Typology

Juraj Halas

Typology: A multi-dimensional classification that reduces complexity, serves heuristic purposes, and facilitates theoretical or explanatory inferences about phenomena.[1]

Introduction

The importance of typologies is contested: some view them as fundamental to **CONCEPT FORMATION** (Collier et al. 2012: 222), while others consider them as temporary devices at best and discourage their use (King et al. 1994: 48). We shall focus here on the less problematic, heuristic roles of typologies. However, first and foremost, we need to introduce some measure of conceptual order, since the term "typology" is equivocal.

1 Classification, typology, taxonomy

Regardless of the precise meaning ascribed to "typology", "classification" and "taxonomy" are usually viewed as closely related terms. As far as terminology is concerned, we shall loosely follow Bailey (1994).

A *classification* is a system of classes (sets) that group objects based on the values of a single nominal or ordinal **VARIABLE**. A simple classification would divide states into "democracies" and "non-democracies". Hence, classifications are unidimensional. However, the variable ("dimension") underlying a classification may itself be a compound variable. In our example, a particular state could be classified as a "democracy" based on a checklist of criteria (e.g., free elections, freedom of the press, etc.). Each of these criteria is a necessary condition for membership in the class, and together they form a sufficient condition. The set of all objects that the classification applies to (e.g., all states) is the *domain* or *universe of discourse*. The values over which the variable ranges (e.g., "democracy", "non-democracy") form the *property space* of a classification.

Any classification must follow two general rules. First, classes must be mutually exclusive: any object from the domain can only be a member of a single class. Second, classes, taken together, must be exhaustive relative to the domain: each object from the domain must be classifiable. The second rule may require one to postulate a *residual* class for objects which are dissimilar but do not fit into any of the other classes.

The basic function of a classification is that it introduces order and reduces complexity (Bailey 1994: 12ff). In this sense, classificatory procedures are related to the fundamental dimension of all knowledge as a sort of ordering imposed on (and, to some extent, *derived from*) a diverse,

[1] This work was supported by the Slovak Research and Development Agency under the contract No. APVV-0149-12.

multi-faceted reality. Beyond this basic role, a classification should be systematically fruitful: values of the classifying variable should be known to highly correlate with other relevant characteristics which are logically independent of that variable (Hempel 1965: 156). In our example, these could be economic growth or involvement in war. A fruitful classification enables some rudimentary prediction and should lead to the formulation of a new **HYPOTHESIS** (Bailey 1994: 14).

These considerations also apply to typologies and taxonomies. However, unlike a classification, a *typology* is multidimensional. An object from the domain is assigned to one of the classes ("types") based on the values of two or more variables. Typologies are usually presented in the form of a matrix which cross-tabulates the two (or more) variables, with each cell representing a distinct *type* (Collier et al. 2012: 218). Consider the following classic example (Lijphart, 1968: 38):

		Political Culture	
		Homogenous	**Fragmented**
Elite Behaviour	**Coalescent**	Depoliticised democracy	Consociational democracy
	Competitive	Centripetal democracy	Centrifugal democracy

Figure 1: Lijphart's (1968) typology of democratic systems.

Here, four types of democracies are distinguished based on two dimensions conceptualised as dichotomous variables: "elite behaviour" (rows) and "political culture" (columns). Lijphart (1968: 38) states that the types should be associated with a decreasing measure of political stability (from the top-left to the bottom-right cell). Hence, the typology lends itself to the formulation of at least one kind of predictions and hypotheses.

Three different aspects of a type need to be distinguished: its *name*, *concept* (or *intension*), and *extension*. A type name is simply the conventional label for a cell in a typology (e.g., "Depoliticised democracy"). A type concept is the meaning associated with a given type name. The concept corresponding to the top-left type is simply *a democratic regime characterised by a homogeneous political culture and a coalescent elite*. Finally, the type extension is the set of all objects from the domain which belong to a given type – or, in other words, all objects in the domain that satisfy the criteria postulated by the type concept. If there are no such objects, we say that the type is "empty".

Note that any typology may be presented in various ways. Above, type names expressing type concepts appear in the cells. Alternatively, one could list the names of (some or all) objects which belong to each type's extension. The top-left cell would then contain a list of countries. Another mode of presentation would include information on the relative shares of the objects of a type in the whole domain. These and other modes of presenting a typology are equally valid, but serve different purposes (see next section).

Taxonomies differ from classifications in that they involve hierarchy: their classes have subclasses which may contain sub-subclasses etc. Classes of a taxonomy are called taxa. Objects assigned to a given taxon have all the properties required for membership in the superordinate taxon, but differ, in other properties, from objects in the other taxa under the same superordinate taxon. Due to their hierarchical nature, taxonomies are amenable to presentation in a tree-like diagram, in which lines represent relations between subordinate and superordinate taxa.

2 Building and using typologies

There are two basic approaches to constructing a typology: *top-down* and *bottom-up*. The first is often described as "deductive", while the resulting types are termed "conceptual" or "ideal types".[2] The second is usually called "inductive" and the types it yields are sometimes characterised as "extracted types" (Lehnert 2007: 63). From a logical point of view, both approaches result in the same kind of structure, but their uses can be different (see **INDUCTIVE AND DEDUCTIVE REASONING**).

In the top-down approach, of which Lijphart's typology is an example, a typology is formulated based on pre-existing knowledge. This may be an established theory or a set of conjectures. This knowledge is used to determine the relevant dimensions (as well as the ranges of the corresponding variables) which, when cross-tabulated, yield a number of types. Once this has been done, the typology is applied to the given domain: objects are sorted into types.

However, this latter step is not always desirable. The top-down approach can be used to *illustrate* the implications of a theory, e.g., to list the particular kinds of a phenomenon the theory recognises. Apart from didactic purposes, this may be useful when contrasting competing theories. Similarly, the top-down approach can be used to explicate concepts and introduce new compound variables in preparation for measurement or the formulation of hypotheses. In such cases, we are not primarily interested in the extensions of types (i.e., the particular objects which fall under them, the number of such objects or their distribution among types), but in type concepts or the number of types. This approach can lead to new **RESEARCH QUESTIONS**, such as:

1. Are all of the types postulated by the theory possible?
2. Do any of the types seem less probable than others, so that they should be underrepresented in the domain?
3. Does the theory imply types without explicitly discussing them, so that it could be further extended?

Here, typologies function as "tools for thinking" which help generate problems and orient further research.

However, the heuristic import of typologies also comes to the fore when objects in the domain are sorted into types. For example, a typology could be used for **CASE SELECTION**, to identify particular cases of interest which are then examined in more detail (e.g., all objects in a type, or a

[2] Note that in its original usage, due to Max Weber, "ideal type" refers to an idealised model quite independent of a typology as defined here (Hempel 1965: 162).

single object within a type suitable for a **CASE STUDY**). Some other questions this procedure may generate are:

1. Why is a given type empty or only sparsely populated?
2. What mechanisms could explain the correlation between the typology's dimensions and the characteristics associated with a particular type?
3. What mechanisms could explain differences in the associated characteristics of objects of the same type?

A particular case of the top-down approach is an "explanatory typology". Here, dimensions represent (rows and columns) independent variables, i.e., causes, while types (cells) represent combinations of dependent variables, i.e., effects (Elman 2005: 296-297). Note that all of the explanatory work is done by the underlying theory. The typology is used as a means of presenting predictions derived from the theory, e.g., for purposes of **COMPARATIVE ANALYSIS**, to investigate interaction effects of multiple variables, to identify kinds of cases for further scrutiny, or as an aid in **COUNTER-FACTUAL ANALYSIS**.

In the bottom-up approach, one starts with data about objects in the domain and looks for similarities based on which they could be sorted into types or "clusters" (Bailey 1994: 34). When the domain is large and to be processed at once, the bottom-up approach may use complex quantitative methods and be automated. However, the classic example of a bottom-up typology (more precisely, a taxonomy), that of biological species, emerged incrementally and without the use of quantitative methods. The resulting typology provides a quick overview of the (usually very large) domain. Similarly, to a top-down typology, it can be deployed to heuristic purposes in the discovery of recurrent patterns or outliers.

With regard to the distinction between **NOMOTHETIC AND IDIOGRAPHIC METHODS**, typologies are usually related to the former, since types are seen as "generalizations" of the common features of a number of diverse phenomena. However, as noted above, typologies can also serve as instruments of case selection, thus facilitating research designs associated with the idiographic approach.

3 Managing typologies

The number of types in a typology depends on the number of variables and the number of values over which each of the variables ranges. If all variables are dichotomous, the number of cells is 2^n, where n is the number of variables. A greater number of types allows for finer distinctions between objects in the domain, but the more types there are, the more difficult to manage is the typology. Generally, a useful typology strikes a balance between *parsimony* and *discriminatory capacity* (Lehnert 2007: 64). This is often the result of a longer process of fine-tuning.

One can introduce new types by adding new variables or, if the existing variables are continuous, by specifying anew the intervals over which they range. Conversely, one can eliminate existing types to increase parsimony (and generality) of the typology. Apart from the obvious possibilities (removing variables or collapsing several types into one), this can also be achieved by disregarding empty types. Alternatively, one might assign equal weights to different combinations of variable values, whereby different types are treated as equal (Bailey 1994: 24-32).

References

Bailey, Kenneth D. 1994. *Typologies and Taxonomies: An Introduction to Classification Techniques*. Thousand Oaks, CA: SAGE Publications.

Collier, David and Jody LaPorte and Jason Seawright. 2012. Putting Typologies to Work: Concept Formation, Measurement, and Analytic Rigor. *Political Research Quarterly* 65(1): 217-232.

Elman, Colin. 2005. Explanatory Typologies in Qualitative Studies of International Politics. *International Organization* 59(2): 293-326.

Hempel, Carl Gustav. 1965. *Aspects of Scientific Explanation*. New York: The Free Press. (Chapters 6 and 7.)

King, Gary and Keohane, R. O. and Verba, S. 1994. *Designing Social Inquiry*. Princeton: Princeton University Press.

Lehnert, Matthias. 2007. Typologies in Social Inquiry. In: Gschwend, T., Schimmelfennig F. eds. *Research Design in Political Science*. Palgrave Macmillan: London, 62-79.

Lijphart, Abend. 1968. Typologies of Democratic Systems. *Comparative Political Studies* 1(3): 3-44.