A Few Considerations on the Comparison Method in Appraisal

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Abstract The paper has a theoretical and methodological content and is focused on the comparative method as Appraisal rational. Even though many scholars have strong prejudices against comparison as a research strategy and hold that it should be substituted by a "more scientific" statistical one, the paper holds that to increase the scientific content of appraisals does not require to change the method of inquiry but to replace the "impressionistic" comparison with "scientific" comparison. Consequently, the paper presents some relevant achievements in comparison theory and illustrates the connected concepts of similarity and classification. Finally, the paper recognizes that even though "scientific" comparisons" are methodologically feasible, at the operational level they are not yet available, this exhorts the appraisers' community to a deep and thoughtful reflection and further researches.

Keywords Methodology of appraisal · Scientific approach · Comparison · Similarity · Classification

1 Introduction

According to the Italian school, Appraisal[1] is not only or primarily a professional practice but it meanly is an autonomous scientific discipline endowed with its own distinctive method, set of principles, and its own specific areas of expertise. Of course, these distinctive elements are continuously evolving: the philosophy of science and each scientific discipline develop dealing with the real world that nowadays is more and more uncertain and complex. Therefore, language, methods,

[1]The paper strictly concerns comparison in Appraisal, whereas comparison in real estate evaluation is not faced.

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and principles of Appraisal cannot be regarded as immutable and it is legitimate to rethink and update them through an in-depth critical process that may result in a partial revision or even in a complete reformulation. Simply ignore the problem can be risky because the breaking off of its historical roots can weaken the present and future developments of the discipline.

Due to the scientific evolution of Appraisal (depending on the enlargement of its areas of interest, the enrichment, and complexification of the tools, etc.) and not forgetting the theoretical and methodological foundations of the Italian school, the next paragraphs are concerned with the comparison principle as the rationale of Appraisal.

2 Appraisal as a Scientific Discipline

According to Medici (1953) Appraisal can be considered a scientific discipline as even «if appraisal has not a code of statistic laws derived from the scientific observation of facts, it *has a method which teaches the procedures to be followed* whereby to establish the equivalent monetary value of specific economic goods».

Medici (1953) underlines that «the foundation of the doctrine of appraisals is its method» and, as a consequence, «Herein resides the rational and scientific character of appraisal, vainly would one seek for it those laws which form the basis of a science similar to natural science», in other words, appraisal is a social science.

As a scientific discipline Appraisal is «devoted … in large part to the study of the methods and rules of … real estate valuation» (Medici 1953), that is in its own methodological aspects «Appraisal … has as its main object, study of the method which enables the appraiser to express judgment on the value of goods perfectly defined in their technical substance and economic aspect» (Medici 1953).

The methodology of Appraisal is the set of principles (postulates) and rules which allow a scientific assessment of complex assets (usually real estates) in a limited market. The postulates of Appraisal are those propositions not proved, but believed true according to real evidences, knowledge, experience and common sense, that are the foundations of any appraisal and that can never be contradicted (Simonotti 2006).

Following Forte (1968), such principles can be summarized in the following six simple points[2]:

1. The value depends on the purpose of the appraisal judgment;
2. The forecast is immanent in the appraisal judgment;
3. The price constitutes the foundation of every appraisal judgment;
4. The appraisal method is unique as it is exclusively based on comparison;

[2]The same postulates (with minor differences in wording and/or listing) are present in all the most relevant Appraisal handbooks, e.g.: see Medici (1953), Simonotti (2006) Polelli (2008), Michieli and Michieli (2002).

5. The appraisal judgment must be objective and generally valid and thus, must be formulated on the basis of the theory of ordinariness;

The principle of comparison as the rational of the "unique" appraisal method is the central concern of the paper.

3 Why Comparative Method in Appraisal

The comparative method is the rationale of Appraisal discipline due to three main reasons:

- The value of the good depends on the context;
- The analysis is case-oriented (casuistic nature);
- Appraisal has an interpretative approach;

About the dependence of the estimated value on the context, Forte (1968) holds that the "value" is not an intrinsic attribute of economic good, but it quantitatively depends on external circumstances and varies with the "market", even if it differs, in the same circumstances, according to the different characteristics of the good. Such characteristics are attributes whose species are fixed but whose extent can vary.

Also Giuseppe Medici, repeatedly arguing that an appraisal judgment is always the result of a comparison exercise, states that "the prices paid depend on causes peculiar to the case in point" (Medici 1953) so that he recommends a detailed knowledge of "the basis of the physical characteristics" of the real estate, but also of "the socio-economic conditions" influencing the market prices. Medici (1972) in his book "Principi di Estimo" better develops this point recommending that Appraisal should be based on «an exhaustive inquiry into the market situation and how the market relates to the characteristics of the asset to be estimated»[3] and asks for "an in-depth report" (i.e. a thick description in terms of the comparative-qualitative approach) where «the analysis of demand and supply is highly relevant in order to identify the economic agents' specific behavior as well as the reasons for it. In this way, the appraiser should produce a sound assessment and, at the same time, the report reader should be able to find the proper justifications of the results» (Medici 1972). As a consequence the method of appraisal can be considered a scientific one as it is transparent, communicable, controvertible, and then falsifiable.

Forte (1968) underlines also another aspect of the context-dependence of Appraisal stating that «if the value judgment should be determined by the market, the estimated value may, in turn, determine the market value itself, as we should admit not only an influence of market-prices on estimated values but also of estimated values on market-price», so that «In any judgments of value … the estimated values generally become actual market realities, often transforming the economic

[3]All the translations from Italian are by the author.

directions in economic transactions. If the expected estimated convenience [or value] is operationally confirmed this evidently means that the different evaluations contributing to the appraisal judgment coincide with the "real values"».

The "casuistic" nature of Appraisal is clearly stated by Medici (1953): «when the theoretical process is completed and the practical process begins, appraisal becomes necessarily *casuistic*. Going deeper, one could make a distinction between *appraising casuistry*, in the correct and narrow sense characterized by the study of separate and specific cases of appraisal, and a *group casuistry*, consisting of the examination of numerous cases of a similar nature—which are thus in group form —wherefrom can be deduced rules common to all cases of the kind». He also adds that the first kind, «true casuistry, studies the case and arrives at a solution passing through each phase and overcoming each difficulty, and therefore has the didactic efficacy proper to that which I would call the *operative method*. The second, group casuistry, represents the specification of a method common to groups of cases».

About the interpretative approach of Appraisal we should always remember that to make a judgment means to "interpret" data, events, phenomena, etc. because, as Medici (1953) states, «In the case of a valuation, the appraiser finds himself in a similar position to that of the doctor confronted by a clinical case. Both must express an opinion, and to this end they both make use of all the varied elements of their experience, and "accumulated experience", which is offered respectively by the doctrine of appraisal and by medical science, is of the highest importance».

It is key to note that, in facing real cases, an explanation of events—correctly based on a deep knowledge of the theory and the method of appraisal—provides the expert with a control on facts (Medici 1953, 1972): «When the appraiser has a profound knowledge of the appraisal method and an intimate understanding of its logical nature, any variation in the market or social conditions, … will not find him unprepared; in every instance he will be able to give a correct answer to the appraisal problem with which he is confronted».

Following this direction Forte (1968) holds that an appraiser should be considered someone able to "interpreter" the market, rather than simply provide—like a thermometer—measurements.

Forte and Medici are also both concerned about the drift of Appraisal towards a mathematical formalism and warn against the tendencies to reduce Appraisal merely to its financial arithmetic calculating dimension, as «the cloak of algebraic exactness veils the reality … instead of helping … to discern it» (Medici 1953).

Carlo Forte's distrust (1968) to formalistic approaches in Appraisal is evident when he asks for «a critical examination of the calculation procedures and a revision of choreographic mathematical formulas that often not properly fit in Appraisal's methodology». Sharing the same precautionary position Medici (1953) highlights the risk of the oversimplification and mechanization of Appraisal analysis as follows: «these formulistic decorations, ofttimes artificially complicated, … prevent a rapid perception of the concrete problem. Furthermore, they incline one to mechanize a problem, which, by its nature, does not have, nor should have anything mechanical or predetermined. In fact, the answer to a query depends upon a correct basis being given to the valuation problem, which finds solution in the judgment of

appraisal». The problem becomes especially relevant when not-trained people are involved: «The danger of an arithmetical bias in valuation has been, and is, a serious one, particularly for young students who, unused to meditation, and lacking the maturity which is acquired by experience, seize gladly these formulas, which give them a sense of security but which bear only the fruit of delusion» (Medici 1953).

4 Comparison Method in Appraisal

As Medici (1953) stresses, notwithstanding the apparent diversity of the various methods (analytical, synthetic, comparative, etc.), the appraisal method is essentially only one, and it consists of a procedure to be necessarily followed because, being logically accurate, it is the sole rationale of any appraisal. Such a procedure establishes the comparison between the good to be assessed and other similar known-priced goods or between the project to be evaluated and other buildings or interventions, having similar characteristics and known costs, is the rationale of evaluation (Simonotti 2006).

Definitively, any appraisal judgment requires to «(1) form a scale of prices (2) select the level of the scale at which to place the object that is to be appraised» and only «As a final act, a synthesis of the entire process, the appraiser delivers his judgment on value»[4] (Medici 1953).

Within the appraisal judgment, these two coordinated phases have a different nature. The construction of the "scale of prices" is the "objective" moment of the procedure because it is the result of a statistical observation of the market prices of the similar goods (i.e. real estates). As a consequence, it is one only, even though the accuracy and completeness of the result depend on the number of analogous cases observed and their similarity. The selection of the level of the scale at which to place the object to be appraised is the "subjective" moment of the procedure, because at this moment the appraiser make a synthetic judgment comparing the technical and economic features of the good to be assessed with the ones of the goods included in the different steps (or classes, or categories) of the "scale of prices" and finally bestowing the good to the most suitable class. The result of this phase, of course, strongly depends on the appraiser's technical and economic knowledge, skills, and abilities (Medici 1953).

Clearly, from the methodological point of view, the fundamental element in this procedure is to establish the "similarities" between the object to be estimated and the other comparable one/s, that are identified taking into consideration the most relevant elements or characteristics of the object. In real estate appraisal, the

[4]In his *Principles of Appraisal* Medici (1953) provides an exhaustive presentation of the procedures to construct the price scales according to each of the five economic aspects (market value, cost value, substitution value, transformation value and complementary value) of the object to be appraised.

comparison mainly refers to technical and economic characteristics of the goods (Simonotti 2006).

5 The Need of Scientific Comparison in Appraisal

Unfortunately, we can often verify a gap between how comparison should be performed according to the theory and how it is actually performed in professional appraisals resulting in poor quality level esteems[5] due to an inaccurate methodological support. As a matter of fact, in appraisal judgments only generic and vague references to market researches—adopting wording like "according to a careful market survey" or "according to an inquiry among experts"—are mentioned and no elementary historical data are produced. As a consequence, neither the appraisal procedure nor its result meet the scientific standards of the appraisal logic.

Due to this widespread inadequate methodological support, many scholars have been persuaded to question the scientific nature of the comparative method and to adopt the statistic approach on the "naturalistic" assumption that large-scale studies are more scientifically reliable (Lor 2012).

The paper supports that to replace the comparative method with the statistical one is not a suitable solution to the need for an increase in the scientific content of Appraisal method because the choice of the method of inquiry actually is «a matter of logic (the logic of causal inquiry,[6] and empirics (the investigation of the empirical world[7])» (Seawright and Gerring 2008), it depends on the specific characteristics of the inquiry at stake and on what conditions must be accomplished in order to ensure the reliability and validity of results. As a consequence, when Appraisal is concerned with problems (as in cadastral and other similar fields) where many data are available and the main goal is to define probabilistic tendencies, the statistical method represents a suitable solution, but when Appraisal is concerned with estimating the "only-most likely" value—depending on many factors (like location, quality, technology, legal constraints, etc.)—of a "unique" real estate (as in architectural heritage field) and only a small number of empirically observed data is available, we cannot rely on the statistical method.

In this latter case, to overcome biases against approximation and subjectivity often affecting judgments of appraisal we should not give up the comparative method, but to use it appropriately as «the issues [is] in making systematic scientific as opposed to impressionistic comparisons» (Lor 2012).

This means that we must turn our attention on the logical basis of the main methods of inquiry and especially on comparison.

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[5]See, e.g. Farinelli (2016) "La razionalità della stima dei beni storico storico-architettonici: le Ville Venete" Tesi di dottorato. Scuola di Dottorato di Ricerca in Ingegneria Gestionale ed Estimo.

[6]That is, their capacity of testing rival explanations [note added by the author].

[7]That is, the difficulty in acquiring the data needed to employ the method [note added by the author].

6 Main Methods of Inquiry

Any strategy of research aims at scientific explanation. According to the Encyclopaedia Britannica, «the structure of a scientific explanation is that of a valid deductive argument whose conclusion is the event to be explained. Some of the premises of this argument will be factual statements of the antecedent circumstances, while the others will be the scientific hypotheses offered as a way of linking those circumstances to the outcome stated by the conclusion». The fundamental methods of research are the experimental, the statistical, the comparative and the case-study.

According to the experimental method, the researcher can manipulate the independent variable (the cause), and at the same time, all other variables are controlled in the laboratory (the environment in which the experiment takes place).

The experimental method has the merit of providing strong criteria for eliminating rival explanations through experimental control (Collier 1993) but—even though it is considered as the norm which other methods should try to approximate—unfortunately, it cannot be applied in social sciences because of practical (it is impossible to generate appropriate experimental data) and ethical impediments (it divorces a phenomenon from its context).

In social disciplines (Kothari 2004), that usually rely on observation rather than experimentation, the researcher has no control over any of the variables in play, and as a consequence, he/she—following the positivist (and post-positivist) or the interpretivist visions of science respectively—may adopt an extensive or an intensive approach.

In extensive research, the dominant strategy to collect empirical data is large-scale statistical surveying. In this case, the main goal is to understand and explain the phenomenon through data aggregation (by means of aggregating data) and producing information about frequency distributions and relationships.

These "variable-oriented" studies are focused on a limited number of variables which are abstracted and removed from the concrete reality and context by means of simplifying and homogenizing assumptions. As a consequence, they tend to "eliminate complexity instead of deciphering it" (Lor 2012; Ragin 1987, 2000).

The statistical method may be considered as an approximation—not the equivalent—of the experimental method. It has the essential logical functions of experiment in inquiry, but it cannot control for all variables, merely for the key variables that are known or suspected to exert influence (Lijphart 1971).

The statistical method has the merit of assessing rival explanations through the weaker but still valuable procedure of statistical control—founded on partial correlations—unfortunately, it is often not feasible to collect a sufficiently large set of reliable data to do this form of analysis (Collier 1993).

Nevertheless, in recent decades statistical methods have become prominent in social sciences as well as in Appraisal, this is probably due to the width of extensive statistical analysis that makes for a high level of external validity.

In the literature you can find at least three kinds of critiques of the use of regression analysis in social sciences, the most well-known is the methodological[8] one which relates to the so-called "small-N problem." Since in social science we normally have only a limited number of cases, the assumptions of regression analysis are very difficult to meet (Rubinson and Ragin 2007).

On the other hand, intensive comparative research considers social phenomena complex and difficult to disentangle not simply because «there are too many variables affecting them … but because different causally relevant conditions can combine in a variety of ways to produce a given outcome» (Ragin 1987).

To embrace complexity, we have to resort on the comparative "case-oriented" studies which «keep cases, not the net effects of variables, at the forefront of their analyses» as «they perceive that it is not variables but cases that have relationships with one another» (Rubinson and Ragin 2007), as a consequence they use "thick descriptions" focusing only on a handful of specific instances—studied in detail in their own specific context—and considering many separate variables (Lor 2012; Ragin 1987).

The comparative method shares the same logic of the experimental method and resembles the statistical method in all respects except for a crucial difference, that is, the number of cases it deals with is too small to permit systematic control by means of partial correlations. There is no clear dividing line between the statistical and comparative methods, the difference depends entirely on the number of cases, we should resort to the comparative method whenever the number of cases available for analysis is so small that a credible statistical control is not feasible. This, of course, does not mean that comparison may be regarded neither as "the social scientist's equivalent of the natural scientist's laboratory nor as an adequate substitute for experimentation in the natural sciences (Lijphart 1971).

Due to the lack of experimental control and the problem of many variables and small N, the comparative method, provides a weaker basis than the experimental or statistical method for evaluating hypotheses. However, given the scarcity of time, energy, and financial resources, an intensive comparative analysis of a few cases if appropriately and systematically utilized, may be more promising than a more superficial statistical analysis of many cases (Collier 1993; Lijphart 1971).

The main strength of the intensive comparative "case-oriented" studies is the depth of analysis that makes for a high level of internal validity.

7 The Comparative Method

The word "comparison" comes from the Latin word "comparare", which means "to pair, match" and in the everyday language comparison is "the act of looking at things to see how they are similar or different" (Merriam-Webster 2006).

[8]According to Rubinson and Ragin (2007), the other critiques are epistemological and theoretical.

First of all, we should clarify that in this paper the comparative method should be intended as a general research method,[9] not a narrow, specialized technique.[10]

The comparative method—also referred to as the method of "controlled comparison"—is a fundamental and powerful tool of analysis and one of the most powerful tools used in intellectual inquiry: it sharpens our power of description, and plays a central role in concept-formation by bringing into focus and emphasizing suggestive similarities and differences among cases (Collier 1993).

Comparison is aimed to verify or falsify relationships between two or more phenomena (that may be both concepts and objects) its main goals are: (1) the systematic examination of covariation among cases for the purpose of causal analysis; (2) the examination of a number of cases for the purpose of the parallel demonstration of theory (i.e., showing. that a particular model or set of concepts usefully illuminates these cases); (3) the examination of two or more cases in order to highlight how different they are, thus establishing a framework for interpreting how parallel processes of change are played out in different ways within each context (Collier 1993).

The comparative analysis is specially suitable for those disciplines that rely on observation, rather than experimentation,[11] as in this case the researcher, having no control over any of the variables in play (Peterson 2005) must pay a special attention to all the possible sorts of intended and unintended discrepancies between the cases that are being compared (Collier 1993).

In comparison, the central concern is how to address the "many variables, small N" problem.[12] According to Lijphart (1971) we can take four possible directions:

1. Increase the number of cases (geographically or longitudinally through a cross-historical extension);
2. Reduce the property space (combining two or more variables, expressing a similar characteristic, into a single variable);
3. Focus the comparative analysis on "comparable" cases (in this context comparable means "similar" in a large number of variables);
4. Focus the comparative analysis on the "key" variables (according to a general commitment to theoretical parsimony).

We will focus the attention on the third alternative because the fourth is especially relevant in scientific political comparative inquiries, but not in Appraisal

[9]Research methods may be understood as all those methods that are used for conduction of research. Research methods refer to the behavior and instruments used in performing research operations (selecting and constructing research technique).

[10]Research techniques refer to the behavior and instruments used in performing research operations such as making observations, recording data, techniques of processing data and the like.

[11]It is the case of social sciences like anthropology, sociology, education, and political sciences, but also of astronomy.

[12]The paper mainly relies on the theoretical and methodological development of the comparative method and other related concepts produced in social science and especially in political science, psychology, etc. that have been largely and deeply confronted with these problems.

where the analysis is usually restricted to the key variables, whereas the first and the second ones are not operable in Appraisal. As a matter of fact, due to the strict dependence of real estate prices to the specific market, any geographical or historical enlargement of the number of cases is not advisable.[13] Finally, also reducing the property space is inappropriate as it sacrifices a part of the available information.

A comparative analysis performed focusing on "comparable" cases renounces to enlarge the number of cases aiming to identify similar cases in which many variables are constant so that the number of operative variables can be considerably reduced allowing the analysis of their relationships under controlled conditions (Lijphart 1971).

Even if there are several kinds of comparison—e.g.: similarity,[14] analogy,[15] juxtaposition,[16] metaphor,[17] and allegory[18]—here we are interested in cases that are similar in a large number of important characteristics (variables) which the analysis considers as constants, but dissimilar in those variables that the analysis wants to relate to each other. Such "comparable" cases allow the establishment of relationships among a few variables while many other variables are controlled offering particularly good opportunities for the application of the comparative method (Lijphart 1971).

In this case we clearly refer to John Stuart Mill's (1872) methods of agreement,[19] difference,[20] and concomitant variations[21] that is considered the first systematic

[13]As Medici (1953) states, «The prices collected should refer to a fairly uniform area as to make comparison easier and less arbitrary» and that «The prices collected should be recent ones, as their indicative value diminishes with time» and «in any case current prices … are of fundamental importance».

[14]Similarity compares two things with the conjunction "like" or "as," or "such as." It may refer both to the quality or state of being similar and a comparable aspect.

[15]Analogy infers that if two or more things agree with one another in some respects they will probably agree in others.

[16]Juxtaposition places two concepts, characters, ideas, etc., near each other so that the reader makes comparisons between them and perhaps contrasts them as well.

[17]Metaphor uses a word or phrase literally denoting one kind of object or idea in place of another to suggest a likeness or analogy between them.

[18]Allegory is an extended metaphor that represents symbolical (fictional) figures and actions of truths or generalizations about human existence.

[19]The method of agreement is regulated by the following First Canon: «If two or more instances of the phenomenon under investigation have only one circumstance in common, the circumstance in which alone all the instances agree, is the cause (or effect) of the given phenomenon» (Mill 1872).

[20]The method of difference is regulated by the following Second Canon: «If an instance in which the phenomenon under investigation occurs, and an instance in which it does not occur, have every circumstance in common save one, that one occurring only in the former; the circumstance in which alone the two instances differ, is the effect, or the cause, or an indispensable part of the cause, of the phenomenon» (Mill 1872).

[21]The method of concomitant variations is regulated by the following Fifth Canon: «Whatever phenomenon varies in any manner whenever another phenomenon varies in some particular manner, is either a cause or an effect of that phenomenon, or is connected with it through some fact of causation» (Mill 1872).

formulation of the modern comparative method as it does not merely observe the presence or absence of the operative variables, but it also observes and measures the quantitative variations of the operative variables relating them to each other (Lijphart 1971).

According to many scholars (e.g.: Gentner and Merkam 1994; Goldthorpe 1997; Lijphart 1971; Przeworski and Teune 1970, etc.) comparability is not an inherent property of any set of objects; rather it is a quality imparted to them by the observer's perspective, depending on some specific interpretation and/or the analytic concepts available.

In replaying the question: "what is comparable?" Sartori (1970) states that «If two or more items are identical, we do not have a problem of comparability. On the other hand, if two or more items have nothing, or not enough in common, we rightly say that […] cannot be compared … we obtain comparability when two or more items appear "similar enough", that is, neither identical nor utterly different». This means that we must discover deeper or fundamental similarities among the items under consideration, so the next step is to investigate the concept of similarity.

8 Similarity

Similarity may be considered as an organizing principle by which individuals classify objects, form concepts, and make generalizations, which plays a fundamental role in theories of knowledge and behavior (Tversky 1977).

There is a general consensus that similarity between two objects increases with its commonalities[22] and decreases with its differences.[23]

According to Sartori (1970) to compare requires a substantive understanding of the thing we have to compare in order to be able to distinguish between what is homogeneous—i.e., comparable—and what is heterogeneous—i.e., non-comparable depending on a taxonomical treatment, that is the belonging of things to "the same genus". Unfortunately, the taxonomical requisites of comparability are currently neglected, if not disowned (Sartori 1970).

Even if the comparison process that determines similarities phenomenologically is an intuitive, holistic and unstructured process (Sun 1995), Tversky (1977) proposes a theoretical approach to similarity based on features matching expressing the

[22]The commonalities are simply the elements of the matching representational structure (Genter and Markman 1994).

[23]The differences may be of two types: "*alignable differences*" those related to the common structure and "*non-alignable differences*" those independent of the common structure. In the similarity relationship, as well as in comparison, alignable differences are considered more important than no-nalignable differences because alignable differences are related to commonalities but non-alignable differences are not (Genter and Markman 1994).

similarity S(a, b) of the element "a" to the element "b", as a weighted difference of the measures of their common and distinctive features by the following contrast model:

$$S(a,b) = \theta f(A \cap B) - \alpha f(A - B) - \beta f(B - A)$$

where

S	is an ordinal scale of measure of similarity;
f	is a monotonic function;
a and b	are two distinct elements;
$A \cap B$	are the features common to a and b;
$A - B$	are the features that belong to a but not to b;
$B - A$	are the features that belong to b but not to a;
θ, α, β	are non-negative parameters[24] that determine the relative weights of the three components of similarity.

According to the contrast model, similarity may be defined as "an increasing function of common features, that is features in common to the two objects, and as a decreasing function of distinctive features, that is features that apply to one object but not the other" (Heit 1997).

It is key to note that the function f measures the "salience" or prominence of a particular set of features that is, the contribution of such (common or distinctive) features to the similarity between objects. According to Tversky the salience of features—and hence the similarity of objects—is influenced by two factors: intensity and diagnosticity (strictly dependent on the context). The intensity of a feature refers to its physical salience and other inherent, stable aspects. As a matter of fact, it is determined by perceptual and (relatively stable across contexts) cognitive factors. Whereas, the diagnostic factors refer to the effects on salience due to the influence of the context in grouping objects. As a consequence, diagnostic factors are highly sensitive to the particular object set under study and change with the context.[25] It is also key to note that diagnostic factors, being strictly related to the classificatory significance of features, highlight the relation between similarity and grouping (Tversky 1977).

According to Sartori (1970) «the background of comparability was established by the per genus et differentiam mode of analysis, i.e., by a taxonomical treatment». As a matter of fact, «When faced with a set of objects, people often sort them into clusters to reduce information load and facilitate further processing (Tversky 1977).

[24]For example, if $\theta = 1$, and α and β vanish, then S (a, b) = f(A ∩ B) that is, the similarity between objects is the measure of their common features. If $\alpha = \beta = 1$ and θ vanishes, $-S(a,b) = f(A - B) + f(B - A)$; then: that is, the dissimilarity between objects is the measure of the symmetric difference between the respective feature sets (Tversky 1977).

[25]On this point, we can quote Medici (1953) who says: «there is no limit to the number of groups to be classified as the factors affecting prices are extremely numerous, their importance varies widely, and the combinations to which they lend themselves are many».

Moreover, categorization facilitates a number of cognitive abilities and functions, one of the most important of which is inductive inference that is based on the human capacity to project information from one category to another, similar category[26] (Heit 1997).

In the taxonomical process «Clusters are typically selected so as to maximize the similarity of objects within a cluster and the dissimilarity of objects from different clusters» (Tversky 1977) so that «the class provides the "similarity element" of comparability» (Sartori 1970) while «the "differences" enter as the species of a genus, or the subspecies of a species—and so forth, depending on how fine the analysis needs to be» (Sartori 1970).

9 Classification

According to the logic of classification building, «Classes are required to be mutually exclusive, i.e., class concepts represent characteristics which the object under consideration must either have or lack. Two items being compared must belong first to the same class, and either have or not have an attribute; and only if they have it, the two items can be matched in terms of which has it *more* or *less*. Hence the logic of gradation belongs to the logic of classification. More precisely put, the switch from classification to gradation basically consists of replacing the signs "same-different" with the signs "same-greater-lesser," i.e., consists of introducing a quantitative differentiation within a qualitative sameness (of attributes). Clearly, then, the sign "same" established by the logic of classification is the requisite condition of introducing the signs "plus-minus"» (Sartori 1970).

We can say that a classification,[27] or better, «a taxonomic unfolding represents a requisite condition for comparability» (Sartori 1970) and that, «regardless of whether we rely on quantitative data or on more qualitative information, in any case the problem is … to construct fact-finding categories that own sufficient discriminating power»[28] (Sartori 1970), that is «the logical requirement of a classification is that its classes should be mutually exclusive and jointly exhaustive, it follows from

[26]But, we must also take care that not all categories are created equal in inductive reasoning, not all properties are equal: some properties are more projectable, or more easily projected, than other properties, as a matter of fact, in assessing similarity people reason differently depending on their background knowledge and what property P is actually considered (see Heit 1997).

[27]It is key to note that a dynamic interplay between similarity and classification exists. According to Tversky (1977), «It is generally assumed that classifications are determined by similarities among the objects», but it is also possible to support «the converse hypothesis that the similarity of objects is modified by the manner in which they are classified».

[28]Genter and others more recently suggest that in similarity besides the commonalities only those differences related to the commonalities (i.e., the alignable differences) should be considered. The idea that alignable differences are more salient in the comparison process has one startling, counterintuitive implication according to which people should list more differences—particularly more alignable differences—for similar pairs than for dissimilar pairs (Genter and Markman 1994).

this that the taxonomical exercise supplies an orderly series of well sharpened categories, and thereby the basis for collecting adequately precise information» (Sartori 1970). The classical rule is that the smaller is the number of classes, the greater will be the variation between classes, and vice versa.

In classification, the classic problem is that of inclusion and exclusion: what goods should include in each class/category?

10 Selection and Classification of Cases

Even though the quality of comparison mainly depends on how cases are selected and classified—according to the similarity relationship—scholars and handbooks of comparative analysis as well as of Appraisal generally pay a little attention to these two fundamental processes simply relying on pragmatic reasons and/or the appraiser's technical knowledge, competences, skills, etc. (Seawright and Gerring 2008). But neglecting the question may undermine the results of the comparative analysis, so the next step is to address the questions of how to build a set of reference cases, and to identify the properties and attributes according to which it is possible to properly classify empirical events that occur in reality.

In the comparative analysis, the selection of cases is strictly related to analysis and specifically to its goal/s and, in no event it should follow the statistical sampling rules[29] (Ragin 1987; Lor 2012). In selecting cases for comparison, they should be comparable in respect of the phenomenon mainly relevant in the analysis, this means that entities considered should have both shared and non-shared attributes (Sartori 1991; Lor 2012). As «It is intuitively obvious that there is little point in comparing entities that are so different that hardly any commonality can be found … Neither would it be useful to compare entities that are so similar that little difference of interest can be found» (Lor 2012).

The adoption of the "Most Similar Method"—based on J.S. Mill's Method of Difference[30]—might be a suitable strategy in selecting cases for comparison. According to this method, we select cases that are very similar on all the measured, controlled, independent variables, except in respect of the particular independent variable/s or factor/s whose influences (being crucial for the analysis) we want to evaluate (Lor 2012; Seawright and Gerring 2008; Bentivegna 2009).

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[29]The main kind of statistical sampling are:
- · convenience sampling;
- · random sampling;
- · probabilistic sampling;
- · judgmental or purposive sampling;
- · etc.

[30]The Mill's method of difference (Mill 1872) has been developed by Przeworski and Tuene (1970) as the method of "most similar systems," and by Lijphart (1971) as the "Comparative Method".

Within each category or classes «Most similar case selection proceeds by (1) defining the relevant universe of cases, (2) identifying key variables of interest that should be similar across the target cases, (3) identifying a variable or variables that should vary meaningfully across the target cases, and (4) selecting the … cases … that have the specified similarities and differences» (Nielsen 2014). So that, if our case is similar to all the other selected cases across all background conditions that might be relevant to the outcome of interest, and if the cases differ, however, on one dimension X_1 and on the outcome, Y, it may be presumed from this pattern of covariation across cases that the presence or absence of X_1 is what causes variation on Y. Unfortunately very often this procedure is not operatively applicable due to the following reasons: the continuity of variables; the impossibility to find cases with precisely the same score on all the scalar dimensions; the larger the number of matching variables employed, the lower the likelihood of finding exact matches (Seawright and Gerring 2008). As a consequence, «if a researcher is to select cases that are really similar, however that similarity is defined, the number of appropriate cases is likely to become limited» (Collier 1993). And indeed Simonotti (2006) states that, in most practical cases of Appraisal, the sample (i.e. the whole set of buildings forming the scale of prices) is: (1) multiple because it should consider the many characteristics of the buildings (related to their intrinsic and extrinsic conditions, qualitative and quantitative modalities and prices); (2) very small because the number of "similar buildings" exchanged on the market is very limited.

Simonotti (2006) proposes a so-called *allegorical*[31] classification which encompasses equal buildings at an end, and dissimilar buildings at the opposite end, while the intermediate categories include buildings having different degrees of similarity (without the possibility to define any clear line of demarcation among them):

- equal real estates have the same characteristics and the same modality for each characteristic;
- similar real estates have the same characteristics and a different modality for at least one characteristic (e.g.: different apartments in an apartment block);
- intermediate real estates, placed between the former and the following category, may have both common and different characteristics, but should have a different modality for more than one common characteristic (e.g.: apartments vs. single-family houses);
- dissimilar properties have different characteristics except a common one (e.g.: a building and a building area).

Simonotti (2006) also suggests that, according to the purposes of comparison as well as in order to mirror the reality and increase the likelihood of the estimate, the appraiser should use samplers including the greatest possible number of buildings

[31]Allegoric relationship mainly refers to "relational" commonalities as Gentner and Markman (1997) affirm: «In a fundamental sense, similarity is like analogy … The difference between them is that in analogy, only relational predicates are shared, whereas in literal similarity, both relational predicates and object attributes are shared».

similar to the one at stake. In any case, among the selected cases should be listed, in addition to the benchmark property, at least another real estate that may be:

- equal, in this case, no comparison is possible as we do not have a similarity but rather an identity relationship and, as a consequence, the appraisal becomes a tautology;
- similar, intermediate and dissimilar, in this case, the comparison is always possible since there is at least a common feature or a standard of comparison;
- dissimilar, in this case, the comparison is impossible since there is no standard of comparison.

As Simonotti (2006) himself notes, also following his rules, the selection and classification of cases still remains highly vague and indeterminate. Several solutions to the problem are available, we will present just two relevant ones. The first solution recalls the Tversky (1977) contrast model, whereas the second solution is inspired by Lin's (1998) "theorem of similarity".

As previously addressed in paragraph 8 on similarity, according to the contrast model, the similarity between two elements a and b is an increasing function of commonalities and a decreasing function of differences that may be expressed and measured by the following formula:

$$S(a,b) = \theta f(A \cap B) - \alpha f(A - B) - \beta f(B - A)$$

Lin's "Theorem of Similarity" is based on the following three basic intuitions:

- The similarity between a and b is related to their commonality. The more commonality they share, the more similar they are;
- The similarity between a and b is related to the differences between them. The more differences they have, the less similar they are;
- The maximum similarity between a and b is reached when a and b are identical, no matter how much commonality they share;

and states that: «the similarity between a and b is measured by the ratio between the amount of information needed to state the commonality of a and b and the information needed to fully describe what a and b are» and may be measured by the following function (Lin 1998):

$$\mathrm{sim}(a,b) = \frac{I(\mathrm{common}(a,b))}{I(\mathrm{description}(a,b))} = \frac{\log P(\mathrm{common}(a,b))}{\log P(\mathrm{description}(a,b))}$$

where

a and b	are two elements;
common(a, b)	is a proposition that states the commonality between a and b;
I	is the amount of information contained in a proposition;
I(common(a, b))	is the proposition that states the commonality between a and b;
I(description(a, b))	is the proposition that describes what a and b are.

In addition, we should note that, according to the information theory, the information contained in a statement is measured by the negative logarithm of the probability of the statement.

Summarizing, we can say that, in spite of many positivistic-quantitative prejudices, comparison—properly used and applied—is a method of research having the same scientific status of the experimental and statistical ones. Moreover, it is especially suitable for those disciplines that usually rely on observation, like Appraisal, when the problem at stake is not to understand and explain the phenomenon through data aggregation and producing information about frequency distributions and relationships, but rather to highlight similarities and differences to analyze the causal covariation among cases.

According to the literature, it is possible to increase the scientific content of comparison through a careful definition and measurement of the similarity concept. Many scholars have been engaged in producing similarity functions and two interesting examples are reported above. But even though both these two similarity functions provide the researcher with a satisfying solution for comparing and classifying cases, such solutions are unfortunately merely theoretical and not yet operational ones. As a matter of fact to make them operative the experts should determine: in the case of Tversky's contrast model, the θ, α, and β parameters representing the relative weights of the three components of similarity included in the function; and in the case of Lin's theorem of similarity, a suitable way to quantify the amounts of information required, that is: I(common(a, b)) and I(description(a, b)).

Both tasks are not trivial and go beyond the limits of this paper deserving a great careful attention. As a matter of fact, a further step toward an increase of the scientific quality of the comparative research in Appraisal is required. This means that—to bridge these theoretical-methodological and practical-operational issues within a common vision—a deep and thoughtful reconsideration process should be advisable. But such a task necessarily is the responsibility of appraisers' epistemic community, and it certainly cannot be delegated to the so called "unconscious thinkers" (Sartori 1970) operating both in the research as well as in the professionals field.

11 Conclusions

The paper has been focused on the comparison method firstly addressing the reason why it should be considered the rationale of Appraisal as a scientific discipline and in what it consists highlighting its two fundamental phases and their different nature. Subsequently, the paper has addressed the need for an increase of the scientific content of comparison in Appraisal questioning the thesis that it should simply be substituted by the statistical method.

As the choice of the method of inquiry actually is a matter of logic, the paper has provided a short overview of the main research strategies (experiment, statistic, and

comparison) delineating the respective application fields depending on the specific characteristics of the inquiry at stake and on what conditions must be accomplished in order to ensure the reliability and validity of results.

As not always in Appraisal the assumptions of the statistical regression are met, due to the "many variables, small N" problem, the paper has been focused on the comparative method which is especially suitable whenever we have only a limited number of observed cases. The paper has also considered the concepts of similarity (focusing on how it can be measured) and categorization as they strongly influence the selection and classification of cases and, more importantly, they condition the scientific quality of the comparison process.

Subsequently, the paper has considered a recent method of case selection and categorization (allegorical classification by Simonotti) suggesting how the methodological developments of the comparative theory should help in reducing its vagueness and indetermination using two possible measures of similarity.

Finally, the paper complains that the theoretical and methodological progress in comparative analysis are not yet matched by operative-practical solutions and exhorts the appraisers' epistemic community for starting a deep and thoughtful reflection on this question.

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