

THE LOGICAL AND PRAGMATIC STRUCTURE OF ARGUMENTS FROM ANALOGY

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ABSTRACT

The reasoning process of analogy is characterized by a strict interdependence between a process of abstraction of a common feature and the transfer of an attribute of the Analogue to the Primary Subject. The first reasoning step is regarded as an abstraction of a generic characteristic that is relevant for the attribution of the predicate. The abstracted feature can be considered from a logic-semantic perspective as a functional genus, in the sense that it is contextually essential for the attribution of the predicate, i.e. that is pragmatically fundamental (i.e. relevant) for the predication, or rather the achievement of the communicative intention. While the transfer of the predicate from the Analogue to the analogical genus and from the genus to the Primary Subject is guaranteed by the maxims (or rules of inference) governing the genus-species relation, the connection between the genus and the predicate can be complex, characterized by various types of reasoning patterns. The relevance relation can hide implicit arguments, such as an implicit argument from classification, an evaluation based on values, consequences or rules, a causal relation, or an argument from practical reasoning.

Keywords: Analogy, Reasoning, Argumentation schemes, Inferences, Pragmatics, Relevance

1. Introduction

Analogy can be broadly considered as a comparison between two objects or systems of objects that highlights respects in which they are thought to be similar (Bartha 2010, 1). From an ontological point of view, these objects can be thought of as entities (individuals having specific characteristics) or states of affairs. This comparison¹ is the ground of a specific type of reasoning, analogical reasoning, which can be used to support a conclusion in the so-called argument from analogy (Juthe 2005; Guarini 2004; Macagno and

¹ Aristotle developed a sophisticated system of comparative logic, which is the underlying logic of all the arguments that will be discussed in this paper. This paper does not intend to address the logic of such arguments, but their pragmatic and argumentative machinery. The modern (formal) account of comparative logic has been developed by Casari (Casari 1987; Casari 1989; Paoli 1999).

Walton 2009; Walton 2010; Macagno 2014). This type of argument can be summarized in the dialectical maxim that Boethius expressed as “regarding similar, the judgment is one and the same” (Boethii *De Topicis Differentiis*, 1197B 27-28). However, this ancient *locus* hides a complex structure. Analogical arguments can be used to support judgments different in kind, i.e. conclusions that can be classificatory, evaluative, causal, or deliberative in nature. Is the structure of the reasoning the same in all such distinct cases? What is the process of reasoning that is common to all these various types of inference?

The purpose of this paper is to analyze analogical arguments starting from an interpretation of their place in the dialectical and rhetorical traditions, and show how they can be regarded as a twofold reasoning process. On the one hand, analogy is a comparison, an abstraction of a generic characteristic common to two distinct entities or states of affairs. On the other hand, this common feature guarantees an inferential step, leading from the attribution of a predicate (to the Analogue) to its predication (to the Primary Subject). The relationship between these two passages needs to be investigated, specifying how and why a common property can be abstracted from two distinct concepts, and how and why this new generic category can support the inferential passage. In order to address these issues, the Aristotelian dialectical notion of *genus* and the *topoi* related thereto will be reinterpreted from a pragmatic perspective, tracing back the logic of analogy to its dialogical and pragmatic function.

2. The Aristotelian genus and the semantics of analogical arguments

An analogical argument is representation of a form of analogical reasoning in which the presented similarities between two entities or events (the Analogue and the Primary Subject) are used to support the conclusion that a specific feature (quality; predicate) characterizing the Analogue shall be also attributed to the Primary Subject (also called “target”) (Copi and Cohen 2005; Walton 2010; Walton 2014). This type of reasoning mirrors the structure of the type of argument that, in the Latin and Medieval tradition, was called “from proportion” and classified as a kind of reasoning from likeness (Boethii *De Topicis Differentiis*, 1202b 34-35; Buridani *Summulae de dialectica*, SDD 6.5.8). A clear example, taken from Aristotle and discussed in the dialectical tradition, is the following (*Rhetoric* 1393b4-1393b8):

The illustrative parallel is the sort of argument Socrates used: e.g. ‘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 steersman 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’.

This argument is based on the similarity between two states of affairs, or more specifically two decisions: selecting public officials by lot (Primary Subject), and selecting athletes (or steersmen) by lot (Analogue). This comparison is aimed at guaranteeing the transfer of a value judgment from the Analogue (choosing athletes by lot is nonsensical/choosing steersmen by lot is foolish) to the Primary Subject (choosing politicians by lot is nonsensical/foolish). However, the structure of argument outlines in the contemporary argumentation and logical literature does not develop the reasoning underlying the reasonableness of such a transfer of predication. The dimension of reasonableness does need to be distinguished from the logical soundness of the reasoning, but also needs to be included in the analysis of the reasoning, since it constitutes an essential element for assessing the acceptability and fallaciousness (Walton 2003) of an analogical argument. For example the same argument could be understood quite differently if the Analogue were “using the lot to select the one to whom attribute a prize of a lottery” or “using the lot to select the soldier that is going to start the attack.” In both cases, the argument as a whole would have sounded very different. In the first case, unless one considers public offices a sort of gamble, the comparison leads to the opposite conclusion and is highly problematic. In the second case, unless one thinks of politics as a sort of punishment or dangerous activity that nobody wants to carry out, the reasonableness of the parallel is extremely doubtful.

These cases point out the need to integrate the logical dimension of analogy with a semantic one, governing the dimension of reasonableness. This semantic process can be referred to as a process of abstraction of a common property. An interesting insight regarding this semantic process was provided in the *Posterior Analytics*, where Aristotle pointed out that analogy could be used for identifying a characteristic common to various entities different in genus (Hesse 1966, chap. 4), 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.

The pounce (of a cuttlefish), the spine (of a fish), and the bone (of an animal) do not belong to the same genus, but they can be conceived as the same in a specific respect, in this case the function they have in different types of animals. This function is not a strictly semantic genus, but an analogical one. As Aristotle points out in the *Metaphysics*, analogy presupposes a difference in genus of the concepts that can be considered as the same from a relational point of view (*Metaphysics* 1016b31-1017a2):

Again, some things are one in number, others in species, others in genus, others by analogy; in number those whose matter is one, in species those whose formula is one, in genus those to which the same figure of predication applies, by analogy those which are related as a third thing is to a fourth. The latter kinds of unity are always found when the former are, e.g. things that are one in number are one in species, while things that are one in species are not all one in number; but things that are one in species are all one in genus, while things that are so in genus are not all one in species but are all one by analogy; while things that are one by analogy are not all one in genus.

The spine, the bone, and the pounce do not belong to a common genus, but they can be thought of as having the same function considering their relation with the body of the various types of beings. They can fall under the nameless category (*Posterior Analytics* 74a8) of “osseous nature,” (Hesse 1965, 329) which is functionally essential even though it has no name and is not part of the definition of the concepts. Cajetanus pointed out that the terms of an analogy are essentially different, as their definitions are different, but they are the same from a specific point of view (*De nominum analogia*, c. IV, 36).² This generic “concept” is abstracted based on the relation, and not on the absolute meaning (definition) of the terms of the analogy (c. V, 49-50)³.

3. The argumentative structure of analogy

The analysis of the reasonableness of analogy leads us to inquiring into the relationship between the logical and semantic dimensions of this type of argument and in particular, between the notion of *genus* (or generic predicate under which more specific predicates fall) and the corresponding rules of inference (Macagno, Walton, and Tindale 2014). On this view, analogical arguments can be described as arguments in which two distinct states of affairs or actions are classified or assessed in the same way in virtue of some common features, based on a maxim or rule of inference. For instance, we distinguish some of the possible implicit conclusions of analogical reasoning:

² «In analogis vero, quoniam fundamenta analogae similitudinis diversarum rationum sunt simpliciter, et eiusdem secundum quid, idest secundum proportionem.»

³ «Unde sicut non est alia ratio quare unum proportionaliter non est unum absolute, nisi quia ista est eius ratio formalis; ita non est quaerenda alia ratio, cur a similibus proportionaliter non potest abstrahi res una; hoc enim ideo est, quia similitudo proportionalis talem in sua ratione diversitatem includit.»

Case 1.

The hunting and fishing cases recognize that a mortally wounded animal may run for a distance before falling. The hunter acquires possession upon the act of wounding the animal not the eventual capture. Similarly, whalers acquire possession by landing a harpoon, not by subduing the animal. (Analogy stated in *Popov v. Hayashi*, WL 31833731, at 8, Cal. Super. Ct. 2002, in which the plaintiff (*Popov*) stopped with his glove the baseball ball hit by a famous player, but could not secure it and lost it).

Case 2.

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 steersman 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)

Case 3.

"Unfortunately, the economy, it's a little like a bathtub," billionaire investor Warren Buffett, the Oracle of Omaha, told CNBC this week, explaining why the average American suffers when investment banks collapse. "You can't have cold water in the front and hot water in the back."⁴

Case 4.

I will be calling members and getting their ideas. The main thing is to just move away from this hyper-political environment and recognize the house is on fire, let's put the fire out first and we can figure out what caused it⁵.

Case 5.

You don't go out to dinner and then, you know, eat all you want and then leave without paying the check. And if you do, you're breaking the law. (Obama, on the GOP's opposition to raising the debt ceiling)⁶.

Case 1 can be represented as based on a comparison between the incomplete securing of a ball and the landing of a harpoon on a whale, both falling under the implicit class of "efforts to establish complete control on an entity in the future." Since the latter case is considered to be "possession" in virtue of the abstract implicit category, also the former needs to be classified as

⁴ Retrieved from <http://online.wsj.com/news/articles/SB122247765693581355> on 23 January 2014.

⁵ Retrieved from <http://abcnews.go.com/Politics/Vote2008/story?id=5922487&page=1> on 23 January 2014

⁶ Retrieved from <http://www.youtube.com/watch?v=oR9RQ2yDGw0> on 23 January 2014.

such. Case 2 is aimed at providing a negative value judgment on the choice of selecting individuals performing activities based on skill and abilities by lot. Since athletes or steersmen selected by lot are likely to yield disastrous results, selecting public officials can lead to unfortunate consequences if not chosen based on their expertise. Case 3 is based on a comparison between thermodynamic laws and finance, as they both affect all the elements in a given space (molecules or people). Since it is impossible that heat is not equally distributed in time in a bathtub, similarly the distribution of financial problems will affect all the elements in society. In Case 4 the implicit conclusion is a decision, which is based on the equivalence between what should be done first in two emergency situations. In case of fire, the first goal is to avoid further damage; therefore, in a situation of economic turmoil, the first thing to do is to curb the source of the disaster. The last case leads to the attribution of a judgment or a consequence based on a rule of law to two distinct situations in which a financial obligation is not complied with: not raising the debt ceiling and leaving a restaurant without paying the check. Since the latter case is considered illegal because of the non-compliance dimension, the first is characterized by the same judgment.

All of these distinct uses of analogy have a similar structure, based on a similarity and a consequent “transfer of” predication, this transfer is justified by the relationship between the characteristic considered as common and the judgment or classification attributed to it. In order to better understand the reasoning steps that characterize analogical reasoning, it is useful to start from the structure of the argument from analogy, whose more generic formalization provided in the modern argumentation theories appears as follows (Walton, Reed, and Macagno 2008, 315):

Major premise	Generally, case C1 is similar to case C2.
Minor premise	Proposition (property) A is true (false) in case C1.
Conclusion	Proposition (property) A is true (false) in case C2.

Figure 1: Argument from analogy

This scheme shows how analogy can be regarded as grounded on two components: a comparison between two different entities or facts and the passage from a predicate attributed to the Primary Subject to the attribution thereof to the Analogue. This quasi-logical structure needs to be integrated with a semantic relationship guaranteeing the reasonableness of the attribution of the proposition (quality; predicate) to both the Primary Subject and the Analogue. A common feature, a *genus* in the Aristotelian tradition, needs to be abstracted from the two terms of the comparison, triggering the

corresponding rules of inference. On this view, the conclusion of an analogical argument is guaranteed by a twofold inferential link. The first one establishes the passage from the species (the Primary Subject or the Analogue) to the genus (the common category) and from the genus to the species. The second rule of inference governs the passage from the attribution of a property or characteristic to the species (the Analogue has the feature *A*) to the genus (the common category has the feature *A*), and from the genus to the other species (therefore, the Primary Subject has the feature *A*). We can distinguish the two inferential steps characterizing analogy as two different and interrelated processes, a process of abstraction and one of predication.

4. Abstracting a non-essential genus

The first crucial dimension of analogy concerns how comparison works and how it can be used for classifying two different concepts under a common characteristic (Glucksberg and Keysar 1990). The fundamental characteristic of a comparison consists in the relationship between the similarities and the differences 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). A comparison cannot be drawn from an essential (definitional) property of the two compared entities, but only from an accidental one, not constituting their commonly accepted meaning or classification. For instance, a public official and an athlete, or a doctor and a builder, cannot be considered as similar because they are “human beings,” but rather because of some non-definitional characteristics (such as “being characterized by expertise or skills”) that are common to both of them. Analogical similarities include the two terms of the comparison under a common characteristic, which does not correspond to the definitional genus but rather to a “super-ordinate category” (Glucksberg and Keysar 1990).

From a logic-semantic perspective, this new category can be considered as a *pragmatic or functional genus* (Macagno and Walton 2009). Aristotle described the genus as a predicable included in the definition of a thing, which indicates “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 connecting the fundamental, *definitional* characteristics of a concept, such as the relation between “animate being” and “man.” In case of analogy, this generic predicate does not correspond to a feature of the definition of the Primary Subject and the Analogue (i.e. it is not an “essential” characteristic) (Bartha 2010, 44). The analogical genus represents an

abstraction not from a meaning pre-existing the utterance, but rather from speaker's meaning, i.e. what the speaker wants to communicate through his speech act (Carston 2002; Stern 2000; Stern 2008, 263; Searle 1985, 77; Katz and Langendoen 1976; Atlas 2005; Levinson 2000).

The Primary Subject and the Analogue are used in a speech act aimed at drawing a specific conclusion, and for this reason the *pragmatically essential* characteristic may be different from the definitional one (see the treatment of the Aristotelian account of analogy and its relation to causality in Bartha, 2010, p. 39; Hesse, 1963; Lloyd, 1966 and its roots in Abelard's notion of ambiguity in Abealardi *Dialectica*, 568). For instance, in the analogy between a public official and an athlete described by Aristotle, the comparison is aimed at attributing the predicate "to be selected by lot." For this reason, the common characteristic that is pragmatically (functionally) essential is not human nature, but rather the performance of activities requiring expertise and skill.

The pragmatic or functional genus corresponds to the generic characteristic of the contextual, pragmatic meaning that the terms of the comparison have for the purpose of the specific speech act. In this sense, analogies contingently redefine the primary subject and the Analogue. For the purpose of the comparison (the attribution of a specific predicate), the two terms are characterized by semantic features that are different from the definitional ones (Macagno 2014; Macagno and Zavatta 2014). An athlete becomes an individual performing an activity based on physical skills, like the public official is seen as an individual performing an activity based on the ability to manage public affairs. The abstract functional characteristic has the function to make the equivalence between the two compared concepts relevant for the specific communicative purpose. For this reason, the analogical genus can be conceived as a component of a contextual (contingent) redefinition, which provides the pragmatic meaning of the terms of the comparison within a specific speech act.

5. The logic of analogy: genus and species

As mentioned above, the mechanism of analogy is grounded on two distinct components, an abstraction and a twofold inferential step. The first component represents the similarity relation and it can be conceived of as a functional genus. The idea of pragmatic or functional genus (as distinct from the Aristotelian definitional one) can be used for investigating the inferences that can be drawn from the abstraction of the (non-essential) generic feature that includes the two terms of the comparison. Such inferences can justify the reasoning involved in the second component of analogical reasoning, articulated in two steps: 1) the passage from the

attribution of a property A to a specific concept (C_1), to its attribution to a more generic one (G , encompassing both C_1 and C_2); and 2) the passage from the attribution of A to G to the attribution of A to C_2 .

The first step of reasoning is strictly bound to the aforementioned process of abstraction. The genus is abstracted from the predicate that is attributed to the Analogue, as it represents the reason of this predication. The reason can be logic-semantic in nature, like the examples of dialectical analogy mentioned in the *Topics*, or grounded on other argumentative relations that can support the creation of a functional genus. For instance, an athlete can be considered as “not selectable by lot” as he is an individual performing an activity based on specific skills. The relationship between the genus and the predicate is *pragmatically* “essential,” as the features of the genus are the only ones among the ones shared by the terms of the comparison that can justify the attribution of the predicate. The abstraction redefines the terms of the comparison, providing a new criterion (a new generic category) for classifying them (Macagno 2014).

The second inferential link can be explained using the ancient system of *loci* (Kienpointner 1992; Rigotti 2007; De Pater 1965; Kienpointner 1987; Bird 1962; Bird 1960). The functional genus abstracted from the Analogue can be used for classifying the Primary Subject, as it is regarded as a species of the new superordinate category. For example, a public official is regarded as a specific kind of individual that performs his or her activities based on his or her specific skills. The passage from the attribution of a predicate to the functional genus (G is A) to its predication to the Primary Subject (C_2 is A) is regulated 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). The predicate, being a fundamental characteristic of the functional genus, justifies its pragmatic meaning. For this reason, it is also predicated of the specific concepts falling under it. For example, the attribution of “being not selectable by lot” to “athletes” is motivated by the generic feature of *being an activity grounded on specific abilities or knowledge*, which cannot be dependent on fortune or lot. For this reason, it concerns the generic concept itself and is related to one of its characteristics. Therefore, the predication can be transferred to the other species, i.e. the Primary Subject, according to the following type of reasoning:

Maxim	Whatever is present to the genus is present to the species.
Abstraction	Athletes can be said to be “not selectable by lot” inasmuch as they are a species of “individuals performing an activity based on specific abilities or knowledge.”

Syllogism 1	Whatever is present to the genus is present to the species. “Individuals performing an activity based on specific abilities or knowledge” is the genus of “public officials.” Therefore, whatever is present to “individuals performing an activity based on specific abilities or knowledge” is also present to “public officials.”
Syllogism 2	Whatever is present to “individuals performing an activity based on specific abilities or knowledge” is also present to “public officials.” Individuals performing an activity based on specific abilities or knowledge are not selectable by lot. Therefore public officials are not selectable by lot.

Figure 2: Analogy as a genus-species relation.

The pragmatic relation between the functional genus and the predicate is the ground of all the reasoning steps presupposed by the argument by analogy. As mentioned above, this relation can be considered as a contextual renegotiation of meaning, in which the meaning of the terms of the comparison is redefined on the basis of how it can be relevant to the purpose of the utterance. For this reason, this account of analogy as a process of abstraction yields to investigating the reasoning underlying relevance relations and the types of relevance relations in analogical arguments.

6. Functions and relevance – reconstructing analogical relations

Analogy can be thought of as a type of reasoning grounded on a process of abstraction, in which a common semantic property, the functional or pragmatic genus, is abstracted from the Primary Subject and the Analogue. As mentioned above, this functional genus represents the respect under which the two terms are taken into account for the purpose of the speech act, the feature that is relevant for the pragmatic meaning of the move. For this reason, this mechanism of abstraction can be considered as a reconstruction of the relevance relation of a dialogical move. The reconstruction of the analogical genus corresponds to the retrieval of the relevance relation.

In argumentation theory, relevance has been defined starting from the pragmatic concepts of “speaker’s meaning” and to “purpose of the discourse” (Grice 1975, 45). A speech act (also referred to as “element” or “move” of discourse) is relevant to a goal-directed conversation to the extent that it is coherent with the other moves and informative (Dascal 1979; Giora 1988;

Giora 1997). A move thus needs to be *functional* in terms of coherence and informativeness to the goal of such a discourse (Walton 2004), namely when it somehow supports the abstract conclusion (and the macro speech act expressing it) representing the overall discourse goal (Giora 1997; Van Dijk 1984). For this reason, it needs to be coherent with, or rather structurally connected to such a conclusion, i.e. it needs to be part of a pattern of reasoning leading to it (Walton 2003).

In argumentation theory, the purpose of a speech act (which in pragmatics is analyzed using the concept of “informativeness”) is defined as the effects that a move can produce on the context, conceived as the conversational situation. More precisely, the meaning of a discourse move consists in its dialectical effects, i.e. in the way that it modifies the interlocutor’s communicative situation by restricting the paradigm of his possible replies (Ducrot and Anscombe 1986; Ducrot 1972). The purpose of a discourse move corresponds to the possible inferences that can be drawn from it (its informativeness), and, consequently, to the implicit conclusion that the interlocutor needs to reconstruct and reply to (Wilson and Sperber 2004; Moeschler 2006; Levinson 2000, 27–56; Walton and Macagno 2016).

For instance, let us consider the aforementioned analogical argument by Aristotle, in which the selection of public officials by lot is compared to choosing athletes or steersmen by lot. The conclusion (C), “Public officials ought not to be selected by lot,” is grounded on the analogical premise (P) based on a relevance (coherence) relation, or rather a connective (Lascarides and Asher 1993; Macagno and Walton 2014a; Grimes 1975; Hobbs 1979; Hobbs 1985; Dascal 2003; Grosz and Sidner 1986), between the two sequences (motivation, or rather “P is a reason for C”). The relation can be further specified by taking the characteristic of the conclusion into account and showing its connection with the premise, reconstructing the premise by linking the analogy to the negative judgment on the specific case. In this specific case, the negative judgment (selecting certain individuals by lot is unreasonable) is related to the shared characteristic of the object of similar decisions, i.e. individuals performing activities based on specific skills or abilities (Macagno and Walton 2014b).

This negative judgment can be further explained by individuating its reason. For example, value judgments on decisions are made by considering the consequences thereof, and since the similar cases presented in the premise lead to implicit negative consequences, it is possible to interpret the relation as one from negative consequences. Since selection by lot does not result in choosing skilled individuals and since the selected individuals need to have the required skills to perform their activities, it will be highly likely that the selected individuals will perform very poorly, resulting in failures or disasters. The reconstruction of the relevance relation as an argumentative link can be reconstructed as follows:

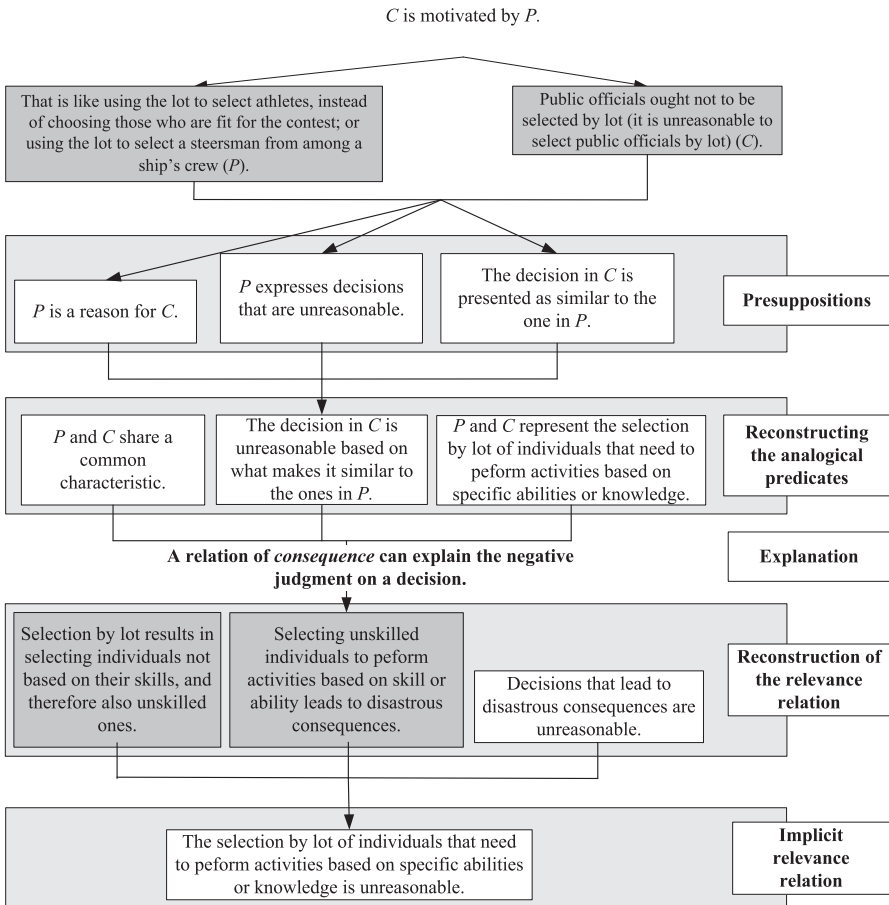


Figure 3: Relevance as an argumentative relation

The purpose of a dialogue move is represented as an abstract predicate imposing certain conditions onto its components (the premise and the conclusion). A sequence is relevant to another when it contributes to fulfilling the role imposed by the abstract predicate (in this case, assessing a decision made on specific grounds, i.e. the lot). Since the premise expresses a similarity in order to support a conclusion, the nature of the similarity (what makes the states of affairs represented in the premise similar to the one in the conclusion) needs to motivate the negative judgment. The specific reason needs to be retrieved abductively, i.e. the best explanation of the motivation of the negative judgment (selection by lot is unreasonable) needs to be found (Atlas and Levinson 1981; Atlas 2005, chap. 2). In this case, the common quality of the similar individuals selected (performing activities

based on skills or ability) can justify the judgment based on reasoning from consequences, which is directly connected with the definition of “selecting by lot” and the type of activity performed by the chosen individuals.

The force of an analogy can be analyzed by taking into account the relevance relation, i.e. the relationship between the abstracted functional genus and the predicate. The abstract genus needs to be functional to the attribution of the predicate, namely essential for its predication. The reconstruction of the relevance relation is a necessary step for discovering the respect under which the two terms of the comparison are similar and are essential for the predication. This analysis can be used to establish the essential elements of the functional genus in more complex cases. Sometimes the relationship between the terms of the comparison and the predicate is not made explicit and can be subject to various interpretations, leading to the abstraction of different properties and, consequently, of different functional *genera*. An example of this type of ambiguity is given by the famous case used by Thomson in defense of abortion (Thomson 1971, 48–49):

Case 6.

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.

The problem with this powerful argument is the determination of the relevance relation, since in this case the predicate to be attributed to both of them is implicit. The person whose body has been connected to the violinist’s one is regarded as free to refuse to be exploited by another being. However, how is this predication supported by the qualities common to both terms of the comparison? The woman and the other person are both characterized by several common properties: they are both human beings, they are both connected to human beings, even though a fetus cannot be considered as a legal person. What makes the person reasonably free to refuse to be bound to the violinist is that this duty was not accepted. He is subject to a non-consensual obligation, and for this reason he cannot be considered to be bound to a duty that he never accepted. This law-like principle justifies the predication and for this reason it constitutes an essential component of the functional genus. The functional genus justifies the attribution of the same predicate to the woman: she is subject to a non-consensual bond with the fetus. In this case, the analogy can be reasonably used to

support the right of abortion in case of rape or forced pregnancy, but it can hardly support this right in every different case.

As shown in this section, the relevance of one move to another, or a move to the discourse, can be represented as an implicit argumentative conclusion, which can be assessed and compared with other possible reconstructions. On this perspective, relevance can be conceived as the best explanation of the reasoning underlying the connection between two moves or a move and the overall discourse. Each move is relevant if it leads argumentatively to a given conclusion (explicit or implicit). However, if the force of an analogy consists partly in the implicit argumentative relation of motivation, the very structure of analogy hinges on an implicit reasoning that can be based on various patterns of argument.

7. The arguments of analogy

The relevance relation in analogical arguments constitutes the strength of the argument itself. However, the reconstruction of the argumentative link is more complex when it is expressed through an analogy. The relevant semantic feature of the premise is rarely explicit; normally, it needs to be abstracted from the comparison. The hearer needs to retrieve the goal of the dialogical move and then select the characteristics common to the Primary Subject and the Analogue that can support the argumentative relation. This account results in an analysis of analogical arguments as complex types of reasoning, which can be traced back to simpler patterns.

7.1. *Analogical classifications*

One of the most powerful uses of analogy is the re-classification of a state of affairs. A concept is analogically redefined and this new definition is used to attribute the predicate to the Primary Subject. For instance, we consider Case 1:

The hunting and fishing cases recognize that a mortally wounded animal may run for a distance before falling. The hunter acquires possession upon the act of wounding the animal not the eventual capture. Similarly, whalers acquire possession by landing a harpoon, not by subduing the animal. (Analogy stated in *Popov v. Hayashi*, WL 31833731, at 8, Cal. Super. Ct. 2002, in which the plaintiff (*Popov*) stopped with his glove the baseball ball hit by a famous player, but could not secure it and lost it).

In this case, the argument is aimed at attributing the predicate “to be an instance of possession” to the action of catching, but not securing, a baseball ball. The type of reasoning on which the relevance relation is based can be represented as an argument from classification, following the pattern below (Macagno and Walton 2009):

	ARGUMENT PATTERN	EXAMPLE
MAJOR PREMISE	For all x , if x fits definition D , and D is the definition of G , then x can be classified as G .	Possession is “the (successful) performance of actions aimed at establishing complete control on an entity in the future.”
MINOR PREMISE	a fits definition D .	Plaintiff caught the ball with the purpose of securing it.
CONCLUSION	a has property G .	Therefore, plaintiff possessed the ball.

Figure 4: Analogical argument from classification

Analogical arguments of this kind do not support the redefinition through an explicit reason. Rather, the reasons for the selection of the characteristics of the *definiendum* are simply left implicit and used by the speaker. In the case mentioned above, no argument is advanced to support the redefinition and the hearer can only suppose a possible reason connecting the expression of *an intention of possession* with possession itself. Analogy in this case hides the reason of the classification of the Analogue, which was grounded on the essential effects of the efforts made to possess the animal on the future capture thereof. Clearly, such a reason would have hardly applied to the catching of baseball ball.

In stronger classificatory analogies the reason of the redefinition is made explicit, so that the abstraction of the characteristics of the new definition is guided by an argument. For instance we consider the following famous legal analogy between innkeepers and steamboat operators (*Adams v. New Jersey Steamboat Co.*, 151 N.Y. 163, 1896):

Case 7.

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 creates a new category of “innkeepers,” characterized not by the kind of accommodation that is provided (an inn) but the type of service provided to clients, i.e. accommodation (presupposing a kind of extraordinary confidence) for valuable consideration. The redefinition of “innkeeper” as “providers of accommodation” is grounded on an explicit argument from values (or principles of law), in which the confidence reposed in the provider of the service for valuable consideration shall result in an adequate responsibility. This link between promise and obligation makes the analogical redefinition more complex and more difficult to attack.

7.2. Analogical values and consequences

The aforementioned Aristotelian analogy between public officials and athletes or steersmen is aimed at pointing out the unreasonableness, or danger, of choosing by lot a person in charge of an activity requiring skills, expertise, or ability. As pointed out in the previous section, this type of analogy presupposes a relevance relation grounded on a negative judgment, which is justified by considering its negative consequences. This type of reasoning can be analyzed in both a more generic and more specific fashion using two interrelated schemes: the scheme from values and the scheme from consequences. The first argument pattern is based on an evaluation of a state of affairs and links the judgment with the commitment to a specific action related thereto (Walton, Reed, and Macagno 2008, 321):

	ARGUMENT PATTERN	EXAMPLE
MAJOR PREMISE	The state of affairs x is <i>positive/negative</i> as judged by agent A according to Value V (value judgment).	Recruiting individuals for skill-based activities by lot is negative (because it is unreasonable and is likely to lead to bad outcomes).
MINOR PREMISE	The fact that x is <i>positive/negative</i> affects the interpretation and therefore the evaluation of goal G of agent A (If x is <i>good</i> , it supports commitment to goal G).	If recruiting individuals for skill-based activities by lot is negative, I should not recruit public officials by lot.
CONCLUSION	The evaluation of x according to value V is a reason for retaining/retracting commitment to goal G .	Therefore, I should not recruit public officials by lot.

Figure 5: Analogical argument from values

This pattern of argument simply connects a judgment, grounded on a value (unexpressed in this case) with a commitment to a decision. However, if we reconstruct the analogical argument in more depth, we can retrieve the grounds of the negative judgment by bringing to light the reason why the selection of an athlete or a steersman by lot is unreasonable or negative. In particular, we can reconstruct the justification as a relation of consequence, linking the necessary or productive cause of an undesirable state of affairs with a judgment thereon, and a decision to act accordingly. This pattern of argument can be represented as follows (from Walton et al., 2008, p. 332):

	ARGUMENT PATTERN	EXAMPLE
MAJOR PREMISE	If action Q is brought about, good (bad) consequences will plausibly occur.	Recruiting individuals for skill-based activities without assessing their skills and abilities is likely to lead to failures or disasters (unskilled people will perform poorly activities requiring skill).
MINOR PREMISE	Good (bad) consequences are (not) desirable (should (not) occur).	Failures or disasters (poorly performed activities) are not desirable.
CONCLUSION	Therefore Q should (not) be brought about.	Therefore, individuals recruited for performing activities based on skills or abilities (public officials) should not be recruited by lot.

Figure 6: Analogical argument from consequences

This reconstruction of the argument directly links the productive cause of a state of affairs (lot) with its negative effect (failure to select the factor essential for performing the activity).

7.3. Analogical rules and values

Analogies can be used not only for a value judgment, but also to highlight the nature of the principle that justifies such a value judgement. For instance, consider Case 5 above, in which Obama compares the opposition to raising the debt ceiling (resulting in default, i.e. a refusal or impossibility to pay the public debt) to leaving a restaurant without paying the check.

The analogy pointed out the common factor, i.e. that failures to comply with financial obligations are crimes, possibly resulting in sanctions or negative consequences, and for this reason they should not be brought about. Here the negative judgment and the decision-making process is grounded on a rule, which in its turn can suggest possible negative consequences. We can reconstruct the argument as follows:

	ARGUMENT PATTERN	EXAMPLE
MAJOR PREMISE	The state of affairs x is <i>legal/illegal (positive/negative)</i> as judged by agent A according to Rule R .	Failure to fulfil financial obligations is a crime resulting in sanctions, as it is a rule of law that debts shall be paid.
MINOR PREMISE	The fact that x is <i>legal/illegal</i> affects the interpretation and therefore the evaluation of goal G of agent A .	The refusal to raise the debt ceiling results in a failure to pay the debts of the Country, which is a crime (which may lead to legal consequences).
CONCLUSION	The evaluation of x according to Rule R is a reason for retaining/retracting commitment to goal G .	Therefore, the proposal of not raising the debt ceiling shall not be accepted.

Figure 7: Analogical argument from rules

The analogy in this case classifies the proposal by placing it under the abstract genus of “illegal acts that result from non-fulfilled financial obligations,” without providing any other argument in support of it.

7.4. Analogical causal relations

Analogies can be used to make a causal consequence or relation clearer, without providing an explicit explanation of the phenomenon. A clear example is represented by Case 3 above, whose complete formulation reads as follows (Luxton and Braedley 2010, 4):

Unfortunately, the economy is a little like a bathtub. You can't have cold water in the front and hot water in the back. And what was happening on Wall Street was going to immerse that bathtub very, very quickly in terms of business. Look, right now business is having trouble throughout the economy. But a collapse of the kind of institutions that were threatened last week, and their inability to fund, would have caused industry and retail and everything else to grind to something close to a halt.

Buffet, using this analogy, wanted to explain why the average American should be worried about the collapse of some major investment banks. Just like temperature propagates in a bathtub, the interrelated elements of a financial system (investment banks, small investors, beneficiaries of credit lines) are affected by an alteration of a component thereof. This argument can be represented as follows (Walton, Reed, and Macagno 2008, 168):

	ARGUMENT PATTERN	EXAMPLE
MAJOR PREMISE	Generally, if <i>A</i> occurs, then <i>B</i> will (might) occur.	The interrelated and interdependent elements of a complex system are all affected by an alteration of a component thereof.
MINOR PREMISE	In this case, <i>A</i> occurs (might occur).	In this case, a component of the financial system (investment banks) is collapsing.
CONCLUSION	Therefore in this case, <i>B</i> will (might) occur.	Therefore, the other elements of the financial system (small investors, beneficiaries of credit lines) will be affected by this collapse.

Figure 8: Analogical argument from cause

Here Buffet is clearly taking for granted that the financial system is an interrelation of interdependent components, in which the smaller ones, different in kind from the most important ones, are nevertheless affected by their crises or improvements.

7.5. Practical analogies

Analogies can be used to support a choice based on the analysis of the possible means to achieve a goal. The analogy points out a practical rule that is to be followed when making a choice, highlighting its reasonableness or the unreasonableness of a different option. A clear example is provided in Case 4 above, which compares the courses of action to be taken in a time of crisis with the choices that a reasonable agent makes during a fire:

I will be calling members and getting their ideas. The main thing is to just move away from this hyper-political environment and recognize the house is on fire, let's put the fire out first and we can figure out what caused it.

Obama uses this argument to trigger a specific conclusion, i.e. that the best means to tackle the crisis is to curb it first. The analogy with the fire is based on the best actions to be performed in critical and dangerous situations, considering the possible effects of the alternative courses of action. This type of reasoning can be represented as a kind of practical reasoning, in which the best means to achieve a goal is chosen by comparing the possible effects and side-effects of the alternative possibilities. This pattern can be represented as follows (Walton, Reed, and Macagno 2008, 96):

	ARGUMENT PATTERN	EXAMPLE
GOAL PREMISE	My goal is to bring about A .	We need to tackle an emergency that has immediate disastrous consequences (the economic crisis).
ALTERNATIVES PREMISE	I reasonably consider on the given information that each one of $[B_0, B_1, \dots, B_n]$ is sufficient to bring about A .	In order to tackle the crisis, it is reasonable to analyze it causes, or act promptly to limit its effects.
SELECTION PREMISE	I have selected one member B_i as an acceptable, or as the most acceptable sufficient condition for A .	To analyze the causes of an emergency that has disastrous effects can cause results in greater damage.
PRACTICALITY PREMISE	Nothing unchangeable prevents me from bringing about B_i as far as I know.	It is possible to act promptly to curb the emergency (to summon the members and analyze their proposals).
SIDE-EFFECTS PREMISE	Bringing about A is more acceptable to me than not bringing about B_i .	No bad consequences can result from trying to curb a disastrous emergency.
CONCLUSION	Therefore, it is required that I bring about B_i .	Therefore, I need to act to try to curb the emergency first.

Figure 9: Analogical argument from practical reasoning

In this case, the analogy brings to light a crucial dimension of the reasoning, i.e. the unreasonableness of the alternative possibility (discussion about the causes of the crisis). By underlining the emergency of the situation, abstracting it from the analogy with the fire, the consequences of not acting promptly are underscored.

8. Conclusion

The structure of analogy is apparently simple, consisting in an inference drawn from a similarity between the Primary Subject and the Analogue. This simple characterization, however, leaves the explanation regarding what makes two distinct entities or states of affairs similar, and the ways in which this similarity can support the transfer of the predication from the Analogue to the Primary Subject, unclear. In order to address this issue, we need to investigate not only the logical dimension of analogical arguments, but more importantly, their semantic-pragmatic aspect. Analogy can be conceived as an argument characterized by two interdependent processes: 1) abstracting a common feature, relevant to the attribution of the property to the Analogue and the Primary Subject, and 2) transferring the attribution of such a property from the Analogue to the Primary Subject.

This twofold treatment of analogy closely connects logical considerations with semantic and pragmatic ones. On the one hand, the property needs to be at the same time both abstracted from the possible semantic structure of the terms of the comparison and pragmatically relevant to the attribution of the property. On the other hand, the relationship between the common property and the Primary Subject and the Analogue can be thought of as a logical-semantic relation governed by specific topical rules of inference.

The abstracted feature can be considered from a logic-semantic perspective as a *functional* genus, in the sense that it is contextually essential for the attribution of the predicate. This approach is based on two crucial dimensions, the analysis of relevance as an argumentative relation of justification and the account of the process of selecting the relevant features of a concept as a mechanism of contextual redefinition. The common generic property is a property that is pragmatically fundamental (i.e. relevant) for the attribution of the relevant predicate, or rather the achievement of the communicative intention.

The reasoning process of analogy hinges on this strict interdependence between the process of abstraction of this nameless pragmatic category (as pointed out in the treatment of semantic analogy) and the attribution of a predicate. While the transfer of the predicate from the Analogue to the analogical genus and from the genus to the Primary Subject is guaranteed by the *loci* governing the genus-species relation, the connection between the genus and the predicate can be complex, characterized by various types of reasoning patterns. The relevance relation can hide (among others) an implicit argument from classification, an evaluation based on values, consequences or rules, a causal relation, or an argument from practical reasoning.

Clearly, the argumentative relation alone cannot explain the whole argumentative effect of analogy. The process of abstraction reduces the Primary

Subject to one specific dimension – the one brought to light by the Analogue and the relevance relation – and thus implicitly and contextually redefines it. This implicit redefinition is a further hidden move that is aimed at hiding the other possible dimensions or semantic features of the Primary Subject.

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