



Argument from Analogy in Law, the Classical Tradition, and Recent Theories

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Argument from analogy is a common and formidable form of reasoning in law and in everyday conversation. Although there is substantial literature on the subject, according to a recent survey (Juthe 2005) there is little fundamental agreement on what form the argument should take, or on how it should be evaluated. The lack of conformity, no doubt, stems from the complexity and multiplicity of forms taken by arguments that fall under the umbrella of analogical reasoning in argumentation, dialectical studies, and law. Modeling arguments with argumentation schemes has proven useful in attempts to refine the analyst's understanding of not only the logical structures that shape the backbone of the argument itself, but also the logical underpinning of strategies for evaluating it, strategies based on the semantic categories of genus and relevance. By clarifying the distinction between argument from example and argument from analogy, it is possible to advance a useful proposal for the treatment of argument from analogy in law.

ANALOGY IN LEGAL REASONING

Analogy is one of the most common forms of reasoning in law (see Hage 2005). Through analogical reasoning, legal inference is drawn from one case

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that has already been classified and is assessed to another case on the basis of similarity or dissimilarity. This form of argument is widely used to fill “the gap between facts and rule” (Weinreb 2005, 92). In other words, analogy is used to apply general legal rules to cases not directly falling under the classifications of the rule.

The approaches examined in this section show that there are different types of analogy based on different logical structures, and these differences are key to evaluative strategies. While Klug distinguishes between different kinds of analogy, Alexy and Weinreb focus their studies on the species of analogical reasoning most common in law, namely the imperfect inference leading to presumptive conclusions. This kind of reasoning, according to Brewer (1996) for instance, is often formalized as a syllogistic argument; however, several other authors maintain that analogy cannot be reduced to a deductive form. This section shows that a defeasible approach to analogy in legal arguments is stronger than a deductive or inductive one. Some authors have identified all kinds of defeasible reasoning, that is, reasoning leading to merely plausible conclusions, with inductive reasoning (see for instance Grennan 1997), or with deductive reasoning (see for instance Groarke 1999). On our view (see Walton 1996), defeasible reasoning should be clearly distinguished from induction and deduction. Defeasible reasoning can be described as an alternative to (apodeictic) deductive reasoning, which stems from a universally quantified premise (like “All men are mortal”). While apodeictic deductive reasoning is based on the passage from the universal to the particular, in default reasoning the link between premises and conclusion is not guaranteed by quantification. The premises are simply endoxical (acceptable), and the reasoning is grounded on patterns of reasoning called maxims, and represented in modern argumentation theories as argumentation schemes. For instance, consider the following reasoning:

Tweety is a bird.
Therefore Tweety flies.

In this case, the conclusion is supported by the implicit premise that “birds (usually) fly.” However, this premise is not an absolute truth: it is only endoxical, and it warrants only a defeasible conclusion, that is, a conclusion that might be wrong. The link between premises and conclusion is warranted by some commonly shared principles of inference, like “the property

is predicated convertibly of the subject” (Aristotle, *Topics*, I, 5). These rules of inference have been developed in modern argumentation theories in the so-called argument schemes, abstract argumentation patterns combining a semantic principle with a logical axiom (see Walton, Reed, and Macagno 2008). For instance, the argument mentioned above can be analyzed using the argument from verbal classification (Walton, Reed, and Macagno 2007, chapter 9; for further discussions of this scheme see Hastings 1963, 36–52; Kienpointner 1992, 250–52; Walton 2006, 129):

Definition Premise	Classification Premise	Conclusion
<i>a</i> has property <i>F</i> .	For all <i>x</i> , if <i>x</i> has property <i>F</i> , then <i>x</i> can be classified as having property <i>G</i> (if <i>G</i> is a semantic property of <i>F</i>).	<i>a</i> has property <i>G</i> .
Tweety is a bird.	The property of birds is to fly (if something is a bird, then it flies).	Therefore, Tweety flies.

Argumentation schemes can be useful instruments for analyzing the structure of natural language arguments, and in particular the different types of reasoning from analogy.

In order to map the different theories on the patterns of inference from analogy, it is useful to start with the different forms delineated by Klug in his *Juristische Logik*.

Ulrich Klug

Klug describes analogical reasoning as proceeding from a previously established application of a norm to a case that, though it is substantially related to the case under consideration, is in some ways different from that case (Klug 1951, 110–12). This kind of passage can have three different forms:

- analogy as a conclusion following from two premises by means of a syllogistic inference;
- analogy as an inference from a particular premise to a particular conclusion, by means of reasoning that cannot be classified as deductive or inductive;
- analogy as a kind of imperfect reasoning, leading to only presumptive conclusions.

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In the first two forms reasoning is by direct inference. In contrast, in the last case, this kind of reasoning is deemed to be only plausible. The patterns of the first group reflect the Aristotelian logical-semantic theory of analogy as a “like relation.” Given two subjects A (the subject) and B (the target) and that α is the property of A and β the property of B, if α is predicated of A, then β is predicated of B. On the other hand, the relation between predicates and subjects might be one of specific difference. For instance, if A is “man,” and B is “animal,” belonging to the same genus “animate beings,” a criterion to divide the genus into its species will be “capability of acting” (p). This generic property will be the genus of the two specific differences “capable of acting using reason” (α) and “capable of acting using instinct” (β). In this case, the analogical scheme is based on the relation of specific difference and can be represented as follows:

If P ($p\alpha$) is predicated of A, then Q ($p\beta$) will be predicated of B.

The validity of the reasoning depends upon the relation between the genus of the subjects and the genus of the predicates.

The second kind of analogical reasoning analyzed by Klug is based on proportion ($\acute{\alpha}\nu\alpha\lambda\omicron\gamma\iota\alpha$ in Aristotelian terms), a relation between the terms and the predicates. This kind of reasoning is founded on a passage from particular to particular, which differs from induction and deduction but nonetheless is based on both of them. The conclusion of the analogy, in other words, is deduced from a universal premise induced from a particular one. This theory can be explained through the example below (113):

The war of Thebes against Phoci was bad.
The war of Thebes against Phoci was an offensive war.
Therefore, all offensive wars are bad.
All offensive wars are bad.
The war of Athens against Thebes is an offensive war.
Therefore, the war of Athens against Thebes is bad.

Finally, analogical reasoning can be considered defeasible reasoning, an imperfect deduction. The deductive pattern is, in fact, a *Quaternio terminorum* with the following scheme:

M is P.
S is similar to M (in virtue of the properties a, b, c...).
Therefore S is P.

In this form, M and S are different and as a result, this consequence cannot be considered a valid syllogism. However, M and S are similar, and in some respects they can be considered the same. The potential problem here is that they are presented not as identical, but only as similar, that is, the same *relative to some unstated properties*.

The three schemes are based on the concept of similarity: the schemes based on genus and induction are basically grounded on a kind of functional similarity. Klug, following Ziehen, distinguished between different types of similarity relations. Two subjects might be similar because of the number of common features, or because they have in common the most fundamental characteristics, or because they are functionally identical although morphologically different. For instance, the wings of birds and the arms of humans are similar in the number of common bone features, whereas the wings of insects and the wings of birds are only functionally similar, as they serve the same function in the organisms, but their morphology is completely different. Ziehen, for that reason, distinguishes reasoning based on the number of common features, called homology, from reasoning grounded on functional similarity, called analogy. Two subjects can be homologous relative to the number of features or the number of the most fundamental features (the most important characteristics, which distinguish one thing from another), but they can be considered analogous even though they are completely different, provided that the two subjects can be subsumed under a common functional genus.

These different types of similarity and reasoning from analogy cannot be easily formalized as a standard normative rule. In order to make these patterns of reasoning formal and ruled by objective principles, Klug made the criteria of similarity explicit, and treated them as presuppositions of inference from analogy. Two subjects must fulfil a series of criteria of similarity, indicated as $v_{i,2,...n}^{sim}$. Reasoning from analogy was formulated as follows (Klug 1951, 125):

$$[(v_{i,2,...n}^{sim} C r_{i,2,...n}) \& (x \in v_{i,2,...n}^{sim})] \rightarrow (E r_{i,2,...n})$$

In this formula, if something fulfils the presuppositions for being similar to r, it can be considered to be an r; as x fulfils these presuppositions, it can be considered as an r. This type of reasoning, in which the conditions of similarity are clearly expressed and can therefore be ruled by a norm, can be extremely useful for legal reasoning.

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Robert Alexy

Alexy's treatment of analogy is based on Klug's defeasible analogical reasoning. Alexy formalizes the pattern as follows (1989, 281):

- (I) $(x) (Fx \vee F \text{ sim } x \rightarrow OGx)$ If x is a contract of sale (F) or a contract for a transaction similar to sale (F sim) then paragraphs 433ff.BGB shall be applicable (G) to x .
- (II) $(x) (Hx \rightarrow F \text{ sim } x)$ If x is a contract concerned with the transfer for value of a commercial enterprise (H) then x is a contract for a transaction similar to sale (F sim).
- (III) $(x) (Hx \rightarrow OGx)$ If x is a contract concerned with the transfer for value of a commercial enterprise (H) then paragraphs 433ff.BGB shall be applicable (G) to x .

The main thesis of Alexy's theory is the distinction between a deductive passage and an analogical one. A deductive passage proceeds from a rule of the following kind:

$$(I) \quad Fx \vee F \text{ sim } x \rightarrow OGx.$$

However, the problem of analogical reasoning is that the rule (the legal norm) takes the following form instead:

$$(I') \quad Fx \rightarrow OGx.$$

On this view, the main feature of analogical reasoning is the move from (I) to (I'), which needs a premise of the form "states of affairs which are alike from a legal point of view should have like legal consequences" (1989, 282). This analysis of analogical argument highlights the problem of analyzing "likeness" and the need to justify a claim of "likeness" by means of an argument.

Brewer

In his work on analogical reasoning, Brewer analyzes analogy as a kind of reasoning characterized by the following form (1996, 966):

1. z has characteristics $F, G \dots$
2. x, y have characteristics $F, G \dots$

3. x, y have also characteristic H .
4. The presence in an individual of characteristics $F, G \dots$ provides sufficient warrant for inferring that H is also present in that individual.
5. Therefore, there is warrant to conclude that H is present in z .

The inference can be valid or merely plausible, according to the form of premise 4. This generalization, in fact, may be inductive and lead only to a probable conclusion, or be deductive and lead to valid consequences. The schemes have in these cases the following forms (1996, 968, 971):

Inductive pattern

- 1'. y has F and G .
- ...
- 4'. The presence in an item of F and G makes it (sufficiently) probable that H is also present (inductive analogy-warranting rule).
- 5'. Therefore, it is (sufficiently) probable that H is present in y .

Valid deductive pattern

- 1'. y has F and G .
- ...
- 4'. All items that have F and G also have H .
- 5'. Therefore, y has H .

The crucial point of his theory is related to the distinction between the deductive and inductive forms. He distinguishes between an argument from a given rule and an argument operating in cases in which the rule is vague or not directly applicable. The fundamental difference lies in the connection between the second and third premise and the generalization. The reasoning underlying this link is, according to Brewer, abductive (1982). This is because the unstated rule is abducted from a similar case and subsequently applied to the target by means of a move that can be demonstrated.

Lloyd Weinreb

In Weinreb's account, analogical reasoning cannot be reduced to any other kind of reasoning. In contrast to Brewer's proposal of analyzing abductive reasoning as a two-step process based on an abductive step and a deduction, analogical reasoning, according to Weinreb, is, in most cases not theorized

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at all (2005, 71). That is, most of the time, it is not possible even for the person who constructed the analogy to express or formulate the rule that governs the deductive move. This observation is extremely relevant in law, since analogical reasoning does not introduce a new rule, but is simply used to apply an established rule to cases. Weinreb's theory is critical of the deductive step in Brewer's scheme, based on the generalization in premise 4 (2005, 29):

If anything that has characteristics p , q and r has characteristic s , then everything that has characteristics p , q and r has characteristic s .

The observation he advances is that often people don't know why the characteristic s is associated with the other characteristics: moreover, in many cases they cannot point out characteristics p , q , and r , let alone show that characteristics p , q and r are sufficient conditions to warrant the conclusion. Take the following case:

Mary spills cranberry juice on a white tablecloth. "Try pouring salt on it," Edna says. "It works with wine." (2005, 68)

In this example, the rule warranting the move from the case to the generalization cannot be stated if the person is not a chemist, and the features relevant for the analogical move cannot always be pointed out, so the argument is weak. While in ordinary conversations it is the lack of epistemological certainty that highlights the difference between analogical reasoning and abduction (induction, or deduction), in law the crucial difference derives from the rules of the dialogue. Argumentation schemes are understood in relation to context, the dialogue in which the argument is embedded that governs what sorts of moves are acceptable within a given circumstance. In law, analogical reasoning is distinguished from deductive reasoning by the rules the court formulates to cover specific cases.¹ For example, there is an essential difference between two kinds of reasoning supporting the liability of operators of steamboats as insurers for their guest's losses:

Innkeepers and all others who provide private accommodations overnight on land or water are liable as insurers for their guest's losses.
Operators of steamboats provide private accommodations overnight on water.
Operators of steamboats are liable as insurers for their guest's losses.

And

Innkeepers are liable as insurers for their guest's losses.

Operators of steamboats differ in no essential respect from innkeepers.

Operators of steamboats are liable as insurers for their guest's losses.

In the second case, the rule applied to innkeepers is, by means of analogical reasoning, applied to steamboat operators, without any rule being stated or formulated. The reasoning proceeds from the fact that, since the rule is matter of public policy and the two entities fall under the same considerations of public policy, they should be regulated by the same rule. The basic concept in this theory is that the similarity must be relevant to the rule in order for the analogy to hold. The notion of relevance cannot be reduced to deductive reasoning by any rule that assesses the characteristics that must be similar in order for the norm to apply.² Hence, analogical reasoning in law, such as case-based reasoning, is best understood as a defeasible form of presumptive reasoning. Thus the logical structure informs the way an argument is identified, classified, and appraised.

ANALOGY IN THE CLASSICAL TRADITION

Section 1 showed that we can distinguish between different logical forms of analogical reasoning: deductive, inductive, abductive, and defeasible. The central claim of our proposal depends upon the ability to distinguish between various conceptions of analogy as rational correspondence, illustration, argument from example, identity of relation, and similarity of attributes belonging to a subject or to two different subjects. Drawing on the classical tradition, this section shows that conceptual distinctions can be made and contribute to our appreciation of analogical reasoning.

Comparison and Classification

Comparison, in Greek *paradigma*, was a common strategy employed in Plato's dialogues. Arguments by example, analogy, and illustration are based on the concept of comparison, which is the basis of Aristotle's analysis of arguments. Comparison, the discovery of similarities and relationships between two terms, is the discovery of the genus under which two terms

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may be classified. The similarity between terms is a means to understand the class to which they belong. For instance, in *The Sophist*, the sophist is compared to an artist. The artist and the sophist play similar games, because the former, by means of his art, “creates, in a short time, and sells, for a small fee, the sea, the earth, the sky, and the gods.” Similarly, the latter, by means of a single art, knows how to make and to do everything—the sophist “says that he knows everything and will teach it to someone else for a small fee and in a short time” (Plato, *Sophist*, 233E). The game of producing all things is based on the imitation of real things. The painter produces an imitation of the sea, the real object. The sophist operates in the same way: he “beguiles the young by means of speeches by displaying spoken images of all things” (234C) (see Goldschmidt 1947, 18, 19). In this example, painter and sophist are presented as similar, because they fall under the same genus of “imitators”: “une fois saisi, chez le producteur universel, le genre de l’imitation, impossible de ne pas voir que c’est là le genre qui convient au sophiste” (Goldschmidt 1947, 19). The “grand subject,” or shared genus (*ibid.*, 20), is applied to both terms, even though the painter imitates reality concretely and the sophist does so only in a figurative way.

The argument from paradigm can be conceived as a classification stemming from the description of a particular aspect of the two terms being compared. In this case, the painter and the sophist are described only in terms of the relationship between the result of their work and reality. From this point of view, they both fall under the presumed definition of imitator. For instance, the example above might be represented as follows:

Imitator: A person who creates things that are similar to reality, but are in fact not reality.		
The Sophist’s art enchants the hearts of young men by words poured through their ears generating fictitious arguments that appear to be true.	Activity and relationship of its result with reality.	The Painter’s art makes resemblances of real things which have the same name as the real thing.
He says that he knows everything and will teach it to another person for a small fee and in a short time.	Activity	He creates, in a short time, and sells, for a small fee, the sea, the earth, the sky, and the gods.
Sophist		Painter

The comparison is the presumption that two objects share a common description under a common genus.

Aristotle on Analogy, Example, and Illustration

Comparison, or similitude, is a kind of classification of objects under the genus represented by the property they share. In the Platonic comparison, the genus is inferred from the description of the painter and the sophist. This kind of principle is present in the explanations Aristotle gives of the different kinds of reasoning that are classified as “analogy” in many modern theories.

SIMILARITY AND GENUS: EXAMPLE, ILLUSTRATION, AND FABLE

The best starting point from which to understand the Aristotelian account of example is the concept of likeness and its relation with the process of reasoning. Likeness is fundamental for both inductive and the deductive reasoning,

because it is by means of an induction of individuals in cases that are alike that we claim to bring the universal in evidence: for it is not easy to do this if we do not know the points of likeness. It is useful for hypothetical reasonings because it is a general opinion that among similars what is true of one is true also of the rest (*Topics* I, 18).

The whole process of defining and identifying a genus common to a set of objects (or concepts) is based on the discovery of similarities and dissimilarities.³ The comparison between things belonging to different genera⁴ can be used to discover a greater genus predicated of both things.⁵ In the ancient perspective, genus was considered a predicable, namely a logical-semantic relation between subject and predicate. Genus represented the way of attributing a predicate to one of its hyponyms. For instance, the relation existing between the subject “man” and the predicate “animal,” or between the subject “crime of violence” and the predicate “felony,” can be described using the following *topoi*:

This is a man; therefore, this is an animal.	This is a crime of violence; therefore, this is a felony.
This is not an animal; therefore, this cannot be a man.	This is not a felony; therefore, this cannot be a crime of violence.
A man is an animal; therefore, he is a living being (and not a machine).	A crime of violence is a felony; therefore, it is a crime punishable with more than one year of reclusion.

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As section 4 will develop further, genus can be conceived in terms of semantic analysis, and represents the relevant semantic characteristic of a predicate in a context. For instance, in the comparison mentioned above, “the sophist is like a painter,” the two concepts are different; however, they can be subsumed under a higher pragmatic predicate, namely “to be an imitator.” The concept of similitude and genus is basic to the treatment of the different kinds of reasoning based on relations of similarity.

Example, or paradigm, is a kind of rhetorical induction, proceeding not from particular to general, like induction, but “from part to part, of a similar case to similar, when, both coming under the same genus, the one happens to be better known than the other” (Aristotle, *Rhetoric*, I, 2, p. 21). For instance, in the example below, the inference is from part to part, not from particular to general.

For instance, you assert that Dionysius, in asking a guard, has views of setting up a tyranny, because Pisistratus before him, when designing this, began to ask for a bodyguard, and when he got it, established himself as tyrant.

In this kind of reasoning, the two particulars, *a* and *b*, can be classified as instances of a common genus. From the application of the property *P* to the particular *a*, the predication of *P* to the genus is induced. In the second passage, the reasoning follows from genus to species: since property *P* belongs to the genus of *b*, the predication of *P* to *b* is deduced. The analysis proposed by Aristotle in the *Prior Analytics* clarifies this concept:

Let *A* be evil, *B* aggressive war on neighbours, *C* that of Athens against Thebes, *D* that of Thebes against Phocis. 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. (Aristotle, *Prior Analytics*, II, 24; 68b38–69a19)

Here the crucial passage is the attribution to the two subjects, *C* and *D*, of the same generic predicate, “aggressive war against neighbours.” In virtue of the generic predicate abstracted (*B*), the property “to be evil,” formerly

attributed to subject D, is predicated of a second subject C. We can represent the reasoning as follows, indicating the predicate on the side of the subject it is attributed to:

<i>PREDICATES</i>	<i>SUBJECTS</i> (D) War of Thebes against Phocis	<i>PREDICATES</i> (A) Evil
<i>Abstraction of the genus</i>		
(A) Evil	(B) Aggressive wars against neighbors	(A) Evil
<i>Reasoning from genus to species</i>		
(A) Evil	(C) War of Athens against Thebes	

In this table three levels can be identified. In the top level a predicate (A), “to be evil,” is attributed to subject (D), “War of Thebes against Phocis.” In the second level a generic characteristic (B) is abstracted from subject (D) and becomes the new subject of the predication “to be evil.” In this example, the characteristic of “being an aggressive war against neighbours” is the (semantic-pragmatic) feature that is relevant from the point of view of the reasoning. In the third level the reasoning proceeds in a deductive fashion from the generic characteristic to the specific. The war of Athens against Thebes (C) being an aggressive war against neighbours, it is subject to the same predication, namely “to be evil.”

Aristotle divides example, or paradigm, into three main categories, according to the type of cases compared. The name “example” is used to classify the general category and specifically a type of paradigmatic reasoning based on real historical facts. In contrast, illustration and fable were types of examples fabricated by the speaker. An instance of illustration is the following:

Were one to say that it is not fitting the magistrates chosen by lot should be in office; for it is just the same thing as though one were to pick out wrestlers by lot; not taking such as are able to contend, but those on whom the lot may fall.... (*Rhetoric*, II, xx, 4, p. 166)

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In Aristotle the distinction between illustration and fable is not stated. They both belong to a type of paradigmatic reasoning in which the parallel between the facts is not drawn from actual past events. However, whereas in fables the subject (D) is constituted by a fantastic character or story, in illustration the subject is a verisimilitude, or paradox drawn from real life.

SIMILARITY OF RELATIONS: ANALOGY

The word “analogy” is not present in the *Topics*. A closely related scheme, on the other hand, is developed: the “like relation.” This concept is studied in connection with the predicables, the possible logical-semantic relationships between the predicates, and, in particular, the genus and the property. In treating the genus, Aristotle explains the like relation with the following example:

the relation of the pleasant to pleasure is like that of the useful to the good: for in each case the one produces the other. If therefore pleasure be a kind of ‘good’, then also the pleasant will be a kind of ‘useful.’ (*Topics*, IV, 4)

In other words, if pleasure is good, something pleasant is something useful. Here the two subjects and the two predicates are compared: something pleasant and something useful both produce their respective products, pleasure and good. We can represent the square of relations as follows:

	Producer-produced	Producer-produced
Genus-species	Pleasant	Useful
Genus-species	Pleasure	Good

Reasoning from analogy, therefore, seems to be a relation between two identical generic predicative relationships. The topic from analogy used to attribute the genus is noticeably different from the topic used to attribute the property. In the following example the reasoning stems from the generic relationship between the two pairs and the relation of property:

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 would be a property of a doctor to possess the ability to produce health. (*Topics*, V, 7)

The relation between the two predications is characterized as “possession of the ability of producing a physical condition in the body” and this is presented as a principle of establishing the property. Property, linguistically conceived, is the predicate convertible with the concept but not showing the essence (it does not explain what the concept is). For instance, “to be ruby” can be predicated only of “red.” In this case, the relation between the predicate “able to produce health” and “doctor” is the same as the relation between “able to produce vigour” and “trainer.” Since the first predicate is a property of the first subject, the second predicate will be a property of the second subject. This kind of reasoning also holds in a case where two different properties are identically related to a single subject.

These topics should be differentiated from schemes based on attributes belonging in a like manner. In this case, the reasoning presupposes not an identical relation between the two predications, but a similar attribution (*Topics*, V, 7). For instance, A is as much property of x as B is property of y . If the antecedent is conceded, the consequent should be conceded as well. Here, there is a comparison between two attributions and the conclusion seems based on a rule of equality: since the two terms of comparison are similar in acceptability, if one is conceded, the other should be conceded as well.

ANALOGY

The word “analogy,” from Greek *ana logon*, according to ratio,⁶ originally meant rational correspondence. This kind of reasoning, mentioned in the *Posterior Analytics*, is a scheme of inference exemplified in the *Rhetoric*. Reasoning from analogy is introduced in the *Analytics* as a method for individuating a genus that has no traditional name. The genus, in particular, is “what is common to all the cases?” (*Topics*, I, 18) which answers the question, “What is it?” By observing the particular cases it is possible to identify the genus common to all the particulars. In some instances, there is no name by which to classify individuals under a common genus, but it can be reconstructed by analogy. For instance, there is no common genus for “pounce” and “fish bone,” but they have common properties. The genus can be drawn by the analogical predicate “animal bone,” since both these two predicates (animal- and sea-bone) have the same ontological structure (*Posterior Analytics*, 98a15). This type of reasoning is extremely similar to the similarity of relation: the fact that the kinds of bones in fish share some substantial characteristics (answering to the question “What is it?”) allows

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one to classify them under a genus having the same function as the genus of animal bones.

Reasoning from analogy is used in the *Rhetoric* as a persuasive argumentative pattern with the structure of the following example:

Another element is deducible from the analogy of the results; as Iphicrates urged when they compelled his son to serve who was under the standard age, because he was tall, that “if they esteem great children as men, they assuredly will vote small men to be children”. And Theodectes, in the oration respecting the law, asked, “Do ye make the mercenaries, such as Strabax and Charidemus, citizens on the account of their virtue, and will ye not make exiles of those among the mercenaries who have committed these intolerable acts?” (Aristotle, *Rhetoric*, II, XIII, 17, p. 186)

This example can be interpreted by means of the explanation of analogy given in the *Topics*. The relation between “small man” and “child” is the same as between “great child” and “man.” A classification is advanced: the great child is considered as a species of the predicate “man.” In fact, according to this reasoning, a great child can be considered a man along with “people above the standard age.” On the other hand, the relation between “small man” and “great child” and “child” and “man” is problematic. In fact, the argument is aimed at showing the impossibility of such a classification. A great child is not older than a small man nor has he more responsibilities, nor a higher social status (possible interpretations of the relation between “man” and “child” in the text). A common genus attributable to the two pairs cannot, for this reason, be reasonably identified. The analogy, in this case, shows the unreasonableness of classifying tall children as men. The only relation between them is “bigger in dimensions,” and it is assimilated to the other relation “older in age.” This kind of relationship between the terms occurring in the two arguments can be represented as follows:

	Genus	Genus
To be bigger than	Small man	Great child
To be older than	Child	Man

The conceptual differences between varying types of analogical reasoning further the case that distinctions play a role in the structure of the argument and the way the argument functions. From the classical tradition we see the intricacies of appearance versus reality, or the general versus the particular, informing the appraisal of arguments that employ reasoning by comparative analogy.

MODERN THEORIES ON ARGUMENTS FROM EXAMPLE AND ANALOGY

The distinction between example and analogy is not always clear in legal reasoning. There is a risk of confusing two different types of reasoning and, thereby, two different types of generalizations. Modern accounts of analogy and example distinguish between the two in various ways, from the things compared in the argument to varying accounts of inference from principle.

Reasoning from analogy has been analyzed in the modern theories from two different points of view. On the one hand, Whately (1859), Perelman and Olbrechts-Tyteca (1969), Copi and Jackson (1992), and Weitzenfeld (1984) take into consideration the relation between the terms in analogy. In particular, Copi and Jackson focus on the causal relation between the terms, whereas Weitzenfeld shows how the terms must be isomorphic, that is, share some nonaccidental features, in order for the relation of analogy to hold. On the other hand, the theories developed by Govier, Waller, and Guarini take into consideration the logical form of analogy. This approach reflects the crucial theme developed in law and inquires into this topic from a logical perspective. Trudy Govier refuses to reduce analogy to a deductive inference. She differentiates between an inductive and an *a priori* scheme from analogy, and concentrates her analysis on the structure of the latter. Even though the analogy in the *a priori* scheme is grounded upon an implied universal principle, it does not proceed from this principle. The implicit claim is often not known and hard to formulate (see also Weinreb's proposal analyzed above); it can be retrieved only after reflection and is not immediately available to the interlocutor. This position is comparable to the account defended by Juthe (2005). On the other hand, reinterpreting a distinction advanced by Govier, Waller advances a contrary opinion distinguishing between two main logical patterns of argument from analogy (Waller 2001, 201–2):

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Deductive (Govier's *a priori*) Analogy

1. We both agree with case *a*.
2. The most plausible reason for believing *a* is the acceptance of principle *C*.
3. *C* implies *b* (*b* is a case that fits under principle *C*).
4. Therefore, consistency requires the acceptance of *b*.

Inductive Analogy

1. *D* has characteristics *e, f, g*, and *b*.
2. *E* also has characteristics *e, f, g*, and *b*.
3. *D* also has characteristic *k*.
4. Having characteristics *e, f, g*, and *b* is relevant to having characteristic *k*.
5. Therefore, *E* will probably also have characteristic *k*.

Waller opposes the form of the logical process to the nature of the underlying principle (2001, 206). From this point of view, Waller states, the principle is fundamental in the logical form of analogy and in the deductive process it is based upon.

The principal criticism of this viewpoint is advanced by Guarini (2004). According to this perspective, the implicit premise upon which the deductive form of argument from analogy is grounded should not necessarily be shared and known by the interlocutors. This premise can be reconstructed in the evaluation and interpretation process, but it is not necessarily present in the argumentative process (157). His analysis of analogy, on the other hand, proceeds from the concept of relevance (161):

1. *a* has features f_1, f_2, \dots, f_n .
2. *b* has features f_1, f_2, \dots, f_n .
3. *a* and *b* should be treated or classified in the same way with respect to f_{n+i} .

The crucial concept of this scheme is the relevance of the similar characteristics. The distinction traced in Govier and Waller between *a priori*, deductive, and inductive analogies is interpreted as a differentiation between analogies supporting a judgment regarding a classification and analogies supporting a prediction. While the former can proceed from hypothesis, the latter can only be grounded upon actual facts. As opposed to these latter theories, Guarini pointed out that the two compared terms are symmetric; there is no logical preference between them in analogical reasoning (see also Adler 2007). Moreover, reasoning from analogy cannot be conceived, on Guarini's view, as essentially deductive: in many cases the reconstruction

of the argument is grounded on principles admitting exceptions, whereas deductive reasoning presupposes premises always true.

The various schemes presented in this section show the value of argumentation schemes in looking at logical and conceptual argument forms. The proportional analogy sheds light on the distinction between argument from analogy and argument from example based on the things compared. Similarly, distinctions between analogies can be based on their different treatments of inference from principle. The different schemes laid down in this section are examined in detail in sections 4 and 5, where their uses are analyzed.

SIMILARITY, GENUS, AND RELEVANCE

Three main concepts appear in the modern accounts of analogy: similarity, relevance, and the distinction between essential and accidental aspects and relations. In order to clarify the relation between the pragma-linguistic concept of relevance and the logical features of argument from analogy, we can analyze the traditional notions of genus and species. If we interpret the ancient ontological categories of the four predicables (genus – definition – accident – property) in a linguistic perspective (see for instance Rigotti and Greco 2006), we can highlight the link between semantic analysis and argumentative reasoning. On this view, the predicables correspond to the possible logical-semantic relations between subjects and predicates. Definition (for instance “man is a rational animal”) and property (for example “to laugh,” which can be attributed only to what is “man,” as “pitch” can be predicated only of the adjective “dark”) are convertible with the subject. For instance, if something is a “rational animal,” it must be “man,” and if something “laughs,” it must be a “man.” Genus (for instance, “man” is “animal”) and accident (for example “to be white” attributed to “man”) are not convertible: if something is “animal,” it is not necessarily “man,” and if something is white, it is not necessarily “man.”

Definition, on this view, represents the semantic analysis of the concept defined, and is made of the genus and its specific difference. For instance, “crime of violence” is defined in 18 U.S.C.S. § 924(c)(3) as “an offense that is a felony and has as an element the use, attempted use, or threatened use of physical force against the person or property of another.” In this definition the genus, “felony,” is specified by the difference “committed by the use of threatened force.” In this perspective, the notions of genus and definition, far from being metaphysical concepts, become dialectical tools for analyzing the meaning of the terms used in a text. Instead of conceiving the predicables as relations connected to an immutable essence, genus

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and definition can be interpreted in a dialectical perspective as semantic relations between predicates. Genus and definition become in this process a method for highlighting the semantic properties of the thing defined. The semantic analysis, in this dialectical perspective, has as its object the meaning of the terms used in a text, namely the concept signified by the terms themselves in context.

Argument from analogy can be explained using these categories of semantic analysis. Our proposal is to analyze similarity as a form of classification under a genus, specifically, a predicate attributed to different kinds (concepts) belonging to the same semantic category (substance, quality, etc.). For instance, consider an example mentioned above:

Operators of steamboats are liable as insurers for their guest's losses, as innkeepers are liable as insurers for their guest's losses.

In this case, the two concepts "innkeeper" and "operator of steamboat" are ontologically different. However, in this context their relevance depends on the fact that they both belong to the common genus "to be providers of accommodation." The genus, in this perspective, becomes the pragmatic predicate accounting for the relevance of the two terms compared. It is the perspective under which they are considered in the text.

On this view, reasoning from example can be described as a two-step process. In the first step, a common (pragmatic) genus is identified in two different species and from the attribution of a predicate to one of them a generalization is brought out, that is, the predicate is attributed to the genus. In the second step, the conclusion is drawn deductively from the generalization, that is, the predicate is attributed to the target subject. In contrast, analogical reasoning is based on two pairs of identical couples of relations, that is, on a pair of relations. The two schemes can be represented as follows:

Example

If x is A , then y is A .

x and y belong to the same genus G .

x is A .

Every G is A .

y is A .

Analogy

If x is A , then y is B .

$(x$ and $A)$ and $(y$ and $B)$ share the same semantic relation.

The relation between $(x$ and $y)$ is the same as between $(A$ and $B)$.

x is A .

y is B .

Another important distinction has to be traced in comparing arguments by analogy with arguments from example. In Aristotle, reasoning from example is associated with illustration. Illustration in an Aristotelian context means the inductive application to a case of an implicit general rule, by means of a clear instance invented for this purpose. In the same way, a legal rule can be advanced by means of a clear case that is then applied to another case, as in a case analyzed by Cicero (*Topics*, III):

An argument is derived from similarity, in this way: “If those houses have fallen down, or got into disrepair, a life interest in which is bequeathed to some one, the heir is not bound to restore or to repair them, any more than he is bound to replace a slave, if a slave, a life-interest in whom has been bequeathed to some one, has died.”

The general rule presupposed can be complex to identify, as in the following illustration:

A U.S. vice-president once claimed that he never expressed disagreement with the president’s policies because “You don’t tackle your own quarterback.” (Cederblom and Paulsen 1982, 137)

In this case, the two actions are deemed to be unreasonable, on the basis that “hindering the leader is always wrong.” In this case, it is the actions that instantiate the same genus.

When relevance is conceived to be the capability of a fragment of text to contribute to the whole textual sense, the genus is closely connected to the concept of relevance. In order to understand this concept in relation to example, we can analyze Weinreb’s case of the innkeeper from section 1.4. Steamboat operators are considered similar to innkeepers in respect to liability law. The law states that a “business that provides sleeping accommodations to its customers must take as much care to protect them as is feasible” (Posner 2006). In this case, it is the level of care that is important, and the level of care expected is dependent on the possibility of providing such care. The possibility of guaranteeing care to the customers is the relevant aspect under which the two objects must be regarded as similar. This feature, rather than the fact that both offer sleeping accommodations, distinguishes the genus proposed in the reasoning from all other objects.

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This treatment of reasoning from example can be useful for explaining the mechanism of the so-called case-based reasoning (CBR). In case-based reasoning the conclusion is drawn not from a generalized rule, but from previous cases (see Leake 1996). When there is not a clear definition of a legal concept (see for instance the concept of “trade secret” in Ashley 1991), or a rule is not clearly stated or does not cover all the possible instances, it becomes extremely difficult for judges to come to an assessment. In those cases, the reasoning used proceeds from similar cases, following the pattern below (Ashley 1991, 758):

1. in the precedent, a prior court resolved the competing factors in favor of a particular side;
2. the current situation is analogous to the precedent because it involves the same competing factors;
3. therefore, the current dispute should be resolved in the same way.

The conclusion is drawn by reasoning from a case characterized by certain factors to another case involving the same factors. The concept of analogy in CBR is conceived as a relation of similarity established on the grounds of some characteristics. If we consider the case of the trade secret, two cases can be compared if they involve some relevant characteristics, like the presence of valuable information, of some measures taken to guard its secrecy, etc. (Brüninghaus and Ashley 2003a). Two cases can hardly be identical from all the relevant perspectives; however, they can share some characteristics that can be used to support an assessment. The concept of a pragmatic genus as a semantic predicate allows one to explain in terms of textual relevance the notion of factor. Factors can be conceived as normative instruments for assessing the relation between genus (or generic pragmatic characteristic) and species. In other terms, factors can be conceived as indications for regulating the implicit categorization of a case as an instance of the intermediate concept allowing the inference to a particular case (see Lindahl 2003, 199; Brüninghaus and Ashley 2003b).

In contrast, in an analogy the general rule is not presupposed, known, nor recalled by means of an example:

For as a place without a harbour cannot be safe for ships, so a mind without integrity cannot be trustworthy for a man's friends.
(Cicero, *De Inventione*, I, 47)

Here the second predicate is attributed to the second subject according to the same relation of the first predication. Here no general rule is either drawn or presupposed. Instead, the two relations are compared. Contrasting argument from example against argument by analogy clarifies the distinction between the two through classification under a genus and semantic categories. This allows for the identification and classification of the distinct forms of reasoning through the use of argumentation schemes.

WEAKNESS AND FALLACIOUSNESS

Often, the purpose of argumentative enquiry is to show the weakness or fallaciousness of an argument rather than its strength. Analogical reasoning falls under the heading informal, and as such is always considered to be less than valid. In the modern tradition, few have inquired into what we define as reasoning from analogy. However, example and similarity have been deeply analyzed along with what is known as conditions of soundness.⁷ In determining the strength or weakness of arguments, it can be useful to distinguish between argument from example and argument by analogy via classification of genus and semantic category.

Reasoning from example is frequently fallacious when the comparison of two cases elicits an unreasonable generalization. The unsoundness has been attributed to dissimilarities, neglected aspects (Manicas and Kruger 1968), and irrelevance (Copi and Jackson 1992). In Burbidge’s treatment of analogy, the reasoning is presented as follows (1990, 12, 13):

The subject of the conclusion in an analogy is called Primary Subject (PS), the predicated referred to the latter, Targeted Predicate (TP), the object compared to it, the Analogue (A) and the features connecting the analogue with the primary subject, Similarities (S).

Scheme

Premise 1: *PS* is like *A* in *S*...*S*ⁿ.

Premise 2: *A* has *TP*.

Conclusion: So *PS* has *TP*.

Example

The universe and a machine are similar in that both are divided into an intricate pattern of parts and subparts.

A machine has a maker.

Therefore, the universe has a maker.

In addition, Burbidge points out that the soundness of the reasoning is based on the relations between TP and the similarities between PS and A. If TP is closely connected to the similarities, the argument provides good grounds for the conclusion. If, on the other hand, the relation between the dissimilarities and TP is stronger than that between the similarities and TP, the inference is unsound (Burbidge 1990, 19; for a similar treatment of fallacious analogy, see Mill 1959). A similar account can be found in Johnson and Blair (1983). In their study of the fallacy of faulty analogy, they observe that the criteria used to state the fallaciousness of the terms can be found in the similarity of the subject and the analogue under the point of view required to support the conclusion (100).

If we look at reasoning from example in terms of genus and attributed predicate, we see that the genus is taken for granted, that is, supposed to be known in order for the text to be meaningful. For instance, in the example above, “machine” and “universe” are regarded in this context as belonging to the genus “complex objects.” In this context, the relevant semantic feature of these two terms is “to be a complex object.” The problem is that “to have a maker” is not a (relative or absolute) property belonging only to “complex objects,” nor it is a fundamental semantic feature of them, since “having a maker” is not a kind of explanation of the phenomenon.

Along with this type of irrelevance, the most frequent fallacious move, especially in law, is to suppress, or to overlook, evidence. The main feature of reasoning from example is that the genus is presupposed, is taken for granted. The fallaciousness consists in subordinating two facts or objects to the same genus G when the description of one of the facts does not fit G’s fundamental features. In such a case, the description of the individual facts or objects is apt to suppress aspects fundamental for their classification. For instance, in *Fairbanks Soap Co. vs. Sheppard*, Sheppard, the defendant, contracted to build a machine for Fairbanks for \$9800. When the machine, constructed to produce soap chips of a certain standard, was almost completed and already installed, Sheppard refused to complete the work unless the sum due at completion was paid in advance. In the work is abandoned, the law provides that the contract is invalid. The defense compared this case to another trial, *Dakin & Co. vs. Lee*, in which there was no abandonment of the work by the plaintiff and no new contract was signed, but the work was done inappropriately (*Fairbanks Soap Co. vs. Sheppard* [1953] 2D.L.R. 193 [S.C.C.], 117).

The contract in *Dakin & Co. vs. Lee* was for repairs to a house. The work as completed did not accord with the contract in certain respects, but

the Divisional Court maintained that the contract was nonetheless valid: the existence of some defects did not amount to a refusal by the builder to perform part of the contract, but simply showed negligence in completing the work (*H Dakin & Co. Ltd v Lee* 1 KB 866 [1916], quoted in *Fairbanks Soap Co. vs. Sheppard* [1953] 2D.L.R. 193 [S.C.C.]):

Take a contract for a lump sum to decorate a house; the contract provides that there shall be three coats of oil paint, but in one of the rooms only two coats of paint are put on. Can anybody seriously say that under these circumstances the building owner could go and occupy the house and take the benefit of all the decorations which had been done in the other rooms without paying a penny for all the work done by the builder, just because only two coats of paint had been put on in one room where there ought to have been three?

The defense had put the unfinished machine and the ill-decorated house under the same genus, namely “improperly completed work.” However, the comparison failed to consider an important fact: the machine did not work. Since a fundamental term of the contract was not respected, the contract had to be considered abandoned.

Another kind of fallacious analogy is related to the acceptability of the genus as a semantic property of the concepts. In this case, evidence is not overlooked, nor suppressed, but a barely acceptable definition of a concept is advanced. The primary subject is redefined in order to be classified under a genus common to the analogue. The possibility for the genus to be taken for granted here is based on this new definition, not on a commonly shared definition of the subject. For instance, consider the reasoning below:

Thinking is a very broad and ill-defined term, but for the sake of argument we shall call it the information processing capabilities which are characteristic to humans. Scientific evidence has shown that these capabilities are a property of the nervous system and primarily the brain. Brains and computers both operate using electrical impulses, although the media used differ, and the brain is considerably more complex than the modern computer. If we make the fairly considerable, but reasonable and useful, leap of faith required to accept science as depicting reality, then yes the operation of a computer is quite similar to that of the brain. The perceived difference between the two is due to the much more

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powerful nature of the brain. However nature has had several million years in shaping our “thinking machines” whereas computer scientists have had only 40 or so years. Give us a few more years at least. (Little, Goarke, and Tindale 1989, 248)

Here the new definition of “thinking” is advanced in order to classify human thinking and computers’ data processing as two species of the same genus.

CONCLUSION

Reasoning from analogy is an extremely controversial and complex form of reasoning. The task of identifying and classifying the various argument forms and logical structures through argumentation schemes is a large research effort. However, the prevalence of argument by analogy in law, as used in case-based reasoning, makes the project a worthwhile endeavor. Legal reasoning in Anglo-American law is based on argument similarity through appeals to precedent; reasoning is understood as the means by which one established case is applied to the case under scrutiny. This kind of reasoning based on similarity of structure is inherently complex. Hage (2005) has shown that it may not be possible to model it on the scheme for argument from analogy without taking into account the principles and goals that underlie a legal rule as applied to a case. Consequently, argument schemes that map reasoning related to principles and goals, such as argument from values and practical reasoning, will undoubtedly emerge as important to the task as research proceeds. Argument by analogy and argument from example can function as the central basis for research in the two complementary fields of law and argumentation theory, and the distinction between these related argument schemes shows the value of analysis based on the semantic categories of genus and relevance. This perspective provides a useful proposal for the treatment of argument by analogy in law, as it supports a strategy for evaluating arguments that emerges from their logical and conceptual underpinnings.

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NOTES

1. Juthe (2005) argues that analogical reasoning cannot be reduced to a deductive or inductive move, since the pragmatic peculiarities of this scheme clearly differentiate it from the other two logical forms.

2. This rule first of all would beg the question: it would be based on the similarity pointed out in the analogy. On the other hand, the court could possibly rely on the rule the analogical passage is based on, without further considering the analogy. This is not actually the case. The court in other cases might consider relevant other particular similarities or dissimilarities in the analogy (Weinreb 2005, 112-13).

3. It is useful for the rendering of definitions because, if we are able to see in one glance what is the same in each individual case of it, we shall be at no loss into what genus we ought to put the object before us when we define it: for of the common predicates that which is most definitely in the category of essence is likely to be the genus (*Topics*, I, 18).

4. Likeness should be studied, first, in the case of things belonging to different genera, the formulae being 'A:B = C:D' (e.g. as knowledge stands to the object of knowledge, so is sensation related to the object of sensation), and 'As A is in B, so is C in D' (e.g. as sight is in the eye, so is reason in the soul, and as is a calm in the sea, so is windlessness in the air). Practice is more especially needed in regard to terms that are far apart; for in the case of the rest, we shall be more easily able to see in one glance the points of likeness. We should also look at things which belong to the same genus, to see if any identical attribute belongs to them all, e.g. to a man and a horse and a dog; for in so far as they have any identical attribute, in so far they are alike (*Topics*, I, 17).

5. In the case above, "each being a form of rest" (*Topics*, I, 18).

6. analogy. (2009). In *Encyclopædia Britannica*. Retrieved January 08, 2009, from Encyclopædia Britannica Online: <http://www.britannica.com/EBchecked/topic/22465/analogy>

7. The most recent argumentation research works on the topic are Juthe (2005) and Hage (2005).



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