” may have implications well beyond their intended meaning.

Other studies suffer from multiple problems. Tiryakian and Nevitte’s (1985) conceptualization of nationalism, just discussed, shows serious confusion in organization and presentation: regarding the overarching concept, the variables that establish the types, and the names for the types, as well as the lack of a matrix to help clarify all of these issues.

Problems of organization and presentation also arise in Carmines and Stimson’s outstanding study of issue voting. They make it clear that a typology is central to their analysis (1980: 85, 87). Yet despite the care with which the overall argument is developed, the typology is not presented as an explicit matrix; the cell types are confusingly introduced in a series of steps through the article, rather than all together; it takes some effort to identify the dimensions from which the cell types are constructed; and although the overarching concept can be inferred fairly easily, the name for this concept should have been identified in the title of an explicit matrix. Overall, it takes some digging to uncover the building blocks in their typology.

## **6. Putting Typologies to Work I: Conceptualization and Measurement**

The goal of establishing the basic template for typologies and discussing errors and missed opportunities is to strengthen substantive research that is both rigorous and creative. In that spirit, we now consider two fundamental ways in which typologies can be “put to work.” Section 6 addresses conceptualization and measurement; Section 7 focuses on analysis of causes and effects.

### **6.1. Organizing Theory and Concepts**

Scholars use typologies to introduce conceptual and theoretical innovations, sometimes drawing together multiple lines of investigation or traditions of analysis.

For example, the typology of “goods” in public choice theory synthesizes a complex tradition of analysis. Goods are understood here as any objects or services that satisfy a human need or desire. Samuelson’s (1954) classic article introduced the concept of “public good,” and later scholars have extended his ideas, adding new types such as the “club good” (Musgrave 1983). With slight variations in terminology (see Mankiw 1998: 221; as opposed to Ostrom et al. 1994: 7), the idea of a good is now routinely conceptualized in two dimensions: *rivalrous*, according to whether consumption by one individual precludes simultaneous consumption by another individual; and *excludable*, according to whether the good can be extended selectively to some individuals, but not others. Cross-tabulating these two dimensions yields public, private, club, and common goods (the last also known as common-pool resources).

The joining of two analytic traditions is found in Kagan’s (2001: 10) typology of “adversarial legalism.” He draws together (a) the idea of an adversarial legal system, which has long been used to characterize Anglo-American modes of legal adjudication, and (b) the traditional distinction between legalistic and informal modes of governance. He integrates these two theoretical approaches in a typology that posits four modes of policy implementation/dispute

resolution: adversarial legalism, bureaucratic legalism, negotiation/ mediation, and expert or political judgment.

Bridging alternative analytic traditions, along with an ongoing process of refining a typology, is illustrated by Schmitter's (1974) analysis of interest representation. He connects what was then a new debate on the concept of corporatism to ongoing discussions of pluralism, as well as prior understandings of monism, anarchism, and syndicalism. He shows how corporatism should be taken seriously as a specific type of interest representation that can be analyzed in a shared framework vis-à-vis these other types. Schmitter later introduces a further refinement, making it clear that the overarching concept in a typology is not necessarily static. Based on his recognition that he is conceptualizing not just a process of *representation*, but a two-way interaction between groups and the state, he shifts the overarching concept from interest "representation" to interest "intermediation" (Schmitter 1979: 35–6, note 1).<sup>21</sup>

## 6.2. Conceptualizing and Measuring Change

Ongoing scholarly concern with mapping political transformations and empirical change is an important source of innovation in typologies. An example is the evolving conceptualization of party systems that occurred in part as a response to the historical changes in their bases of financial support. Duverger (1954) initially proposes the influential distinction between "mass" and "cadre" parties, which are distinguished—among other criteria—on the basis of financial support from a broad base of relatively modest contributions, versus reliance on a small set of wealthy individual contributors (63–64). Subsequently, Kirchheimer (1966: 184–95) observes that in the 1960s, many European parties move away from the organizational pattern of the mass party. They are replaced by "catch-all" parties that cultivate heterogeneous financial bases. More recently, Katz and Mair (1995) conclude that parties have begun to turn away from financial reliance on private individuals (whether wealthy or not) and interest groups, developing inter-party collaboration to obtain financing directly from the state—thereby creating the "cartel" party (1995: 15–16).

The influence of political change can also be reflected in choices about dimensions in typologies. For instance, Dahl (1971) maps out historical paths to modern polyarchy; hence, his dimension of inclusiveness centrally involves the suffrage, and given the historical depth of his analysis this dimension ranges from restrictive to universal. By contrast, Coppedge and Reinicke (1990: 55–6), focusing on data for 1985, declare polyarchy unidimensional and argue that Dahl's dimension of inclusiveness can be dropped. As of that year, the movement to universal suffrage—the central issue in one of Dahl's two dimensions—was nearly complete and was no longer a significant axis of differentiation among cases.<sup>22</sup>

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<sup>21</sup> See Collier and Levitsky 1997 for an extended discussion of innovation in the overarching concept.

<sup>22</sup> Subsequently, based on a more fine-grained measure of inclusiveness, Coppedge, Alvarez, and Maldonado (2008) return to the idea of two dimensions.

### 6.3. Free-Floating Typologies and Multiple Dimensions

Some of the most creative typologies may appear unidimensional, yet this masks multiple dimensions and/or the dimensions are ambiguous. These “free floating” typologies<sup>23</sup> lack explicit anchoring in dimensional thinking. Such typologies may often be refined by teasing out the underlying dimensions.

For example, Hirschman’s (1970) “exit, voice, and loyalty” has provided a compelling framework for analyzing responses to decline in different kinds of organizations—a topic inadequately conceptualized in prior economic theorizing. Yet as Hirschman points out (1981: 212), these are not mutually exclusive categories. Voice, in the sense of protest or expression of dissatisfaction, can accompany either exit or loyalty. Hirschman’s typology can readily be modified by creating two dimensions: (1) exit versus loyalty, and (2) exercise versus non-exercise of voice. This revised typology would also have mutually exclusive categories, thereby responding to a standard norm for scales and typologies and making it possible to classify cases in a more revealing way.

Another example is Evans’s (1995) conceptualization of alternative state roles in industrial transformation. Evans presents what appears to be a nominal scale with four categories: midwifery, demiurge, husbandry, and custodian. Upon closer examination, two dimensions are present: (1) key state actors may see entrepreneurs’ ability to contribute to development as malleable or fixed; and (2) the role of the state vis-à-vis entrepreneurs may be supportive or transformative. Evans’s original four types fit nicely in the cells of this 2 x 2 typology, and the result is a more powerful conceptualization of the state’s role.

### 6.4. Typologies Generate Scales at Different Levels of Measurement

Typologies also refine measurement by creating categorical variables that are distinct scale types.

*Nominal Scale.* Nichter’s (2008) analysis of targeting rewards yields the cell types discussed above: rewarding loyalists, turnout buying, vote buying, and double persuasion. These categories are collectively exhaustive and mutually exclusive, but not ordered; they form a nominal scale.

*Partial Order.* In Dahl’s (1971: chap. 1) 2 x 2 typology of political regimes, there is unambiguous order between “polyarchy” and the other three types, and between “closed hegemony” and the other three types. Yet between the two intermediate types—competitive oligarchy and inclusive hegemony—there is no inherent order, and Dahl’s categories are a partial order (see again Table 1).

*Ordinal Scale.* In their analysis of issue voting, Aldrich, Sullivan, and Borgida (1989: 136) tabulate (1) small- versus large-issue differences among candidates, against (2) low-versus high-salience and accessibility of the issues. One cell corresponds to a low effect, while a second cell corresponds to a high effect of opposing issues being voted on. The other two cells are given the same value: “low to some effect.” A three-category ordinal scale is thereby created.

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<sup>23</sup> We thank a reviewer for suggesting this expression.

## 7. Putting Typologies to Work II: Causes and Effects

Typologies likewise contribute to formulating and evaluating explanatory claims.

### 7.1. Conceptual Typologies as Building Blocks in Explanations

Conceptual typologies routinely constitute the independent, intervening, and dependent variables in explanations. Political scientists take it for granted that standard quantitative variables play this role, and it is essential to see that conceptual typologies likewise do so. Conceptual typologies do *not* thereby become explanatory typologies. Rather, they map out variation in the outcomes being explained and/or in the explanation of concern, and in contrast to an explanatory typology, the outcomes and the explanation are not placed in the same matrix.

The typology as an independent variable is illustrated by Dahl's analysis of the long-term stability and viability of polyarchies. Here, his types of political regimes define alternative trajectories in the transition toward polyarchy (1971: chap. 3). Moving from closed hegemony to polyarchy by way of competitive oligarchy is seen as most favorable to a polyarchic regime, whereas the paths through inclusive hegemony and from a closed hegemony directly to polyarchy are viewed as "more dangerous" (1971: 36).

Typologies serve as the dependent and intervening variables in research on interactions between women's social movements and the state in advanced industrial democracies.<sup>24</sup> Mazur (2001: 21–23) conceptualizes the dependent variable, state response, on two dimensions: the state's acceptance of women's participation in the policy process, and whether the state response coincides with the goals of the movement. Four types of state response emerge in the typology: no response, preemption, cooptation, and dual response. The dual response is of special interest because it constitutes the most complete achievement of women's movement objectives, involving both "descriptive" and "substantive" representation.

A key intervening variable is a typology of "policy agency activities" in the women's movement. These agency activities are analyzed on two dimensions: whether they successfully frame the policy debate in a gendered way and whether the goals of the movement are advocated by the particular agency. Cross-tabulating these dimensions yields four types of agency activities: symbolic, non-feminist, marginal, and insider. The cell type of insider constitutes the most complete achievement of both advocating the movement's goals and gendering the policy debate (Mazur 2001: 21–22).

### 7.2. Typologies in Quantitative Research

The introduction of typologies can be a key step in causal inference within a quantitative study. A typology can provide the conceptual starting point in a quantitative analysis, as with Nichter's study of the targeting of rewards in electoral competition, discussed above (Table 2). It may identify a subset of cases on which the researcher wishes to focus, overcome an impasse in a given study, or synthesize the findings. In other instances, researchers use quantitative analysis to assign cases to the cells in a typology.

*Delineating a Subset of Cases.* In Vasquez's (1993: 73) quantitative study of war, a typology helps in identifying a subset of cases for analysis. He argues that earlier research yielded inconsistent findings because researchers failed to distinguish types of war. He identifies eight types by cross-tabulating three dimensions: (1) equal versus unequal distribution of national power among belligerent states, (2) limited versus total war, and (3) number of participants. Vasquez uses this typology to focus on a subset of cases, i.e., wars of rivalry.

A typology likewise serves to identify a subset of cases in Mutz's (2007) survey experiment on news media and perceived legitimacy of political opposition, in this case involving a four-category treatment. Subjects are shown a recorded political debate in which the content is held constant across treatments, but two factors are varied: the camera's proximity to the speakers (close or moderate) and the civility of the speakers (civil or uncivil). One cell in the resulting 2 x 2 typology, with a close camera and uncivil speakers, is singled out for special causal attention and is conceptualized as "in-your-face" television. The typology thus frames the categorical variable on which the analysis centers.

*Overcoming an Impasse.* Introduction of a typology may help overcome an impasse in quantitative research. Hibbs's study of strikes in eleven advanced industrial countries introduces a 2 x 2 matrix at a point where quantitative analysis can be pushed no further (1987: 69). He uses bivariate correlations to demonstrate that increases in the political power of labor-based and left parties are associated with lower levels of strikes in the decades after World War II, and he hypothesizes that the role of public sector allocation serves as an intervening factor. Hibbs argues that as labor-left parties gain political power, the locus of distributional conflict shifts from the marketplace to the arena of elections and public policy, thereby making strikes less relevant for trade unions.

Yet the multicollinearity among his variables is so high that—especially given the small number of cases—it is not feasible to sort out these causal links. Hibbs then shifts from bivariate linear correlations to a 2 x 2 matrix that juxtaposes the level of state intervention in the economy and alternative goals of this intervention. For the period up to the 1970s, he analyzes cases that manifest alternative patterns corresponding to three cells in the typology: relatively high levels of strikes directed at firms and enterprises (Canada, U.S.); high levels of strikes which serve as a form of pressure on the government (France, Italy); and a "withering away of the strike" that accompanies the displacement of conflict into the electoral arena (Denmark, Norway, Sweden). This typology allows him to push the analysis further, notwithstanding the impasse in the quantitative assessment.

*Placing Cases in Cells with Probit Analysis.* Carmines and Stimson's (1980) study formulates a 2 x 2 typology of issue voting: *easy issue* voting, based on a deeply embedded preference on a particular issue; *constrained issue* voting, based on a deeply embedded preference on a second issue that further reinforces the vote choice; *hard issue* voting, based on a complex decision calculus involving interactions and trade-offs among issues; and *non-issue* voting, based more on party identification than on issue preferences. The study tests hypotheses about the relationship between political sophistication and the role of issue preferences in the vote. The authors place respondents in these four cells using probit analysis, and then examine the contrasts among the types with regard to political sophistication.

*Synthesizing Findings.* In studying the impact of foreign policy platforms on U.S. presidential candidates' vote share, Aldrich, Sullivan, and Borgida (1989: 136) use a typology to synthesize their findings. They explore which campaign messages resonate with voters—specifically, which campaign issues are (1) “available,” in the sense that an opinion or position on a given issue is understood, and (2) “accessible,” or perceived as relevant, by voters. Whereas much of the article employs probit analysis to predict the victory of specific candidates, in their conclusion the authors seek to characterize broader types of elections. They introduce a 2 x 2 matrix to classify presidential elections according to whether there are small versus large differences in candidates' foreign policy stances, and according to the low-versus high-salience and accessibility of foreign policy issues raised in each election.

Typologies thus contribute in diverse ways to quantitative research.

## 8. Conclusion: Guidelines

Conceptual typologies and the categorical variables with which they are constructed are valuable analytic tools in political and social science. This article has addressed criticisms that overlook their contributions and has provided a framework for careful work with typologies.

Regarding the criticisms, we have sought to strike a more appropriate balance. The skeptical critics from the quantitative side exaggerate both the strengths of quantitative methods and the weaknesses of qualitative methods. This comparison of the two approaches is too often methodologically unsound, and it distracts researchers from recognizing the contribution of typologies to both qualitative *and* quantitative work. Concerning the limitations of quantitative research, establishing unidimensionality and meeting the statistical assumptions that underlie levels of measurement is harder than some scholars recognize. With reference to the contributions of qualitative analysis, the foundation for higher levels of measurement depends in part on nominal scales, and work with typologies opens a valuable avenue for addressing the issue of multidimensionality.

We then offer procedures to help scholars form their own typologies, avoid errors and missed opportunities, and evaluate typologies employed by others. The following guidelines synthesize these procedures.

**I. Creativity and Rigor.** The use of typologies facilitates both innovative concept formation (Sections 4.1, 6.1–6.3) and careful work with concepts and measurement (4.2, 5.0, 6.4, and *passim*). There need not be a trade-off between creativity and rigor.

**II. Conceptual versus Explanatory Typologies.** In a conceptual typology, i.e., a descriptive typology that establishes a property space, the cell types are “a kind of” in relation to the overarching concept and the categories of the row and column variables provide their defining attributes. By contrast, in an explanatory typology the cell types are outcomes hypothesized to be explained by the row and column variables (1.0). Of course, conceptual typologies routinely enter into explanatory claims (7.1). Here, the cell types are “descriptive” scores on independent, dependent, and intervening variables, but they do not thereby become explanatory typologies.

**III. Kind Hierarchy.** Careful work with typologies contributes to identifying and refining the hierarchical structure of concepts (4.1).

**IV. Overarching Concept.** The overarching concept is the overall idea measured by the typology (4.1, 4.2-a). This concept should be in the title of the typology. Simply naming the two or more constitutive dimensions in the title is an inadequate substitute (4.2-a, note 17). In an evolving area of research, the overarching concept is not necessarily fixed, but may change as frameworks and theory change and as the analyst gains new insight (6.1). By creating an overarching concept that brings together previously-established concepts and traditions of analysis, scholars can introduce valuable conceptual innovation (6.1).

**V. Dimensions.** These are component attributes of the overarching concept. They may be categorical variables or continuous variables (4.2-b).

**VI. The Matrix.** Cross-tabulation of row and column variables that each consist of two categories yields the familiar 2 x 2 matrix; with more categories on each dimension, a larger matrix with more cells results, although it may still have only two dimensions. The title of the matrix should be the overarching concept. The names of the variables should be placed so that they directly label the horizontal and vertical dimensions, and the category names should label the specific rows and columns (4.2-c). Scholars fail to follow these simple norms more often than one would expect. Careful work with the matrix helps impose discipline on the typology and improves communication with readers.

**VII. Diagramming More than Two Dimensions.** Some typologies incorporate three or more dimensions, and scholars should be familiar with the different options for diagramming them (4.2-c).

**VIII. Cell Types.** Cell types are the concepts associated with each cell, along with the terms that identify these concepts. As just noted, in a conceptual typology, the meaning of the cell types is established as follows: (i) The types are “a kind of” in relation to the overarching concept; and (ii) the categories that establish the row and column variables provide the defining attributes of each cell type (4.1). One option is to label the cell types by simply repeating in the cell the names of the categories on the corresponding row and column variables (4.2-d). When feasible and appropriate, it is valuable to take one step further and to form the concept that distinctively corresponds to the cell type.

**IX. Continuous Variables.** Although it is conventional to think of typologies as based on categorical variables, the use of continuous variables is common. With continuous variables, researchers establish the equivalent of cell types, which may be polar types, located in the corners of a two-dimensional space, or intermediate types (4.2-d).

**X. Dimensional Thinking.** One criticism of typologies and research based on categorical variables has been that they hide multidimensionality. Yet quantitative variables may also do so, and typologies open new ways for working with multiple dimensions (3.4, 6.3). Exploring dimensions through careful work with the row and column variables is an important step in achieving this objective.

**XI. Free-Floating Typologies.** Some typologies are not explicitly anchored in dimensional thinking. They may be unidimensional or multidimensional, yet in either case the dimensions are not clear. Such typologies can be strengthened by making explicit—or indeed sometimes discovering—underlying dimensions (6.3).

**XII. Typologies in Quantitative Research.** Far from being at odds with quantitative work, typologies sometimes play a significant role in statistical studies, and both quantitative and qualitative researchers should be alert to this fact. Typologies may be employed to establish an appropriate set of cases for study, overcome an impasse in statistical analysis, and synthesize conclusions (7.2). Tools such as probit analysis have been used to assign cases to cells in a typology, and both matching designs and experiments centrally depend on categorical variables—which are sometimes conceptualized in terms of typologies (7.2, 3.3)

In sum, typologies are a valuable research tool, with diverse applications. They facilitate work that is both conceptually creative and analytically rigorous. These guidelines can enhance this two-fold contribution to good research.

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