

Chapter 5

Analogy and Redefinition

Fabrizio Macagno

5.1 Introduction

The word “analogy”, in Greek “according to ratio”, originally meant rational correspondence. In the *Posterior Analytics*, Aristotle pointed out that this type of reasoning could be used for identifying a fundamental characteristic common to various entities, and for which no name exists. As Aristotle put it (*Posterior Analytics* 98a20-23):

Again, another way is excerpting in virtue of analogy; for you cannot get one identical thing which pounce and spine and bone should be called; but there will be things that follow them too, as though there were some single nature of this sort.

Aristotle noticed that there is not a specific generic class (a genus in his system of predicables, or rather logic-semantic relations, see Macagno and Walton 2009a) that groups together the pounce (of a cuttlefish), the spine (of a fish), and the bone (of an animal). In this case there is no name referring to this category, which, however, represents an essential feature (or a generic ontological aspect) common to the three entities. These three different concepts share a substantial characteristic that indicates what they are; however, this generic feature has no name. Analogy, in this sense, reveals a genus (a generic, common and essential feature) that can be considered as an ontological and semantic property that does not have a conventional name (see Glucksberg and Keysar 1990, p. 8; Hesse 1965, p. 331).

The purpose of this paper is to investigate analogy from the point of view of its function as a mechanism for abstracting a new common property from different concepts and drawing inferences from it (Macagno and Walton 2009b). In this sense, the goal is to show how this process, which can be considered as semantic, can justify the ancient topic that Boethius expressed as “Regarding similar, the judgment is one and the same” (*De Topicis Differentiis* 1197B 27-28), and that

F. Macagno (✉)
Institute for Philosophy of Language,
New University of Lisbon, Lisbon, Portugal
e-mail: fabrizio.macagno@fesh.unl.pt

Table 5.1 Argumentation scheme 1: argument from analogy

Major premise	Generally, case C_1 is similar to case C_2
Minor premise	Proposition A is true (false) in case C_1
Conclusion	Proposition A is true (false) in case C_2

in the modern theory of argumentation schemes is represented as follows (Walton et al. 2008, p. 315; Table 5.1):

The aim is to investigate how and why a common property, which represents the similarity between C_1 and C_2 , can be abstracted from two distinct concepts, and how and why this new generic category can support the inferential passage. A possible answer can be found by developing the Aristotelian idea of analogy as a semantic process, and combining it with the logic-semantic concept of genus.

5.2 Analogy and Functional Genus

The argumentation scheme from analogy is grounded on two components: a comparison between two different entities or facts, and a predicate attributed to the primary subject. However, the crucial problem is to understand what a comparison is, and what are the mechanisms underlying it. In particular, it is necessary to distinguish between two distinct reasoning processes: (1) the relation between the two terms of comparison and the property or the properties that they have in common; and (2) the relation between the generic common property and the entities that fall under it. The first crucial dimension of analogy that needs to be investigated is how comparison works, and how it can be used for classifying two different concepts under a common characteristic.

We can notice that the fundamental characteristic of comparison corresponds to the relationship between the similarity and the difference between the two entities or facts compared, in this case the primary subject and the analogue. The two terms of the comparison can be compared not only because they are similar in some respects, but because they are also different in others (Glucksberg and Keysar 1990, p. 7). The point is to identify when and how they can be similar and at the same time different. Two varieties of apples (such as the Golden Delicious and the Granny Smith) cannot be compared from the point of view of their generic essential properties (they are fruits, they come from *Malus* trees...), but only from the perspective of some characteristics that do not constitute their commonly accepted meaning or classification. For instance, the two varieties of apples can be compared by taking into consideration their flavor, shape, or sweetness. Likely, a steamboat can be considered as similar to an inn because these two entities are not lodging houses. Similarly, a fetus can be compared to a violinist plugged into a person's circulatory system because the two terms of the comparison cannot fall within the same category of "unborn young (of a human being)."

Analogy can be considered as grounded on a similarity that includes the two terms of the comparison under a common characteristic, which does not correspond to the definitional genus or a commonly accepted generic category. This common

characteristic can be considered as the very purpose of the analogy or it is functional to the attribution of the predicate to the two entities or events. The common characteristic can be thought of as a “super-ordinate category” (Glucksberg and Keysar 1990, p. 8), in which the two terms of the primary subject and the analogue are included. This generic category does not correspond to the definitional or taxonomic genus of the analogue, but rather to a new property (Glucksberg and Keysar 1990, p. 9; Macagno and Walton 2009b) that is functional to the attribution of the predicate or to a classification.

This new category can be considered as a pragmatic or functional genus from a logic-semantic perspective. Aristotle described the genus as “what is predicated in what a thing is of a number of things exhibiting differences in kind” (*Topics* 102a 31-32). According to the Aristotelian account, this predicable is an ontological and logical relation that is connected with the essence, or rather fundamental characteristics, of a concept, such as the relation between “animate being” and “man.” The need of classifying the category according to the traditional system of the predicables is grounded on the need of justifying the reasoning process underlying the passage from the attribution of a property A to a specific concept (C1) to the attribution of the same property to a more generic one (encompassing both C1 and C2). In the system of the predicables, this type of reasoning was justified by a fundamental principle expressed by Boethius in his *De Differentiis Topicis*. The attribution of the property A of the species P to the (functional) genus G is supported by the maxim connecting the species to the genus (Boethii *De Differentiis Topicis*, 1189A): “What is predicated of the parts (in this case essential part, the species) is predicated also of the whole (in this case essential whole, the genus).”

In case of analogy the crucial problem is the requirement of the “essentiality” of the genus. The idea of functional (or pragmatic) genus is self-contradictory if we conceive “essence” as something immutable and pre-existing the utterance. However, from a pragmatic perspective, the “sentence or word meaning”, or rather what the “word, expression or sentence actually means” (Searle 1981, p. 77), can be different speaker’s meaning, i.e. what the speaker wants to communicate through his speech act (Stern 2008, p. 263; Carston 2002). The use of a sentence in a speech act can create meaning that is different from the semantic one. In case of analogy, the comparison is functional to a communicative goal, which can be explicit (the attribution of a predicate) or implicit (a new classification). In both cases, analogy redefines contingently the concepts used, in the sense that for the purpose of the comparison the two terms are characterized by semantic features that are different from the definitional ones. The new property provides a new criterion that does not represent the most generic fundamental characteristic of the concept (constituting its “dictionary” meaning), but only a functional one. The abstract property, in this sense, has the function of making the equivalence between the two compared entities relevant for a communicative purpose. For this reason, the analogical genus does not refer to a characteristic of the terms of the comparison that describes “what a thing is absolutely”, but simply “what a thing is contextually,” for the specific communicative and pragmatic purpose of the analogy. On this perspective, the primary subject and the analogous are functionally and contingently redefined.

5.3 Abstraction and Relevance

In order to describe the process of abstraction on which analogy is based, we need to analyze two distinct reasoning passages: the mechanism of abstraction of the functional genus, and the different ways in which this genus is triggered and supported.

5.3.1 *Abstracting the Functional Genus*

The creation of a functional genus is an implicit mechanism in which an abstract and not pre-existing category is created ad hoc to support the reasonableness of the attribution of the predicate to both terms of comparison. For instance, we consider a famous legal analogy between innkeepers and steamboat operators (*Adams v. New Jersey Steamboat Co.*, 151 N.Y. 163, 1896):

Case 1

It was deemed to be a sound and necessary rule that this class of persons should be subjected to a high degree of responsibility in cases where an extraordinary confidence is necessarily reposed in them, and where great temptation to fraud and danger of plunder exists by reason of the peculiar relations of the parties. The relations that exist between a steamboat company and its passengers, who have procured staterooms for their comfort during the journey, differ in no essential respect from those that exist between the innkeeper and his guests. (...) A steamer carrying passengers upon the water, and furnishing them with rooms and entertainment, is, for all practical purposes, a floating inn, and hence the duties which the proprietors owe to the passengers in their charge ought to be the same.

This analogy is used to attribute the same predicate “to be liable for the guests’ losses” to a category of individuals that cannot be considered as innkeepers, i.e. steamboat operators. This analogy creates a new functional genus, i.e. a category characterized by a specific property (or bundle of properties) that constitutes the reason for attributing the predicate to its hyponyms. In this case, the reasoning is explicit and provides the characteristics defining this new genus: “providers of accommodation to guests reposing in them extraordinary confidence.”

Sometimes, however, the creation of a new functional genus can be used as an instrument for generating an ambiguous category. The crucial dimension of analogy is the relationship between the predicate and the property that grounds its predication. However, when this relation is not made explicit, it can be reconstructed in different fashions, leading to the abstraction of different properties and, therefore, of implicit categories. For instance, we consider the famous case used by Thomson in defense of abortion (Thomson 1971, pp. 48–49):

Case 2

You wake up in the morning and find yourself back to back in bed with an unconscious violinist. A famous unconscious violinist. He has been found to have a fatal kidney ailment, and the Society of Music Lovers has canvassed all the available medical records and found that you alone have the right blood type to help. They have therefore kidnapped you, and last night the violinist’s circulatory system was plugged into yours, so that your kidneys can be used to extract poisons from his blood as well as your own. [If he is unplugged from you now, he will die; but] in nine months he will have recovered from his ailment, and can safely be unplugged from you.

In this case, the problem is to identify the functional genus, and more specifically the relevant property thereof, warranting the attribution of the predicate “to have no right to be left to use the other’s body.” Both a fetus and the violinist are beings, both are human according to some views, but certainly they are not both persons from a legal perspective. Moreover, is it possible to claim that the predicate can be attributed to the two beings because they are using the other’s body without any consent of the host? Or that the host is not bound to the two beings by any responsibility or obligation? The problem in this case is to identify the reason why the predicate can be attributed to the functional genus, which specifies the characteristics that the latter needs to have.

5.3.2 *Types of Analogy and the Functions of the Abstracted Genus*

Analogies can have different structures in the sense that the “identity of relations” can be shaped according distinct propositional forms and communicative purposes. We can consider the following cases:

1. I am to dancing what Roseanne is to singing and Donald Duck to motivational speeches. I am as graceful as a refrigerator falling down a flight of stairs. (Leonard Pitts, “Curse of Rhythm Impairment” *Miami Herald*, Sep. 28, 2009)
2. If you want my final opinion on the mystery of life and all that, I can give it to you in a nutshell. The universe is like a safe to which there is a combination. But the combination is locked up in the safe. (De Vries 1965, p. 307)
3. Thus (e.g.) inasmuch as the relation of a doctor towards the possession of ability to produce health is like that of a trainer towards the possession of ability to produce vigour, and it is a property of a trainer to possess the ability to produce vigour, it will be a property of a doctor to possess the ability to produce health. (Aristotle, *Topics* 137a4-8).
4. Public officials ought not to be selected by lot. That is like using the lot to select athletes, instead of choosing those who are fit for the contest; or using the lot to select a steers-man from among a ship’s crew, as if we ought to take the man on whom the lot falls, and not the man who knows most about it. (Aristotle, *Rhetoric* 1393b4-1393b8).

In (1), the dancing ability of the primary subject (the speaker) is compared with other cases of “complete inability” in performing specific activities. The analogues in this case illustrate a new genus that constitutes the purpose of the analogy, namely classifying the primary subject under a new category. This new category contains in itself a value judgment, which is the very purpose of the move. In (2), the analogy consists in an illustration of a genus from a single case that is created specifically in order to exemplify this abstract genus (Goodman 1968, pp. 52–66; Stern 2000, pp. 153–156). This new category can be represented by different predicates such as “to be a problem that makes no sense to try to solve.” It constitutes the purpose of the analogy, i.e. the classification of the primary subject under a specific functional

genus, which contains the judgment that is the conclusion of the analogical move. In both cases, the analogy works as the construction of a genus through illustration and exemplification. In (3) and (4), however, the mechanism is noticeably different.

In (3), the doctor is compared to a trainer from the point of view of a common property, i.e. possessing the ability of producing health and vigor. The doctor and the trainer are regarded from a specific perspective, namely the ability that characterizes them. The two entities are placed as species of the generic category of professions, and the attribution of the generic predicate to the category of the entities is grounded on the semantic relation of “property.” In (4), the reasoning is different because only one functional category is abstracted from the comparison, the one under which the subject and the analogues fall. The different entities are regarded from the point of view of “being not selectable by lot.” The characteristic that grounds this predication is “to be a duty requiring a specific ability or knowledge,” because chance cannot reveal ability. In these two latter cases of analogy there is an unbalance between the attribution of the predicate to the analogues and to the primary subject. Whereas the predication is uncontroversial for the analogue, it can be problematic when attributed to the primary subject. For this reason, the creation of a functional genus under which analogues and primary subject fall and the attribution of the predicate to it constitute the core of the argumentative move. The force of this mechanism lies in the relationship between the predicate and the functional genus, which can be based on a semantic property, or cause-effect, or values. For instance, while in (3) the relation is semantic (absence of the specific ability results in not being a specific professional, in (4) values or consequences combine with sign (lot does not reveal ability; one should choose the most skilled person in charge for an activity/unskilled persons cannot perform their activities properly). In this sense, the relevance of the functional genus to the property can be represented by a specific argumentative relation.

Different argumentative relations can establish the link of relevance between the predicate and the genus. Such relations constitute a fundamental dimension of the strength of an analogy. For instance, we consider the famous case quoted by Aristotle (*Prior Analytics* 68b38-69a19):

Case 3

If we want to show that the aggression of Athens against Thebes was evil, we must first know that aggressive war on neighbours is evil. Evidence of it is obtained from similar cases, e.g. the aggressive war of Thebes on Phocis. Assuming then that aggressive war on neighbours is evil, and that the attack of Athens on Thebes was aggressive war on neighbours, it follows that the attack of Athens on Thebes was evil.

Here the abstraction of the genus “aggressive war against neighbors” is functional to the attribution of “to be evil” because it can be supported by a possible implicit causal relation (wars against neighbors can be dangerous or lead to unfortunate aftermaths). The acceptability of this analogy depends on the degree of acceptability of this relation. For instance, the acceptability of this analogy would have been noticeably different if the genus had been simply “wars between Greek cities,” which would be hardly acceptable as a cause of evil consequences.

The correlation between the strength of the relevance relation and the force of the analogical reasoning emerges clearly in cases in which the first one is based on values. For instance, we consider the following famous analogy (Aristotle, *Rhetoric* 1399b 1-5):

Case 4

And Theodectes in his Law said, “You make citizens of such mercenaries as Strabax and Charidemus, as a reward of their merits; will you not make exiles of such citizens as those who have done irreparable harm among the mercenaries?”

This analogy is grounded on the relevance relation between “social behavior of a person” and “implementation of punishment or rewards connected to the status of citizenship.” This relation is value-based, as the quality of a person’s behavior is considered to be a principle for attributing rewards or punishments. Moreover, in this case the strength of the analogy is grounded on an implicit threat of inconsistent commitment, as failure to punish the citizens that misbehaved in war would contradict the value that the agent advocated in his first decision.

5.4 The Logic of Genus-species

As mentioned above, reasoning from analogy is characterized by two steps: the abstraction of a functional property to which a predicate is or can be attributed, and the classification of the primary subject according to the new category or the predicate attributed to the category. In the subsections above the first reasoning passage has been described as a process of abstraction grounded on exemplification or reasons supporting the attribution of a predicate. The other passage, the one from the category to the primary subject, needs to be clarified. This relationship is clearly defeasible and, for this reason, it can be explained by using the ancient system of *loci* (Rigotti 2006; Rigotti and Greco Morasso 2010; Kienpointner 1986) and in particular the maxims concerning the genus.

The abstraction of a new ad hoc category results from a logic-semantic point of view in the creation of a functional genus, i.e. a relational predicate that is characterized by specific logical and semantic properties. The genus is semantically more generic than the species, in the sense that the genus can be predicated essentially of the species, but not vice-versa. For example, if “animate being” is the genus of “man,” a man can be considered as an animal, but an animal is not a man based on the principle that “species partake of the genera, but not the genera of the species” (Aristotle, *Topics* 121a 12). Similarly, the functional genus abstracted from the analogous can be used for classifying the primary subject, as it is regarded as a species of the new superordinate category. For this reason, in case 1 above, the speaker is described as belonging to a species of individuals characterized by “complete inability in performing specific activities,” as “of the objects of which the species is predicated, the genus ought to be predicated” (Aristotle, *Topics* 121a 26).

The other types of analogy, based on the attribution of a predicate to the functional genus, are governed by a different *locus*, described by Boethius as follows: “Whatever is present to the genus is present to the species” (*De Topicis Differentiis* 1188B 21-22), in the sense that “the essence of the genus and the accidents adhering to that essence are also part of the species” (note 67). As the genus is functional to the predication of the predicate, namely it is warranted by the genus, it is predicated also of the specific concepts falling under it. For instance, in case 4 above, public officials are presented as a species of the generic category of “duties requiring a specific ability or knowledge,” which justifies the attribution of the predicate “not being selectable by lot.” For this reason, the following reasoning is triggered (Table 5.2):

Table 5.2 Analogy as a genus-species relation

Maxim	Whatever is present to the genus is present to the species.
Assumption	Public officials are a species of “duties requiring a specific ability or knowledge,” of which “to be not selectable by lot” is said.
Syllogism 1	Whatever is present to the genus is present to the species. “Duties requiring a specific ability or knowledge” is the genus of “public officials.” Therefore, whatever is present to “duties requiring a specific ability or knowledge” is also present to “public officials.”
Syllogism 2	Whatever is present to “duties requiring a specific ability or knowledge” is also present to “public officials.” Duties requiring a specific ability or knowledge are not selectable by lot. Therefore public officials are not selectable by lot.

This mechanism can explain also the strategic role of analogy. The hearer can attack the aforementioned classification by either denying the belonging of the primary subject to the functional genus, or the attribution of the predicate to the genus. As mentioned above, the first passage is implicit, and the specific features of the genus can be ambiguous, making the defense of the functional genus easier for the speaker. Otherwise, the hearer can reject the relationship functional genus—predicate by denying that the predicate applies to one of the species. However, by providing extreme and almost irrefutable cases, the speaker increases the burden of denial.

5.5 Analogical Redefinitions and Analogical Definitions

As seen above, analogy is based on a semantic operation of abstracting a generic property that is contextually needed for the attribution of a predicate or a classification. This mechanism is contextual, as the process of abstraction does not involve the commonly shared (and defined) concepts, but rather a specific use thereof, a pragmatic and contextual function. The idea of analogy as a form of contextual definition or redefinition can be analyzed by taking into account the distinct definitional processes based on analogical reasoning. The starting point is the analysis of the