Online ISSN 2424-6158. PROBLEMOS 2018 93
DOI: https://doi.org/10.15388/Problemos.2018.93.11754

ON THE DIFFERENCE BETWEEN THE TWO BARBARAS

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Abstract. *The paper deals with the problem of the "two Barbaras" in the Aristotelian modal syllogistic. The problem consists in Aristotle's differing views on two at a first sight similar in nature syllogisms of mixed assertoric (X) and necessary (L) premises: Barbara LXL and Barbara XLL. The fact that Aristotle believed the first syllogism to be valid and the second one – not, has been received either 1) negatively, because both Barbaras have been held to be invalid, or 2) negatively, because both Barbaras have been held to be valid, or 3) positively, by giving a reason why the two Barbaras differ. We commit ourselves to the position (3) by proving that modal propositions for Aristotle have their modalities de dicto and that Aristotelian modal operators act according to their own separate rules where only the type of the modality of a major premise is relevant for the modal status of the conclusion.*

Keywords: *modal syllogistic, term logic,* de dicto

The Problem of the "Two Barbaras"

Aristotelian modal syllogistic has been considered to be a highly controversial matter ever since its origination in the 4th century BC. Unlike the "basic" assertoric syllogistic, which has had the status of a finished project and remained almost unquestioned until the rise of modern logic, its modal counterpart represented in the chapters 8–23 of *Analytica priora* has been generally seen as suffering from serious internal inconsistencies by both Aristotle's contemporaries and his modern interpreters. The philosophical tradition has the so-called problem of the "two Barbaras" as a test case for all Aristotelian modal reasoning. The problem, as is suggested by its title, consists in a pair of two, at a first sight, very similar syllogisms combined of modal and assertoric premises:

Barbara LXL

All B are necessarily A.
All C are B.
Therefore, all C are necessarily A.

Barbara XLL

All B are A.
All C are necessarily B.
Therefore, all C are necessarily A.

The main question can be formulated as follows: why Barbara LXL was believed by Aristotle to be valid, whereas Barbara XLL was not, and is there any way to ground this claim systematically? When comparing the two Barbaras, Aristotle says:

> It happens sometimes also that when one proposition is necessary the deduction1 is necessary, not however when either is necessary, but only when the one related to the major. (*Analytica priora* 30a15-18)

There have been three possible reactions to the quoted fragment of Aristotle and the problem of the "two Barbaras" in general:

1) both Barbara LXL and Barbara XLL are invalid;
2) both Barbara LXL and Barbara XLL are valid;
3) Barbara LXL is valid, but Barbara XLL is not.

There are no known adherents of a hypothetical position (4), which would inversely affirm the validity of Barbara XLL but deny it for Barbara LXL. The above order of enumeration of the possible answers to the 'Barbara question' more or less reflects their historical succession, however, here they will not be presented in that particular order. Positions (1) and (2) deny consistency of Aristotelian modal syllogistic, whereas position (3) is apologetic and tries to make sense of it – there have been serious advocacies of all three of them. After outlining the most important interpretations of Aristotelian modal syllogistic, we will present our own version of the position (3).

[1] "Deduction" here is used synonymously to "conclusion" – i.e., the thing that is being deduced and not the very technique of deducing (cf. the more recent translation by G. Striker (2009): "It happens sometimes that a syllogism leads to a necessary conclusion, even if only one of the premises is necessary – not any premise, though, but the one with the greater extreme").

Necessary Propositions: *De Dicto* or *De Re*?

There has been a great dispute about which interpretation – *de dicto* or *de re* – is the correct way of reading modal propositions in Aristotelian logic. For the last century, scholars have almost universally believed that, in case of Aristotle, neither way is fully satisfactory: both *de dicto* and *de re* have been considered to explain only some part of his logical system leaving another significant part of it obscure and full of contradictions (Kneale and Kneale 1971: 90-91; Nortmann 1994: 118; and many others). On the one hand, the rules of conversion given in the *Analytica priora* require a *de dicto* reading: in order to get a proposition in which a subject and a predicate have been interchanged and which logically follows from the original one, we need to place the modal operator before the whole proposition.[2] On the other hand, both Barbaras (as well as many other mixed syllogisms) have been assumed to be valid only on a *de re* interpretation of modality. This dilemma, which offers us two supposedly unsatisfactory alternatives, has been first formulated by Albrecht Becker in the early 1930s and has been a standard view to the Aristotelian modal logic ever since: both modes of reading have been deemed untenable when seeking a uniform reconstruction of Aristotelian modal syllogistic.

We will start with the solutions of the "two Barbaras" problem based on the *de re* interpretations of a necessity operator and see if we can ascribe more credit to them than was commonly used to.

[2] Conversion rules are given in *An. pr*. 25a26-35.

The "Two Barbaras" on *De Re*

The study of Becker (1933) was one of the first modern attempts to apply a *de re* / *de dicto* distinction to the Aristotelian modal logic in general. Although questioned by some as an anachronistic and therefore inadequate method to treat ancient logic[3], such an approach to Aristotle and other classical thinkers is now generally accepted: according to it, both Barbaras can be saved when reading their modalities *de re*, but only at the cost of losing the integrity of the whole system. For Becker, the difference between the two Barbaras interpreted *de re* is a simple one: Barbara LXL here serves as a typical example of a valid syllogism where the middle term is shared by the two premises. As a result, the major term (which is of the form 'necessarily-A') can be applied to a minor term without any additional explanations:

> All B are (necessarily-A).
> All C are B.
> Therefore, all C are (necessarily-A).

Barbara XLL, on the contrary, shows the absence of a middle term:

> All B are A.
> All C are (necessarily-B).
> Therefore, all C are (necessarily-A).

Here we have not three, as is required, but five terms that do not result in any conclusion: comparing "B" and "necessarily-B" (we could also name the latter, for instance, "D") is just as reasonable as, for example, doing the same thing with "A" and "C" – both pairs are constituted of two completely unrelated terms. Notice that on this reading Aristotelian modal syllogistic becomes simply an assertoric syllogistic based on non-modal principles. What *is* peculiar is only the nature of the predicate terms it involves – instead of the familiar "S is P" here we have "S is (necessarily-P)", where "necessarily-P" is an indivisible unit. Apart from that, all the rules of syllogistic remain essentially the same as in the assertoric version.

Another influential *de re* reading was offered almost a decade later by Jan Lukasiewicz (1957). Making no pretensions to construct a coherent whole out of Aristotelian modal logic (which Lukasiewicz believed to be "almost incomprehensible because of its many faults and inconsistencies" (1957: 132)), he gave his credit to both mixed Barbaras and therefore commited himself to the position (2) mentioned in the first section. The most intriguing feature of Lukasiewicz's interpretation is his use of a spatial analogy very similar to the one Aristotle's contemporary Theophrastus invoked, however, for the different aim[4]: to show that, once a necessary connection between the two terms of *any* premise has been established, this connection remains so in the conclusion as well. Formalising Barbara XLL as *CAbaCLAcbLAca*[5] (where *C* stands for implication, *L* – for a necessity

[3] We will discuss some instances of this attitude later. For the time being, we will confine ourselves with the remark that talking about a *de re* / *de dicto* distinction in Aristotle's logic is legitimate as long as we are not "ascribing the apparatus to Aristotle himself, but [are] using it to illuminate for us a distinction which Aristotle illuminates" (Barnes 2011: 342).

[4] As will be shown later, Theophrastus sought to ground his position that both Barbaras are invalid by a spatial analogy according to which a syllogism of the form "All B are necessarily A; All C are B; Therefore all C are necessarily A" is invalid, since if C is separable from B, C will be separable from A as well (even though all B are necessarily A).

[5] Notice that in the Polish notation all logical connectives and modal operators are written before the whole proposition or, more precisely, before the list of terms that constitute it.

operator, and *A* – for universal affirmative type of proposition), Lukasiewicz gives his famous wire analogy:

> If *LAcb* means that every *c* is connected by a wire with a *b*, and every *b* is an *a*, i. e. *Aba*, it is evident that every *c* is connected by a wire with an *a*, i.e., *LAca*. Speaking generally, if every *b* is an *a*, then if every *c* is connected with a *b* in any way whatever, it must be connected with an *a* in just the same way (Lukasiewicz 1957: 186).

Before evaluating Lukasiewicz's argument, it is important to note that not every *de re* reading has treated both Barbaras that kindly. In fact, some of them have been overly pessimistic, for instance, that of Ross (1949). Based on the supposed qualitative difference between temporary necessity ("temporary necessity arising from [the predicate's] temporarily sharing in the nature of [a subject]") and metaphysical necessity ("permanent necessity of its own nature"), both Barbaras are here declared to be invalid:

> Aristotle's doctrine is plainly wrong. For what he is seeking to show is that the premises prove not only that all *C* is *A*, but also that it is necessarily *A* just as all *B* is necessarily *A* , i.e. by a permanent necessity of its own nature; while what they do show is only that so long as all *C* is *B,* it is *A* , not by a permanent necessity of its own nature, but by a temporary necessity arising from its temporarily sharing in the nature of *B* (Ross 1949: 43).

In contrast to Lukasiewicz, Ross concentrates on the weaker premise, *i.e.,* the one where modality is absent. Although the debate whether the propositions that express temporal information have their role in Aristotelian modal syllogistic is much too complicated to be discussed here in detail, Ross' treatment of an assertoric proposition "All C are B" as of something that expresses temporal relation between the two terms is in conflict with the Aristotelian "atemporality principle", according to which

> we must understand "that which belongs to every" with no limitation in respect of time, e.g. to the present or to a particular period, but without qualification. For it is by the help of such propositions that we make deductions, since if the proposition is understood with reference to the present moment, there cannot be a deduction (*Analytica priora* 34b6-18).

Since Aristotle himself declares that none of the propositions that constitute the syllogism have anything to do with temporality, there is little sense in talking about subject's "temporarily sharing in the nature of" a predicate.

It seems that there is at least one type of *de re* interpretation which, at a first sight, is capable to systematically ground the difference between the two Barbaras – and we mean that of Becker's, which has been a part of orthodoxy in the Aristotelian scholarship ever since its emergence. One of the most serious counterarguments which can be invoked not only against Becker but against all our discussed interpretations based on *de re* treatment of modal operators, has already been pointed out: if we adopt a *de re* reading, conversions of modal statements become impossible. It is important to note that more than one opinion of how conversions of modal *de re* propositions should look has been offered. In an article on medieval theories of syllogism (Lagerlund 2017) the initial modal statement is formulated as "(A necessarily)*a*B" (where "A" is a predicate term, "B" is a subject term, and "*a*" is the copula) and then converted to "(B necessarily)*a*A" – here we notice an invalid move from "B" in the original proposition to "necessarily B" in the converted statement.

There is one more popular interpretation of *de re* conversions, which is more characteristic of the so-called "modal-copula" reading – here modality is attached not to the whole proposition or to the predicate, but to the copula. Such reading has been offered, in slightly different formulations, by Patterson (1995) and Charles (2000), and can be seen either as a different version of *de re* interpretation or otherwise as falling outside the dichotomy between *de dicto* and *de re*. The modal-copula reading does not seem to help us in any way with the conversions of *de re* modal statements. For instance, if the initial proposition is "Some moving things (necessarily are) animals", conversion fails, as it obviously does not entail "Some animals (necessarily are) moving things" (the second statement can be false while the first one is true).

In addition to this, we have some other, surprisingly simple, argument against Becker-type interpretations of Aristotle's modal syllogistic. Remember the two syllogisms that we mentioned in the beginning of this section. The obvious reason why they differ is that the second one lacks the middle term and does not grant the given conclusion. However, the crucial point here is that Aristotle considers Barbara XLL to be invalid in a sense that the two premises do not grant a *necessary* conclusion, but Barbara XLX with identical premises but an assertoric conclusion is still valid for him. But notice that, when interpreted *de re*, the combination of X and L premises gives us neither necessary nor an assertoric ("All C are A") conclusion and therefore there is no syllogism at all.[6] This is clearly not in accordance with the principles stated in *Analytica priora*, according to which syllogisms such as Barbara XLX are no more problematic than the simple Barbara XXX.

The "Two Barbaras" on *De Dicto*

We have seen that on some *de re* readings of Aristotle a modal proposition is held to express *different* information than the assertoric one,so that the former is no longer considered as the counterpart of the latter; since the modality is a part of a predicate, the two propositions are incomparable in respect to their "'strength". In contrast to that, in all *de dicto* versions a modal proposition expresses the same information as its assertoric counterpart plus the additional information related to the modal status of that proposition; a necessary proposition here is always properly called "stronger" than its assertoric counterpart. We have named different drawbacks of each of our mentioned *de re* interpretations, and two major reasons why it is very unlikely that Aristotle endorsed something like a *de re* understanding of a modal syllogism: namely (1) the inability to make conversions possible, and, more importantly, (2) the fact that, when interpreted *de re*, Barbara XLL obviously yields no conclusion, while for Aristotle it does give an assertoric one. Those reasons encourage us to see if there is a tenable reconstruction of Aristotelian modal syllogistic by using *de dicto* modality. The task here seems a lot simpler: once

[6] One might be tempted to see "All C are (necessarily-B)" as entailing "All C are B", however, such move can be hardly justified by applying the principle, which in contemporary modal logics is known as *reflexivity axiom* ($\Box p \rightarrow p$). It seems that there is no basis for such a rule in Aristotle's logical corpus as far as terms, and not propositions, are concerned: necessary propositions entail their assertoric counterparts, but in *de re* reading the necessity operator is attached to separate terms which by themselves do not participate in any deductive operations.

we find a satisfactory *de dicto* explanation for the mixed syllogisms, we do not have to deal with the conversions anymore – interpreted *de dicto*, they work fine.

One of the best known *de dicto* readings of Aristotle was suggested by his contemporaries Theophrastus and Eudemus, who offered a radical elimination of all mixed syllogisms where the conclusion is necessary and at least one of the premises is not. In their opinion, both Barbaras violated the modal principle, later known as the *peiorem* rule. The essence of this modal principle is well revealed by its full title, which is *peiorem semper sequitur conclusio partem* ("the conclusion always follows the weaker premise or part"): where we have two or more propositions with different modalities, the conclusion cannot be modally "stronger" than the weakest of those premises. Non-modal assertoric proposition here is understood as stronger than the possibility proposition, but weaker than the necessity proposition. As a result, no syllogism of the form XXL[7], XLL or LXL is possible if we follow the rule. A syllogism used by Theophrastus to show the invalidity of Barbara LXL is:

> All that walks is necessarily in movement
>
> All men are walking
>
> All men are necessarily in movement (*Alex. Aphr.* in *An. pr.* 124.24-25)[8]

The *peiorem* rule and those interpretations that rely on it rest on a controversial principle: reading the propositions that constitute the syllogism as having their modalities *de dicto* – the word "necessarily" here is understood as qualifying the whole proposition instead of marking out some predicate that belongs essentially to the subject (that is what modalities interpreted *de re* do). The *peiorem* principle treats propositions as indivisible wholes that differ in their "strength"; as a result, *de dicto* reading of modalities is often called the "Theophrastine way" of interpreting Aristotelian modal syllogistic.

As it has already been explained, the *peiorem* principle holds only if we apply modal operators to the whole propositions and, as a result, can compare them in their strength. The belief that a non-modal premise expresses something "less" than the necessary premise and therefore should be

[7] This particular type of reasoning, where two premises are assertoric and the conclusion is necessary, is not discussed by Aristotle in *Analytica priora*, since its invalidity may have seemed too obvious to him to require any further discussion.

[8] It is worth mentioning that the controversy that surrounds Theophrastian-Eudemian position is related not so much to the *peiorem* rule itself as to the type of examples that were invoked by the authors of the principle. Critics of Theophrastus (who are not by definition the defenders of Aristotle) have pointed out that such a syllogism cannot be called a proper illustration of Barbara LXL since the propositions that constitute it are too different in nature: the first premise is an analytic "eternal" truth (since "moving" is a part of a definition of "walking") independent of any contingent circumstances, whereas the second premise belongs to the type of propositions which express a state of affairs at some particular moment (namely, that all men happen to be walking right now) and for that reason have been named propositions *kata chronon* ("dependent on time") (Huby 2002: 95; McCall 1963; also Malink 2013: 102, who calls this type of predication "unnatural" for Aristotle.). It is only natural, the critics of Theophrastus say, that, two such propositions being combined, we get some strange conclusion where a necessary and at the same time temporal property is attributed to the subject – therefore, Theophrastus' criticism is believed to be unsound. The rejection of Theophrastus' example is usually based on Aristotle's claim in *Analytica priora* 34b6-18, according to which "we must understand 'that which belongs to every' with no limitation in respect of time, e.g., to the present or to a particular period, but without qualification. For it is by the help of such propositions that we make deductions, since if the proposition is understood with reference to the present moment, there cannot be a deduction."

followed by a non-modal conclusion, rises from the conviction that modalities act in a way analogous to the quality and quantity of a proposition: we cannot get a necessary conclusion when at least one of the premises is not necessary, just like we cannot get an affirmative or a universal conclusion when at least one of the premises is, respectively, negative or particular. We believe that this conviction is wrong, and that the modal operators do not act the same way quality- or quantity-words do. We give our reasons for that in the next section.[9]

Final Version: *Major* and *Minor* Operators

There has been, in our opinion, an ill tendency to treat the Aristotelian syllogism as some early form of modern deductive reasoning where a bunch of premises plus some deductive rules must give us a desired conclusion. However, in the Aristotelian syllogistic we do not find any such bunch of premises equal in their status: the contribution that each of them makes in grounding the conclusion is significantly different. We could say quite accurately that the very idea of a syllogism for Aristotle was to show how some general principle is applied in a particular case – a rule that holds for some group will hold for a member of that group as well. Here *the status of the rule* is what matters (is it a logical or natural law[10], or does it only express this group's having some accidental property?), and not the circumstances that caused a particular individual's belonging to that group (they too can be logical or natural (for instance, individual's belonging to its kind or genus), but can also be only accidental, temporary or of unknown status). By "particular case" we do not necessarily mean that the minor premise must invoke a singular term as its subject (as in case of famous "All men are mortal; Socrates is a man; Therefore, Socrates is mortal"): even with a universal subject term the minor premise retains its "special case" status:

	Example	**Function**
Major premise	*All animals move.*	Law or generalization
Minor premise	*All men are animals.*	Special case
Conclusion	*All men move.*	Law or generalization applied to the special case

A strategy that is formally (although described by its author as non-formal) most similar to ours was offered by Nicholas Rescher (1964: 175). Dissatisfied with the results of then ongoing debate about whether *de dicto* or *de re* is the best way to read Aristotelian modalities, Rescher withdrew from the debate considering the question of the scope of a modal operator irrelevant and believing that the difference between the two Barbaras is a non-formal one. The main idea here is that we can fully understand how Aristotelian modal syllogistic works only when we realize what his motives for reasoning about logic were – and those, according

[9] Besides the reasons that will be given later, there are some obvious facts which show that modalities act in a way different from quality and quantity: for example, if both premises are negative, no conclusion follows (*An. pr*. 28a34-36), but an analogous principle does not hold when both premises are non-modal, i.e., there is no rule according to which no conclusion follows from two non-modal premises.

[10] Notice that logical and natural laws were both equally necessary for Aristotle.

to Rescher, lie in the field of physics[11]: if we see the major premise as expressing a scientific law, which holds for some genus, and the minor premise as expressing some species' belonging to that genus, it becomes clear why only Barbara LXL is valid:

> A rule that is necessarily (say) applicable to all of a group will be necessarily applicable to any sub-group, pretty much regardless of how this sub-group is constituted. On this view, the necessary properties of a genus must necessarily characterize even a contingently differentiated species (Rescher 1964: 172).

The same attitude is expressed elsewhere (see Rescher and Parks 1971: 678-9; also van Rijen 1989, who develops the idea of Aristotelian logic as a tool for modal syllogistic to the extreme and puts serious restrictions to the content of such syllogisms), where the "fundamental motivation of Aristotle's modal syllogistic" is considered to lie in "metaphysical rather than strictly logical considerations"; a similar tendency to reject the application of contemporary logical tools to Aristotle's texts is also present in some other recent studies.[12]

Although Rescher himself did not characterize the modal operator in the Aristotelian syllogism either as *de dicto* nor as *de re*, his decision to stress different weight of modalities that pertain to different premises is, in our opinion, very adequate. However, we do not agree that such an interpretation cannot be put in a more formal way and that the explanation for Aristotle's modal syllogistic must itself be extralogical – that is, belong to the fields of physics or metaphysics. The difference between the operators that modify the premises of a syllogism is a formal one – just like the difference between the premises themselves:

Major operator	-	□	□	-
Minor operator	-	□	-	□
Conclusion operator	-	□	□	-

As we can see from the table, modal status of a minor premise is completely irrelevant: *conclusion operator* always mirrors the *major operator*. A parallel example that invokes deontic modality (i.e., the one which indicates what actions ought to be taken (are necessary) or are permitted (are possible)) will help us see that this is really so. Imagine, that you belong to a group (voluntarily) the members of which must follow certain rules. Therefore, as long as you are a member of that group, you must follow certain rules; at the very moment you decide not to belong to that group anymore, those rules become unnecessary for you to follow. This reasoning has the form of Barbara LXL:

> Members of group Z must follow certain rules.
>
> Y is a member of group Z.
>
> Therefore, Y must follow certain rules.[13]

[11] Aristotle's idea of logic as a tool for other sciences such as physics and metaphysics has often been invoked to explain some parts of Aristotle's system which look like inconsistencies or paradoxes to a modern eye: one of such cases is the well-known problem of propositions with empty terms in the square of opposition.

[12] For example, Vecchio 2016, who expresses something close to a 'Rescher-Hintikka' type of attitude by saying that „[i]mporting contemporary notions of modality back onto Aristotle is not merely anachronistic, but risks misinterpreting how he conceives of science as a project by which the mind comes to understand the essences of things" (Vecchio 2016: 7). Similar choice of method is seen in Patterson 1995.

[13] One could object against the possibility of a deontic version of mixed Barbaras on the ground that in deontic logic operators modify actions, not propositions (□*p* is usually translated as "it is obligatory to do *p*"), and for that reason premises with deontic modal-

When invoking a similar parallel, it becomes intuitively clear that Barbara XLL is invalid. Imagine that all members of group Z follow some principles or rules, but they do that voluntarily and with no external constraint. In addition to that, let's say that some Y belongs to group Z by necessity – this premise can be understood as an empty obligation – that is, being a member of Z can be a part of Y's definition – and require no conscious endeavour to fulfill it. The conclusion that we get is, obviously, an X type proposition: despite the fact that Y cannot cease to belong to group Z because of its very own nature, there is no duty for Y to follow the rules that all the members of Z follow voluntarily and without any kind of necessity. In Barbara XLL, the conclusion would obviously be too strong:

> The members of group Z follow certain rules (voluntarily).
>
> Y must be a member of Z.
>
> Therefore, Y must follow certain rules.

Other kinds of examples, also from alethic modal logic, have been invoked as informal means to show invalidity of Barbara XLL and validity of Barbara LXL, but we believe that they do not appeal to our intuition as well as the deontic version does.[14]

There is a famous remark about a supposedly paradoxical nature of the Aristotelian syllogistic, made by William and Martha Kneales in their *The Development of Logic* (1971: 91): according to them, if we interpret Aristotle's modal syllogistic *de re*, it is not a *modal* syllogistic anymore, since in that case it is defined by the same principles as simple assertoric syllogistic; and if we interpret it *de dicto*, it is no longer a modal *syllogistic*, because on this reading it is not terms and their relations that matter, but rather the modal operators that require their own rules. This remark, we believe, is true only in part. As we have shown before, at least some of the *de re* readings do indeed erase the difference between modal and assertoric types of syllogistic by making the first one deal with the special kind of predicates that have the form "necessarily-P". However, we are not so sure for the second part of the remark – at least in our version. It is true that we see Aristotelian modal syllogistic as a layer of rules additional to the assertoric syllogistic: this means, that the modal or mixed syllogism is valid only in case it satisfies (1) the rules of assertoric syllogistic (i.e., has three different terms, a middle term which is univocal, etc.), and (2) additional rules for modal operators. On the other hand, we have seen that the latter modal rules are not completely independent of the syllogistic rules that deal with terms: just like the premise with the major term has more "weight" than that with the minor and is therefore called "the major premise", the modal operator that modifies it also has much more influence to the modal status of the conclusion than the minor one (which, as we have seen, has none).

Before coming to the final conclusions, we must respond to some counterarguments

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ity should not be mixed with non-modal premises that express some state of affairs taking place. However, we can easily avoid this trouble by interpreting $\Box p$ in a propositional way, that is, as "it is necessary that I should do *p*". This is not a very popular strategy, but has been endorsed by some (see Girle 2014: 205).

[14] Rescher also gives such an example of Barbara LXL in order to prove the previously quoted remark that "a rule that is necessarily (say) applicable to all of a group, will be necessarily applicable to any subgroup, pretty much regardless of how this subgroup is constituted": "If all elms are necessarily deciduous, and all trees in my yard are elms, then all trees in my yard are necessarily deciduous (even if it is not necessary that the trees in my yard be elms)" (Rescher 1964: 172).

that could possibly be given against our interpretation. First, it could be said that our *de dicto* reading, although capable of saving the integrity of Aristotelian modal system, is more likely an *ad hoc* move than the original views of Aristotle. Linguistically, it could be said, we have very little, if any, basis to make distinctions between *de dicto* and *de re* in *Analytica priora*: there are places where Aristotle talks about "necessary propositions" (what today we understand as a necessity *de dicto*), but, when providing the example of such propositions, he gives us "A necessarily belongs to B" (today understood as a necessity *de re*). It may also be objected that treating necessity as a sentential operator is anachronistic in Aristotle's case since the tradition has it that he did not deal with propositional logic. Moreover, even if he did, there still remains the question how our interpretation can be applied to the second- and third-figure syllogisms. We do not argue against the fact that there is indeed very little *linguistic* basis to support our reading. As is well known, contemporary way of formulating categorical propositions has its roots in medieval times, whereas the Aristotelian way was completely different: here a proposition starts with the predicate, which is said to "inhere" in the subject. It is therefore obvious that if we want to explain ancient texts using modern logical concepts, such an interpretation should be based on some other than strictly philological basis. We believe we have indicated such basis. In reply to the remark that Aristotle's logic was a logic of terms, not a propositional logic, usually associated with the Stoic school, attention must be paid to the fact that treating propositions as indivisible units was not at all an unusual thing for Aristotle, especially so where modality was concerned. In another famous modal inference given in chapter 9 of *De interpretation* (*De int.* 18a34-19b4), which deals with the relation of contradictoriness between future contingent propositions, Aristotle ignores any kind of relation between the terms of a proposition as far as notions of necessity and contingency are concerned[15] – this certainly seems like a *de dicto* treatment of modality. And finally, although it may initially seem that our interpretation based on the distinction between the major premise, which expresses some necessary generalization, and the minor premise, which specifies some particular case that falls under this generalization, is applicable only to the first-figure syllogisms, it works just as fine with the second- and the third-figure syllogisms after they are reduced to the corresponding "perfect" first-figure syllogism.

Conclusions

We have provided a simple solution to the "two Barbaras" problem, which is based on a *de dicto* reading of modal operators. Interpreted this way, modal syllogisms act according to the double layer of rules: (1) the rules for simple assertoric syllogistic that deal with the relations of terms, and (2) the rules for modal operators, that are concerned with the status of the premises. As it was shown, these sets of rules are independent, but have their parallels. We can now see that most of the scholarly astonishment when facing Aristotle's different evaluation of the two Barbaras arises from inability to adequately grasp the specific nature of an Aristotelian syllogistic schema. There is no

[15] Interpretative controversy that surrounds the chapter is all about the question of where to put the necessity operator in order to capture the essence of Aristotle's views on future contingent statements.

such thing as "switching" or "restating the premises" here, which some scholars see as the main and perhaps only difference between Barbara LXL and XLL[16], since you cannot "switch" something that has their peculiar place and role in the schema. This is in contrast to the most forms of modern deductive reasoning, which are not schemas but rather lists of premises followed by a conclusion where the order and the importance of each of them is usually irrelevant. This blindness to the heterogeneity of the two premises was what caused the failure of most of the previously discussed *de dicto* interpretations: there is indeed no reason to believe that Barbara LXL is valid while Barbara XLL is not, if we do not see any intrinsic difference between the first and the second premise and, correspondingly, the behaviour of the operators that modify them. We believe that we have clearly pointed out such differences.

[16] As, for instance, McCall, who, after discussing the validity of Barbara LXL, says that he cannot see "how Aristotle's restatement of the premises will serve to show the invalidity of Barbara *XLL*" (1963: 10).

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APIE SKIRTUMĄ TARP DVIEJŲ *BARBARŲ*

Živilė Pabijutaitė

Santrauka. Straipsnio objektas – „Dviejų *Barbarų*“ problema, kylanti Aristotelio modalinėje silogistikoje. Šios problemos esmė – tai klausimas, ar ir kokiais principais remiantis galima paaiškinti besiskiriantį Aristotelio požiūrį į du savo forma panašius silogizmus, sudarytus iš asertorinių (X) ir būtinų (L) teiginių – *Barbarą* LXL ir *Barbarą* XLL. Tai, jog Aristotelis laikė pirmąjį samprotavimą pagrįstu, o antrąjį – ne, buvo vertinama skirtingai: 1) neigiamai, nes manyta, jog abi *Barbaros* yra nepagrįsti samprotavimai; 2) neigiamai, nes abi *Barbaros* laikytos pagrįstais samprotavimais; 3) teigiamai, nurodant priežastį, kodėl šie samprotavimai skiriasi. Parodant, jog galimumo ir būtinumo operatoriai Aristotelio modalinėje silogistikoje turi būti interpretuojami *de dicto* bei paklūsta išvedimo taisyklėms, kuriose lemiamą reikšmę turi didžiosios prielaidos modalumas, straipsnyje ginama (3) pozicija.

Pagrindiniai žodžiai: modalinė silogistika, terminų logika, *de dicto*

Įteikta 2017 11 08
Priimta 2018 03 05