IRREFLEXIVITY AND ARISTOTLE'S SYLLOGISMOS

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Aristotle's definition of syllogismos *at Prior Analytics 24b18–20 specifies syllogistic consequence as an irreflexive relation: the conclusion must be different from each premise and any conjunction of the premises. Typically, commentators explain this irreflexivity condition as Aristotle's attempt to brand question-begging syllogismoi illegitimate in argumentative contexts. However, this explanation faces two problems. First, it fails to consider all the contexts in which Aristotle thinks syllogismoi are deployed. Secondly, irreflexivity rules out only some arguments that Aristotle considers question begging. Here I address these problems. First, I examine all the contexts in which Aristotle thinks syllogismoi can be used. Secondly, I argue that, for each context, irreflexivity makes sense as a condition, but for different reasons. Assuming that a condition which holds in each context is a condition on syllogistic consequence tout court, this explains why Aristotle holds syllogistic consequence to be an irreflexive relation.*

Keywords: Aristotle, syllogism, logic, consequence, Prior Analytics, question begging.

Aristotle's definition of *syllogismos* at *Prior Analytics* 24b18–20 specifies that syllogistic consequence is an irreflexive relation: the conclusion must be different from each premise. [I here transliterate, rather than translate, Aristotle's word *συλλογισμός*. No translation is without serious drawbacks (see Smith 1989: 106; Bolton 1994: 110; Striker 2009: 78). I hope to avoid raising those issues by avoiding translation. Unless otherwise noted, translations from Greek are based on the most recent English language translations. I have modified some translations for consistency, accuracy or fidelity.] Indeed, irreflexivity seems to rule out arguments whose conclusion is a conjunction of some or all of the premises. At first sight, irreflexivity may seem strange, because if truth preservation is necessary and sufficient for a consequence relation, then that relation ought to be reflexive: '*p*, therefore *p*' is obviously truth-preserving. Traditionally, commentators have thought that irreflexivity is a necessary condition on being a *syllogismos*, and Aristotle introduced the irreflexivity condition for pragmatic reasons, that is, reasons to do with how *syllogismoi* are used. Irreflexivity, it is usually thought, rules out the argumentative *faux pas* of begging the question.

This explanation faces two problems. The first problem is the exhaustion objection. The traditional explanation is committed to the idea that irreflexivity is partly constitutive of the notion of being a *syllogismos* just in case irreflexivity holds in all pragmatic contexts. If this equivalence is correct, the traditional explanation of Aristotle's irreflexivity condition needs to show why irreflexivity holds in all pragmatic contexts which Aristotle considers. But the traditional explanation does not do this. The second problem is the insufficiency objection. In the context of demonstration, considered in the *Prior Analytics*, Aristotle thinks of begging the question as a broader argumentative failure than reflexivity. Irreflexivity would rule out some, but not all, of the arguments that Aristotle considers question begging. Introducing irreflexivity is not sufficient to rule out question begging.

This paper remedies these defects by showing that irreflexivity is a sensible condition in each context where Aristotle thinks *syllogismoi* can be used. The first section articulates the irreflexivity problem more fully. The second section discusses the traditional view and shows the flaws in that explanation. The third section outlines my own explanation of irreflexivity in Aristotle's conception of consequence, as it emerges from his definition of *syllogismos*, which I call 'syllogistic consequence'.[1] Although in different contexts irreflexivity is a condition on *syllogismoi* for different reasons, in any pragmatic context in which Aristotle envisions *syllogismoi* being used, it is a plausible condition for giving a *syllogismos*. So the definition of a *syllogismos* includes irreflexivity because a *syllogismos* will be irreflexive across contexts, and thus regardless of the context.

This paper may interest philosophers of logic, as well as historians. Many philosophers consider an irreflexive consequence relation to be disreputable. Some deny that any consequence relation could be irreflexive. Others claim that formal systems that have a non-reflexive consequence relation are 'logics' merely by family resemblance. But this paper looks at how Aristotle thinks arguments can be used and thereby explains why an irreflexive consequence relation makes sense to Aristotle. From Aristotle's 'logic in action' perspective, irreflexivity is a more palatable condition on consequence than is usually thought. This paper speaks to modern debates because it shows how conditions on logical consequence that are usually thought outlandish can seem plausible against the background of certain uses of argument. If one thinks, like Aristotle, that an argument is an action used to do things in a context, the conditions on logical consequence might differ significantly from our own.

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[1] I use 'logical consequence' or 'consequence' to refer to any relation between premises and conclusion that has necessary truth preservation (NTP) as a necessary condition; 'classical consequence' refers to a consequence relation which has NTP as a necessary and sufficient condition and 'syllogistic consequence' refers to whatever consequence relation is captured by Aristotle's definition of a *syllogismos*. 'To entail' is the verb that corresponds to 'consequence'.

I. WHY IRREFLEXIVITY?

A logical consequence relation relates the premises of an inference to the conclusion. Aristotle's definition of a *syllogismos* captures his notion of consequence:

> (T1) A *syllogismos* is '(i) an argument (*logos*) in which, certain things having been posited, (ii) something other (*heteron*) than what has been laid down (iii) follows by necessity (iv) because these things are so' (*Prior Analytics* 24b18–20) (Translation Striker 2009: ad loc; cf. Smith 1997: 100a25–28; Forster 1955: 164b27–165a2.).

This is a definition of *syllogismos*, not, strictly speaking, an account of logical consequence. '*Syllogismoi*' which do not conform to the definition are not invalid; they are simply not *syllogismoi* at all. However, the definition implies that, where a *syllogismos* exists, a certain relationship holds between the premises and conclusion. Call this relationship 'syllogistic consequence'. According to T1, syllogistic consequence is non-reflexive. In fact, it is irreflexive: (ii) says that a *syllogismos* must have a conclusion different from the premises. Indeed, Aristotle claims that the conclusion must differ from every premise or some conjunction of the premises.[2] So an argument such as 'it is day; therefore, it is day' is not a *syllogismos*, but neither is the following argument given by Alexander of Aphrodisias:[3]

1. If it is day, it is light;
2. But it is light;
3. So, it is light. [4]

Although classically valid, this argument is not a *syllogismos*, and the conclusion does not follow by syllogistic consequence. Syllogistic consequence is, as we will see below, importantly different from 'classical' consequence. Necessary truth preservation (NTP) is necessary and sufficient for classical consequence to hold between some premises and conclusion. NTP is necessary for syllogistic consequence, but not sufficient. Along with some other additional conditions, syllogistic consequence is irreflexive. Alexander's argument does have a premise different to the conclusion, premise (1), but is still not a *syllogismos* because (2) is identical to the conclusion and hence the argument is not irreflexive. Finally, although it is not explicit in T1, the spirit of the irreflexivity condition rules out *syllogismoi* with a conclusion that is the conjunction of some or all of the premises. As we will see below, *Topics* 163a10–11 shows that

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[2] Commentators sometimes overlook the irreflexivity condition on syllogistic consequence, e.g., Ross (1949: 91); but generally, it is noted, e.g., Smith (1989: 110) and Striker (2009: 80).

[3] 'It is day; therefore, it is day' is not a *syllogismos* for several reasons: it is reflexive, but also syllogistic consequence does not hold between only one premise and a conclusion.

[4] Alexander of Aphrodisias, *On Prior Analytics* 18, 15–20. Note that arguments with conditional premises do not form part of Aristotle's formal syllogistic system, but his informal definition of *syllogismos* does not rule them out, so Alexander's is a legitimate example for my purposes.

Aristotle considers a conclusion that is just the conjunction of the premises to be identical to the premises, in the relevant sense.

From the point of view of modern classical logic, irreflexivity looks unacceptable. An inference like 'p; therefore, p' seems as good as can be. Moreover, a standard account of propositional calculus seems to have reflexivity as a trivial consequence. For example, the deducibility relation might say that if a formula is a member of a set of formulae, then that formula is deducible from that set. If φ is a member of Γ, then $\Gamma \vdash \varphi$. This grounds the recursive definition of other admissible rules of inference, in a natural deduction system. But since φ is a member of the set $\{\varphi\}$, φ is deducible from the set that includes only itself. So reflexivity holds. Reflexivity, in a formal logic as we now understand it, holds because the limiting case of the deducibility relation is reflexive.

These formal reasons are supplemented by philosophical reasons to think that logical consequence is reflexive. Classical consequence holds just in case if the premises are true, then the conclusion must be true. This condition is known as 'necessary truth preservation' (NTP). Classical consequence, so defined, is a reflexive relation. For every premise p, classical consequence holds between p and itself because if NTP is sufficient for a consequence relation, then that relation is reflexive. If the premise and conclusion are both p, then the premise and conclusion must have the same truth value. If the premises and conclusions must have the same truth value, then there can be no situation where the former are true but the latter is false. If there can be no situation where the premises are true and the conclusion is false, then NTP holds. If NTP is sufficient for consequence, then the premises entail the conclusion. But the premises and conclusion were both p. So consequence is reflexive.

Aristotle would deny that NTP suffices for syllogistic consequence, since he puts additional conditions on syllogistic consequence. (iv) is often taken to be a relevance condition on the conclusion, while (ii) is an irreflexivity condition. But Aristotle would still think NTP a necessary condition of syllogistic consequence, as (iii) seems to say. In this respect, Aristotle's syllogistic consequence relation is non-classical. In many non-classical logics, NTP is not sufficient for consequence to obtain, but is necessary. But even logical pluralists, such as Beall and Restall, hold that any respectable consequence relation, even a non-classical one, will not be irreflexive: 'non-transitive or irreflexive systems of "logical consequence" are logics by courtesy and by family resemblance, where the courtesy is granted via analogy with logics properly so called' (Beall and Restall 2009: 91). Beall and Restall go on to suggest that irreflexive consequence gets truth preservation wrong.

For these reasons, a consequence relation that denies reflexivity seems strange. So how can we explain Aristotle's irreflexivity condition on being a *syllogismos*? Commentators usually say that the logical condition of irreflexivity precludes an argumentative *faux pas* now known as 'begging the question'. I will

discuss, and dismiss, this explanation. I go on to suggest a better explanation of irreflexivity: irreflexivity is a condition in any pragmatic context Aristotle imagines a *syllogismos* being deployed in.

II. THE TRADITIONAL EXPLANATION OF IRREFLEXIVITY

II.1 Begging the question and irreflexivity

In various places, Aristotle discusses an argumentative foul that he calls 'asking for the starting point' (*Topics* VIII.13; *Posterior Analytics* II.16).[5] Recently, Castagnoli (2012: 90–121) has clarified what this fallacy amounts to in the different texts, and what the relationships between them are. However, commentators often think that Aristotle includes irreflexivity in the definition of *syllogismos* to rule out question-begging arguments (Kapp 1975: 41; Striker 2009: 80; Castagnoli 2012; 100–4). Others have argued that begging the question is a violation of the rules in Aristotle's questioning game, but they remain silent on its relation to irreflexivity (Hintikka 1987: 219–20). See also Woods and Hansen (1997: 217–39) and Hintikka (1997: 241–9). Castagnoli (2012: 111) takes a different line with the *Prior Analytics* notion of *syllogismoi*: he holds that irreflexivity means that some question-begging arguments are also non-syllogistic. But, I respond here, since begging the question is a broader problem than simply having a premise the same as the conclusion, irreflexivity cannot have been introduced to rule out begging the question. Their reasoning seems to be: question-begging arguments have a conclusion that is the same as a premise; irreflexivity rules out arguments that have a conclusion the same as a premise. So, irreflexivity rules out question-begging arguments. Therefore, the best explanation of the presence of irreflexivity in the definition of a *syllogismos* is Aristotle's desire to rule out question-begging arguments (cf. Hintikka 1987). See also Castagnoli (2012: 99–104).

This suggests that Aristotle includes irreflexivity as a constitutive condition on being a *syllogismos* for argumentative, i.e., pragmatic, reasons. But in T1, Aristotle attempts a general definition of a *syllogismos* and he lists constitutive conditions on being one. So the traditional explanation relates the constitutive conditions on being a *syllogismos* to the pragmatic contexts in which *syllogismoi* are used. Pragmatic conditions, such as a condition not to beg the question, can become incorporated into the constitutive account of a *syllogismos*. How? It must be that pragmatic conditions just *are* constitutive conditions. So the overall traditional explanation is this: (a) irreflexivity holds in some pragmatic

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[5] The Greek expressions *to aiteisthai to en archêi* and *to lambanein to en archêi* literally mean 'asking for the starting point' and 'taking the starting point'. Latin derives its expression *petitio principii* from the Greek. English derives 'begging the question' from the Latin. I use the English equivalent in my discussion.

contexts; (b) irreflexivity holds because it rules out begging the question in these contexts; so (c) Aristotle introduced irreflexivity as a constitutive condition on being a *syllogismos*.

But now the traditional explanation faces a problem with (a), which I style the exhaustion objection. Grant that pragmatic conditions can be constitutive conditions. Pragmatics studies the use of certain linguistic items, such as arguments, in contexts. But the pragmatic conditions on a *syllogismos* might vary between pragmatic contexts. For example, in the context of demonstration, using a *syllogismos* to prove a conclusion, the demonstrator simply 'takes' (assumes) the premises (Smith 1989: 24a22–3 and Ackrill 1963: 20b22–3; cf. Smith 1997: 104a8–9; Forster 1955: 171a38–b2, 172a15–20). But in the context of dialectic, the dialectician must ask for the premises from her interlocutor (Smith 1989: 24a24–5; Smith 1997: 155b3–10). The conditions on establishing premises vary by pragmatic context. How does the traditional explanation differentiate between pragmatic conditions which vary by context (like how the premises are established) and pragmatic conditions which are constitutive conditions, and so do not vary by context (like the conclusion following by necessity)?

Defenders of the traditional explanation could claim that a condition is constitutive just in case it holds in all pragmatic contexts. Since the condition that the conclusion follows by necessity will hold in all pragmatic contexts, it is a constitutive condition. But how the premises are established differs in different contexts and so these conditions are not constitutive. If this is the line, defenders of the traditional explanation have not proved their case. Why does Aristotle include irreflexivity as a constitutive condition on being a *syllogismos*? The answer must be irreflexivity is a pragmatic condition in all contexts. However, defenders of the traditional explanation have not exhaustively considered the pragmatic contexts that are relevant, or even those Aristotle considers relevant: the context of 'arguing' is only one pragmatic context in which *syllogismoi* can be used. Aristotle mentions a range of other pragmatic contexts. Since defenders of the traditional explanation have not discussed all relevant contexts, they have not proved their case.

II.2 *Irreflexivity as insufficient to rule out begging the question*

The second problem with the traditional explanation is that (b) is false. I call this the insufficiency objection. In the *Prior Analytics*, irreflexivity rules out some cases that Aristotle considers question begging, but not all such cases. So, irreflexivity is insufficient to rule out begging the question. Aristotle's discussion of that fallacy in *Prior Analytics* II.16 will help us to see this. Aristotle says:

> (T2) To ask for, to take, the starting point is (to take its genus) a kind of failure to demonstrate what is proposed, but this happens in several ways. For this happens (i) if

someone does not syllogise at all, or (ii) if they demonstrate through more unfamiliar things, or equally unfamiliar things or (iii) if they demonstrate a prior thing through a posterior (for a demonstration is by means of things more credible and prior). In fact, none of these is begging the question (64b28–37) (Translation Smith 1989: ad loc., modified; see Lear 1986: 86–90 for criticism of Aristotle's account of begging the question given here).

Aristotle begins with the point that a question-begging argument fails to demonstrate its conclusion. But he immediately tells us that failure to demonstrate has several kinds. The first is failure to syllogise (Castagnoli 2012: 106). Since all demonstrations are *syllogismoi* (Smith 1989: 25b28–31), if a sequence of statements is not a *syllogismos*, it cannot be a demonstration. Secondly, there is no demonstration through equally unfamiliar things. A demonstration moves from the more familiar to the less familiar. Thirdly, there is no demonstration *of* the prior from the posterior, since every demonstration moves *from* the prior to the posterior. Aristotle then says that none of these three demonstrative failures is begging the question.

For my argument, the first is the most important. Aristotle stresses that begging the question is not a failure to give a *syllogismos*. What does he mean by 'failure to give a *syllogismos*' in this context? It must mean that the string of statements offered by the demonstrator fails to meet the definition of *syllogismos* given at *Prior Analytics* 24b18–20. You do not give a *syllogismos* if: the conclusion is the same as some premise; the conclusion does not follow necessarily from the premises; or the conclusion does not come about through the premises. But, as Aristotle points out, none of these failures amount to begging the question. So, *a fortiori*, having a conclusion the same as a premise does not amount to begging the question. Thus, a *syllogismos* with a conclusion different from a premise could still be question begging. So irreflexivity is not sufficient to rule out begging the question.

This conclusion is supported by Aristotle's explicit discussion of begging the question in dialectic at *Topics* VIII.13. There he portrays it as a mistake in the *Topics* debating game. Such a game has two participants, a questioner and an answerer. The questioner aims to force the answerer to accept a certain conclusion by asking questions. The questioner, Aristotle says, can beg the question in one of five ways. First, asking for the very thing that needs to be proved, or some synonym of it (162b35–9). Second, asking for a universal while trying to prove a particular (163a1–5). Third, asking for a particular when trying to prove a universal (163a5–9). Fourth, dividing up what is to be proved and asking for each separately (163a10–1). Fifth, asking for one premise that is logically equivalent to what has to be proved (163a11–3).

Aristotle's discussion in the *Topics* claims that question begging has various species. Some have argued that, in the *Sophistical Refutations* discussion of begging the question, Aristotle understands 'what is the same and what is different' (Forster 1955: 167a36–9) broadly enough to encompass all five ways

mentioned in the *Topics* (Castagnoli 2012: 99–102). This would mean that all five ways of begging the question are, in effect, violations of irreflexivity and so, contrary to my argument, irreflexivity is sometimes seen as sufficient to rule out begging the question. The first type, for example, does involve asking for something 'the same' as what needs to be proved. It is also plausible that a synonym is, in some sense, the same as what needs to be proved: they are logically equivalent. The fourth sort could also be viewed as involving 'sameness', since, when conjoined, the premises are identical to what needs to be proved. I acknowledge the force of this point for certain types of question begging, but maintain that some are not violations of the irreflexivity condition. See, for example, Kakkuri-Knuuttila (2005: 55) who argues that only the first and fifth ways of begging the question are violations of the irreflexivity condition of being a *syllogismos*.

Specifically, the second and third types of question begging do not seem to be violations of irreflexivity. The third type, for example, is asking for a particular when trying to prove a universal. It is hard to think of a suitable sense in which a universal premise and a particular premise are the same. In fact, when we look at Aristotle's discussion of induction earlier in *Topics* VIII, at 156a5–7, he is clear that particular statements are more familiar than universal statements. If particular statements are more familiar than universal statements, particular statements cannot be the same as universal statements. So at least some species of begging the question do not involve having a conclusion the same as a premise. So some question-begging arguments are reflexive and some are non-reflexive. Thus, ruling out reflexive arguments will not suffice to rule out all question-begging arguments.

I have given two objections. First was the exhaustion objection. The traditional explanation does not examine enough contexts to be persuasive. Irreflexivity needs to hold in all the pragmatic contexts that Aristotle considers relevant for irreflexivity to be a constitutive condition on being a *syllogismos*. Second was the insufficiency objection. In the contexts of demonstration and dialectic, Aristotle thinks that begging the question is a broader foul than reflexivity. So irreflexivity would not rule out all, but only some, question-begging arguments. Irreflexivity is not sufficient to rule out begging the question.

In section III, I propose to remedy these problems by examining all the pragmatic contexts where Aristotle thinks a *syllogismos* could be deployed. To my mind, it is an advantage of my account that it shows Aristotle retaining a single sense of '*syllogismos*' across the various contexts. I claim that irreflexivity holds in all the pragmatic contexts in which *syllogismoi* are imagined to be used. I do not suggest, therefore, a 'validity-relativism' that Smith worries about (see Smith 1997: 150). My position suggests that, for Aristotle, it is not necessary that there is one single notion of validity across all contexts, but, as it turns out, the same notion applies across all contexts, for diverse reasons. This addresses the first objection, i.e., that only some pragmatic contexts are considered. To

address the second objection, I show, for each context, why irreflexivity makes sense as a condition. It turns out that in each context, irreflexivity makes sense for different reasons.

III. EXPLAINING IRREFLEXIVITY

Aristotle enumerates different pragmatic contexts in which *syllogismoi* can be used in several passages. At *Topics* 100a27–30, after having defined a *syllogismos* in a way almost identical to T1, Aristotle says:

> (T4) It (sc. a *syllogismos*) is a demonstration whenever the *syllogismos* is from true and primary things or from similar things that have attained the starting point of knowledge about themselves through true and primary things. Dialectical *syllogismoi* syllogise from reputable opinions (Smith 1997: ad loc., modified; cf. Smith 1989: 24a30–b3).

This passage distinguishes two sorts of *syllogismoi*: demonstrative and dialectic. Aristotle makes this distinction using pragmatic, indeed epistemic, considerations, rather than logical ones. Aristotle points out that the epistemic status of the premises marks a difference in pragmatic context: demonstrative *syllogismoi* have true and primary premises or premises related in the right way to true and primary things, while dialectical *syllogismoi* have merely reputable opinions as premises. A little later in the same passage, Aristotle mentions a third sort of *syllogismoi*, eristic *syllogismoi*, again distinguished by the epistemic status of their premises, but also the logical consideration of whether they fail to be *syllogismoi*:

> (T4 cont.) An eristic *syllogismos* is from apparently reputable, but not actually reputable opinions, and an apparent *syllogismos* from either reputable, or merely apparently reputable opinions (Smith 1997: ad loc., modified).

As in the above case, Aristotle demarcates eristic *syllogismoi* primarily using non-logical considerations: for example, the epistemic status of the premises, which is a non-logical consideration. A logical consideration, namely, whether the *syllogismos* is real or apparent, is only mentioned as a secondary way of dividing up *syllogismoi*, and only then when epistemic considerations, such as whether the premises are reputable, have already been invoked.

While the *Topics* divides *syllogismoi* into sorts by appealing primarily to pragmatic considerations, without specifying straight away how many interlocutors are involved, the *Sophistical Refutations* divides up uses of argument within one particular context, namely, discussions which involve more than one person. Aristotle tells us that:

> (T5) There are four kinds of argument used in discussion: didactic, dialectical, peirastic and eristic. Didactic [arguments] are *syllogismoi* from the principles appropriate to each branch of learning and not from the opinions of the answerer (for it is necessary for the learner to trust); dialectical [arguments] are *syllogismoi* of the contradiction, from

reputable opinions; peirastic [arguments] are *syllogismoi* based on the beliefs of the answerer and necessarily known to one who claims to know the subject (in which manner has been defined in other places); eristic [arguments] are *syllogismoi*, or apparent *syllogismoi*, from apparently reputable but not actually reputable opinions (Forster 1955: ad loc., modified).

T5 demarcates, then, four uses of argument in discussion: use in didactic, that is contexts of teaching; dialectic again; peirastic, roughly, contexts of Socratic questioning; and eristic, which I have already mentioned. All the sorts of argument mentioned in T5 involve two interlocutors. This is to be expected, since the opening sentence describes these as sorts of argument used in discussion, the pragmatic context in the case of each *syllogismos* involves two participants. Hintikka (1987: 299) uses this feature as an argument for his claim that the *Sophistical Refutations* as a whole pertains to the study of interrogative dialogues.

How many contexts are mentioned in T4 and T5? There are at least four: demonstrative, dialectical, peirastic and eristic. But is there also a fifth, namely the context of didactic? Commentators have argued that T5 identifies the didactic *syllogismoi* with demonstrative ones mentioned in T4 (Barnes 1975b: 123–52). Barnes takes this as part of his argument that demonstrative syllogisms are a didactic tool, for systematically presenting a body of knowledge (see also Barnes 1975a: 77). For important qualifications, see Wians (1989: 245–53). This identification is not obvious, since there is a formal difference between demonstrative and didactic *syllogismoi*, namely, didactic *syllogismoi* have a question-and-answer format, while demonstrative *syllogismoi* may not. There are references in Aristotle to 'demonstrative questions' (Barnes 1972a: 77a36–b39; 75a22–7), but this evidence is not strong enough to identify demonstrative and didactic *syllogismoi*.

This problem arises because T4 and T5 have a slightly different emphasis. T4 distinguishes kinds of *syllogismoi*, independent of whether they are used in question-and-answer discussions, but does not rule out their use in such a way, while T5 considers only *syllogismoi* used in such discussions. For Aristotle, there is clearly a close relationship between demonstrative and didactic arguments. Both begin from truths (cf. Smith 1997: 161a25; Barnes 1972a: 71b25–7) and the premises are more familiar than the conclusion (cf. *Rhetoric:* 1355a24–7; Barnes 1972a: 71b20–4). It may be that the form, namely, whether the *syllogismos* is presented using the question-and-answer format or not, is the principal difference between demonstration and didactic *syllogismoi*. Whatever the answer to this question, it is safer for my interpretation to discuss demonstration and didactic separately: irreflexivity makes sense in each case, as we will see.

T4 and T5 show the different ways in which Aristotle thinks *syllogismoi* can be used, whether demonstrative, dialectical, didactic, peirastic or eristic. To improve on the traditional explanation of the irreflexivity condition in

the definition of *syllogismos*, I need to prove that reflexivity holds in none of the pragmatic contexts that Aristotle discusses. So irreflexivity will be a condition in all such pragmatic contexts. The pragmatic context can determine the constitutive properties, a point agreed by the traditional explanation. So Aristotle includes irreflexivity as a constitutive condition because it holds in all relevant pragmatic contexts. I will look at the pragmatic situation for each of the *syllogismoi* in turn.

The procedure is followed by Alexander in his discussion of the '*heteron*' clause in the definition (*On Prior Analytics:* 18, 23-19,3). Alexander only discusses *syllogismoi* used in demonstration, dialectic and eristic. Alexander's list is presumably based on *Topics* 100a27–b26. My approach is inspired by Alexander's, but differs from his in detail. Alexander's aim is to show that, in each of the three cases, a reflexive *syllogismos* is not a useful *syllogismos*. Alexander would then combine this with two further premises: (i) a *syllogismos* is a tool (*On Topics:* 9, 22) and (ii) a useless tool is not that tool, except homonymously (*On Prior Analytics:* 164, 31–165,2). Alexander would then conclude that a reflexive *syllogismos* is not a *syllogismos*, except homonymously. But it seems to me that (ii) is false and that I do not have to take a view on (i). For further discussion, see Barnes (2007: 457–63). In each case, we will rule out reflexivity because of the way Aristotle envisions the *syllogismoi* being used.

I begin with demonstrative *syllogismoi*. These *syllogismoi* are discussed in the *Prior Analytics*, but the context comes in the *Posterior Analytics*. Aristotle tells us as much when he introduces the *Prior Analytics* with the remark that the object of the enquiry is 'demonstrative science' (Smith 1989: 24a10). Irreflexivity makes sense as a condition on demonstrative *syllogismoi*. The *Posterior Analytics* posits a limited number of kinds of statements from which a demonstration can proceed: a thesis, an axiom or a hypothesis. A thesis is an immediate indemonstrable starting point of a *syllogismos* (Barnes 1975a: 72a15–7). Aristotle introduces such indemonstrable starting points because they may allow him to avoid the dilemma discussed at *Posterior Analytics* 72b5–25: if all known things are demonstrable, and S knows that p, then either S is forced into a regress of demonstrations, or S must give circular or reciprocal demonstration of p. But neither of these options is acceptable, so some indemonstrable, q, is known, from which p can be demonstrated. q is then a starting point.

But if the starting point is immediate and indemonstrable, there can be no *syllogismos* to that starting point. If there were, the starting point would be *demonstrable*. Hence, if the starting point is a thesis, Aristotle is correct to model *syllogismoi* as irreflexive. Hypotheses are a sort of thesis, so the same considerations apply (Barnes 1975a: 72a21–2). Axioms are 'principles which anyone who is going to learn must possess' (see Barnes 1975a: 140). But, as Aristotle says a little further down, we must know these better than the conclusion of the *syllogismos* (Barnes 1975a: 72a29–30). Since the starting points

of a demonstration, whatever these are, will be more better known than the conclusion, they have a property that distinguishes them from the conclusion. If this is the case, a premise and the conclusion cannot be identical and so irreflexivity holds. Irreflexivity, it seems, is a non-logical condition on using a *syllogismos* as a demonstration. That condition pertains to the (epistemic) function of a demonstration.

T2, which I discussed above in a different context, also helps us to see why Aristotle thinks demonstrative *syllogismoi* would be irreflexive. T2 tells us some ways in which a demonstration can fail. One way is to attempt to 'demonstrate through more unfamiliar (*agnôstoterôn*) things, or equally unfamiliar (*agnôstôn*) things' (Smith 1989: 64b31–2, ad loc., modified). T2 also mentions that a demonstration can fail because the premises are not 'prior' to the conclusion (Smith 1989: 64b33–4), but in the *Posterior Analytics* (Barnes 1972a: 71b31–72a5), Aristotle seems to identify the familiarity and priority requirements. In any case, discussing familiarity is sufficient for the point I wish to make. That is, in a demonstration the premises must be strictly more familiar than the conclusion. Aristotle's idea of 'familiarity' and 'unfamiliarity' needs some explaining. Aristotle has an illuminating discussion in the *Topics*, where he points out that both genus and differentia are more familiar than the species because:

> (T6) if the species is known, then necessarily both the genus and differentia are known (for he who knows man also knows animal and footed), but if the genus or differentia is known, it is not necessary that the species is also known (Forster 1960: 141b30-4, modified).

Aristotle's analysis of being more familiar is in modal and epistemological terms. In this example, 'man' names the species, while 'animal' and 'footed' name the genus and differentia respectively. Aristotle's point is that an agent can know the genus, being an animal, without necessarily knowing the species, being a man. Likewise with the differentia, footed. But it is not possible to know the species without knowing the differentia. We could formulate Aristotle's idea of familiarity this way:

> (F) X is more familiar to *a* than Y iff it is possible that (*a* knows X and *a* does not know Y).[6]

If (F) is the correct way to state Aristotle's principle, the 'more familiar than' relation is irreflexive. When we replace 'X' and 'Y' in the schema with the same expression, the right-hand side of the resulting biconditional is false. For (F) to hold, whatever replaces 'X' cannot also replace 'Y'. Thus, demonstrations that

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[6] The brackets in this formulation indicate that the possibility operator has a wide scope. Although T6 refers to genus and differentia, which are terms, Aristotle does not, in general, distinguish between individuals, terms and propositions when discussing familiarity. Hence, 'X' and 'Y' can range over any of these classes.

obey this familiarity condition must obey irreflexivity.[7] A demonstration must have premises strictly more familiar than the conclusion; the conclusion cannot even be as familiar as the premises. This, of course, entails that the conclusion differs from each premise, since 'is more familiar than' is an irreflexive relation, on Aristotle's stated view. In virtue of the irreflexivity of 'more familiar than', the premises must be different from the conclusion.

In demonstrative contexts, *syllogismoi* are irreflexive for an epistemic reason: in dialectical contexts *syllogismoi* are irreflexive for more diverse reasons. The *Topics* says that two agents participate in a dialectical *syllogismos* and it proceeds by question-and-answer [for a forceful argument on this point, see Smith (1993: 337)]. The *syllogismoi* proceed from reputable opinions and aim to drive one party into a contradiction [for details of the structure of the *Topics* game, see P. Moraux (1968: 302); Slomkowski (1997). Castelnérac and Marion (2009) suggest a rather different 'rational reconstruction' of the *Topics* game, in light of Plato's Socratic dialogues]. I mentioned above some features of Aristotle's *Topics* dialectical game. A few more details will help us see why irreflexivity makes sense in this context. The questioner and the answerer are the two participants. The questioner presents a *problema* ('problem') to the answerer. All problems are questions of the form 'is X Y or not?', offering the answerer the choice of one of a pair of contradictories.[8] For example, 'Are knowledge and perception the same or not?' (cf. Smith 1997: 102a8). The answerer selects one of the contradictories. This is usually called the 'starting point' (*to en archêi*). I will label it *p*. The questioner then tries to compel the answerer, by means of 'yes or no' questions, to concede the contradictory of the starting point, namely, not-*p* (cf. Bolton 1994:103).

Some intermediate conclusions, which are needed as part of a larger argument for the overall conclusion, may be concealed. Owen (1968: 107) claims that the tactics for concealment discussed in the *Topics* are recommended only in eristic contexts. Each statement that the answerer accepts along the way is called a *protasis* ('proposition' or 'premise'). Finally, the answerer is forced to accept the *sumperasma* ('conclusion'), won by a series of such questions. Ryle points out that neither competitor is committed to the truth or falsehood of *p in propria persona*. It is accepted or denied merely for the sake of argument (see Ryle 1968: 74–5; Moraux 1968: 302; Slomkowski 1997: 107). We can see in the example below that (1) represents the *problema*, presented by the

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[7] More could be said about this familiarity principle. For example, what if 'X' and 'Y' are replaced by 'Hesperus is Hesperus' and 'Hesperus is Phosphorus', where 'Hesperus' and 'Phosphorus' co-refer? In this case, (F) seems to get the right result. In that case, the right hand side says 'it is possible that (*a* knows that Hesperus is Hesperus and *a* does not know that Hesperus is Phosphorus)', which is true, and the left hand side says 'Hesperus is Hesperus is more familiar to *a* than Hesperus is Phosphorus', which is also true.

[8] 'X' and 'Y' can range over individuals or terms.

questioner, and starting point, chosen by the answerer, (2)–(6) the *protaseis*, and (7) the *sumperasma*:

1. Q: Are knowledge and perception the same, or not? A: They are the same.
2. Q: Is it possible to both know and not know the same thing at the same time? A: No.
3. Q: If I remember something, do I know it? A: Yes.
4. Q: If I remember something, do I perceive it? A: No.
5. Q: So, if I remember something, I both know it and do not perceive it? A: Yes
6. Q: But knowing and perceiving are the same? A: Yes
7. Q: So if I remember something, I both know and do not know it. Which you agreed is impossible. A: Oh bother. . . .
8. Q: So knowledge and perception are not the same.[9]

In this context, irreflexivity makes sense. The questioner aims to derive some statement other than the starting point, *p*. In fact, the questioner aims to derive the contradictory of the starting point, not-*p*, known here as the 'conclusion'. In this game, the questioner must build up enough premises to force the answerer to admit not-*p*; the questioner does this by getting the answerer to agree to the premises. But the answerer will not agree to a premise that is just identical to not-*p*: if the answerer does this she will immediately lose. This ensures that no premise that the answerer is willing to admit is identical to the conclusion. Because of this feature of the dialectical game, irreflexivity makes sense as a pragmatic condition in dialectic.

Not all question-and-answer interactions aim at driving the answerer into contradiction: didactic *syllogismoi*, which I mentioned above, aim at one party, the answerer, increasing their knowledge. Didactic arguments move from premises that are more familiar to the learner/ answerer to the conclusion, which is less familiar (cf. Smith 1997: 127–8). Remarks on how didactic discussion would work in detail are scattered throughout Aristotle's corpus, but it seems that (i) didactic arguments proceed to truths, because no one would teach a falsehood (Smith 1997: 159a29-30; cf. 161a25); (ii) the starting points for didactic are proper to the branch of science in question (Forster 1955: 165b2–3). Moreover, (iii) the learner/answerer should always agree to reputable opinions, which are moves on the way to the conclusion (Smith 1997: 159a30). But clearly, the central feature of didactic is connecting the conclusion, which is less familiar to the learner/answerer, to the premises, which are more familiar to her. And this is sufficient for irreflexivity in this context. The conclusion and the premises differ in one important aspect: the former is less familiar to the learner than the latter.

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[9] I loosely base this fictional dialectical game on one of Socrates' refutations of the 'Knowledge is perception' thesis at *Theaetetus* 161–3.

I now consider eristic *syllogismoi*. Like dialectic and didactic *syllogismoi*, eristic *syllogismoi* have a question-and-answer format. In one sense, eristic *syllogismoi* should obviously be irreflexive. As Alexander points out, their purpose is to conclude, on the basis of things that the answerer grants, something that the answerer is unwilling to grant (*On Prior Analytics:* 18, 30). Clearly, if the answerer grants the conclusion there will be no need for an eristic *syllogismos*, so irreflexivity makes sense as a condition on *syllogismoi*. But we should say more here. For example, how does irreflexivity in the eristic context relate to the fallacy of begging the question? Maybe reflexivity is excluded from eristic to rule out begging the question. This, however, cannot be the right explanation. In eristic, no fallacy is ruled out: you can use any argument you can get away with. Understanding eristic as a game allows us to explain the relationship between begging the question and irreflexivity. Aristotle suggests that irreflexivity is a condition on eristic *syllogismoi* because it is a strategic advantage for the questioner to respect irreflexivity, not because irreflexivity is a constitutive rule of the eristic game that the questioner must respect.

We can see this from Aristotle's discussion of how to respond to an attack that uses the *petitio principii* fallacy. In the *Sophistical Refutations*, Aristotle says:

> (T7) Concerning those [fallacies of] begging and taking the starting point in the enquiry, if it is clear, it should not be granted to the questioner, even if it be a true, reputable opinion. But if the questioner takes (the starting point) covertly, because of the mischievousness of such arguments, one must let one's failure [to notice this] fall back on the questioner on the ground that he has not been debating properly. For refutation is without (assumption) of the starting point. Straight away, you must say that it was not given to be used for this, but to be used for a *syllogismos* of the opposite of this, or for a side-refutation (Forster 1955: 181a15–23, modified).

Aristotle gives defensive advice to the answerer: suppose the questioner attempts to 'take the starting point', i.e., beg the question. In this case, two defences are available to the answerer. The prospective strategy is better: do not grant the starting point when it is asked, even if it is 'true' and 'reputable'.

But what if the questioner 'covertly' gets the answerer to admit the starting point and the answerer only notices when it is too late? The text says that the answerer should retort that the questioner has not been debating properly 'for refutation is without (assumption) of the starting point'. This refers to Aristotle's contention in the *Sophistical Refutations* that each fallacy can be explained as not meeting one or more points in the definition of a refutation, part of which is the definition of *syllogismos* (Forster 1955: 164a23–7; 168b22–6). Presumably, the move violates the definition of a refutation because it violates the definition of a *syllogismos*, which suggests Aristotle has a violation of irreflexivity in mind. Now, although Aristotle notes that begging the question is a fallacy and explains why, his advice is not that the answerer should simply point out the fallacy. Rather, Aristotle's advice, if the answerer is caught out and grants the starting point,

p, is that the answerer should say that *p* was not granted for an argument to *p*. Instead the answerer should say that *p* was granted for a different argument: a side-refutation or *syllogismos* to not-*p*.

All this suggests that Aristotle thinks begging the question is a bad strategy for the questioner in eristic. Bolton (1994: 110) suggests that it might be a strategic error in dialectic for the questioner to ask straight out for the conclusion, because then the answerer will know what the questioner is trying to establish. I do not think that this is correct, since in most cases, the answerer will already know what the questioner is trying to conclude, namely, the contradictory of the starting point. Nevertheless, if Bolton agrees that begging the question is a strategic error, he might agree that irreflexivity could be considered strategic advice. Aristotle here offers advice to the answerer, but the questioner must attempt to give a *syllogismos* in the eristic context. So what would be the questioner's strategy in a contest like this? There is no rule against the questioner trying to take the starting point, at least from the point of view of eristic: in the above passage Aristotle does not advise the answerer to retort that the questioner violated a rule; rather he advises the answerer to claim that the starting point was granted for some other reason than deducing itself. But the questioner would be well advised not to attempt such a move in eristic, since the response that the answerer can give is obvious: the starting point was granted not for its own derivation, but for some other purpose. Producing a *syllogismos* where the conclusion differs from the premises is a piece of strategic advice for the questioner, so that the question-begging move does not rebound on her.

This way of understanding the relationship between begging the question and irreflexivity in eristic may illuminate the nature of eristic dialectic. On the one hand, some minimal constitutive rules constrain eristic: there are two players, a questioner and an answerer, and each has a goal (deriving an apparent contradiction or resisting one). However, there are not only rules that constitute the game, but also what one might call 'strategic rules': instructions for how to play the game *well*. Aristotle's reasons for making irreflexivity a pragmatic condition on the *syllogismos* in eristic game-playing may not pertain to the constitutive rules of dialectic, but rather strategic advice to the questioner, given certain possible countermoves by the answerer. If the questioner sneaks in the conclusion, there is a countermove available to the answerer. So it is better not to try to sneak in the conclusion at all. This piece of strategic advice, to argue irreflexively, becomes a pragmatic condition on being a *syllogismos*.

Peirastic, or 'testing', *syllogismoi* are not clearly characterised in Aristotle's dialectical works. Aristotle discusses peirastic and dialectical *syllogismoi* together in *Topics* VIII. 5. I read the passage this way. Aristotle starts with some general remarks that apply to dialectic, not yet peirastic in particular. He says that the argument must begin with a thesis that is acceptable (*endoxon*) or unacceptable

(*adoxon*), either *simpliciter* or to the specific person being tested (Smith 1997: 159b1–3; cf. Forster 1955: 183a37–b1, where peirastic and dialectic are said to deduce from *endoxa*). Since the conclusion is the opposite of the thesis, if the thesis is acceptable, the conclusion will be unacceptable and vice versa. This holds regardless of to whom the thesis is acceptable or unacceptable (159b5). Peirastic dialectic begins with a thesis that is acceptable to the answerer. The conclusion will therefore be unacceptable to the answerer.

Aristotle does not tell us exactly what to do in the case where the thesis is acceptable to the answerer, but he does tell us how to proceed when the thesis is acceptable *simpliciter*. In that case, (i) the conclusion will be unacceptable *simpliciter* (159b17); (ii) the answerer should concede everything that seems correct (159b18) and (iii) anything that does not seem correct, but is more acceptable than the conclusion (159b19–20). Adding the relevant qualifications, in a peirastic dialectic: (i') the conclusion will be unacceptable *to the answerer* (ii') the answerer should concede everything that seems correct *to her* and (iii') anything which does not seem correct *to her* but is more acceptable *to her* than the conclusion.

Irreflexivity holds of peirastic arguments, so understood. A peirastic argument forces the answerer to admit an unacceptable conclusion, on the basis of a thesis and premises that are more acceptable to her than the conclusion. It is easy to see that irreflexivity holds here. Aristotle gives constitutive rules that together entail that the conclusion will have a property not shared by any of the premises: it will be less acceptable to the answerer than any premise. This entails that the premises differ from the conclusion. The premises and conclusion do not share all properties so cannot be identical. Therefore, in this pragmatic context irreflexivity makes sense as a condition on syllogistic consequence.

IV. CONCLUSION

This paper has given a novel account of Aristotle's irreflexivity condition in his definition of a *syllogismos* at *Prior Analytics* 24b18–20. Traditionally, the explanation of this somewhat puzzling condition has been that (i) irreflexivity holds in some pragmatic contexts, (ii) irreflexivity holds because it rules out begging the question in these contexts; so, (iii) Aristotle introduced irreflexivity as a constitutive condition on being a *syllogismos*. I showed in section II that both (i) and (ii) are problematic. (i) is too weak to form part of an explanation of irreflexivity; we need to show that irreflexivity holds in all pragmatic contexts which Aristotle considers. I also criticized (ii): irreflexivity is insufficient to rule out all arguments Aristotle considers question begging. So irreflexivity was not introduced to rule out begging the question.

I gave a more satisfying explanation of the role of reflexivity in Aristotle's definition, by looking at all of the pragmatic contexts that Aristotle considers relevant. In each of those contexts, irreflexivity makes sense as a condition, although for different reasons, without appeal to ruling out begging the question. So Aristotle includes irreflexivity as a constitutive condition on being a *syllogismos*. But to explain the presence of irreflexivity in Aristotle's definition, I appealed to an assumption whereby a condition, which holds in all pragmatic contexts, holds constitutively. This assumption is shared by the traditional explanation.

This paper has treated each of these contexts independently, for analytical purposes. But there may be interesting reasons why *syllogismoi* in different contexts converge on irreflexivity. For example, in mono-agent demonstrations the premises must be more acceptable than the conclusion (Smith 1989: 64b31–2; cf. Smith 1997: 159b8–9). When Aristotle comes to discuss multi-agent dialectic, particularly the use of dialectic for training (Smith 1997: 159a25–6) and inquiry (Smith 1997: 101a34–7), he formulates a corresponding condition for multi-agent contexts: the premises *the answerer grants* should be more acceptable than the conclusion (Smith 1997: 131). It may be that multi-agent dialectic was used to train people to give better demonstrations. The trainee demonstrator could be faced with an 'answerer' trying to block their demonstration. If so, it makes sense to specify that such an answerer should not admit a premise, unless it is more acceptable than the conclusion, since this condition corresponds to how to give a good demonstration. A certain use of question-and-answer dialectic could be to train demonstrators. Such training dialectics would need irreflexivity as a condition.

The key historical contribution of this paper is to show that, for Aristotle, one constitutive condition, irreflexivity, may be a condition for different reasons in different contexts, but if irreflexivity is a condition in all contexts, it is a constitutive condition on being a *syllogismos*. This historical result speaks to more systematic concerns. Contemporary philosophers of logic are suspicious of non-reflexive consequence relations. But Aristotle embraces one. This paper has shown that irreflexivity makes sense to Aristotle as a condition on consequence precisely because he considers consequence to be a property of arguments used in contexts. Aristotle systematically looks at contexts in which *syllogismoi* are used, and concludes that such arguments must be irreflexive. This approach makes irreflexivity seem a necessary condition on consequence to Aristotle. But it is hard to say that a consequence relation rooted in argumentative practice is suspicious. After all, logicians are supposed to study arguments. This may invite a dilemma: either we admit that logical consequence is divorced from at least some uses to which arguments are put or we accept that requirements that even logical pluralists find disreputable, such as irreflexivity, may condition some consequence relations.

REFERENCES

Ackrill, J. (1963) *Aristotle Categories and De Interpretatione*. Oxford: Clarendon.

Barnes, J. (1975a) *Aristotle's Posterior Analytics: Translation with Notes*. Oxford: Clarendon.

—— (1975b) 'Aristotle's Theory of Demonstration', in J. Barnes, M. Schofield and R. Sorabji (eds) *Articles on Aristotle*, vol. I, 123–52. London: Duckworth.

—— (2007) *Truth, Etc.:Six Lectures on Ancient Logic*. Oxford: OUP.

Beall, J. C. and Restall, G. (2006) *Logical Pluralism*. Oxford: Clarendon.

Bolton, R. (1994) 'The Problem of Dialectical Reasoning (Sullogismos) [sic] in Aristotle', *Ancient Philosophy*, 14: 99–132.

Castagnoli, L. (2012) 'Aristotle on Begging the Question: Between Dialectic, Logic and Epistemology', *Logical Analysis and History of Philosophy*, 15: 90–121.

Castelnérac, B. and Marion, M. (2009) 'Arguing for Inconsistency: Dialectical Games in the Academy', in G. Primiero and S. Rahman (eds) *Acts of Knowledge: History, Philosophy and Logic*, 37–76. London: College Publications.

Forster, S. (1955) *Aristotle On Sophistical Refutations*. Cambridge, MA: Harvard University Press.

—— (1960) *Aristotle Topics*. Cambridge, MA: Harvard University Press.

Hintikka, J. (1987) 'The Fallacy of Fallacies', *Argumentation*, 1: 211–8.

—— (1997) 'What Was Aristotle Doing in His Early Logic, Anyway? A Reply to Woods and Hansen', *Synthese*, 113: 241–9.

Kakkuri-Knuuttila, M.-L. (2005) 'The Relevance of Dialectical Skills to Philosophical Inquiry in Aristotle', *Rhizai*, 2: 31–74.

Kapp, E. (1975) 'Syllogistic', in J. Barnes, M. Schofield and R. Sorabji (eds) *Articles on Aristotle*, vol. I, 35–49. London: Duckworth.

Lear, J. (1986) *Aristotle and Logical Theory*. Cambridge: CUP.

Moraux, P. (1968) 'La Joute Dialectique D'après Le Huitième Livre Des Topiques', in G. E. L. Owen (ed.) *Aristotle on Dialectic*, 277–311. Oxford: Clarendon.

Owen, G. E. L., ed. (1968) 'Dialectic and Eristic in the Treatment of the Forms', *Aristotle on Dialectic*, Oxford: Clarendon.

Ross, W. D. (1949) *Aristotle's Prior and Posterior Analytics*. Oxford: Clarendon.

Ryle, G. (1968) 'Dialectic in the Academy', in G. E. L. Owen (ed.) *Aristotle on Dialectic*, 69–79. Oxford: Clarendon.

Slomkowski, P. (1997) *Aristotle's Topics*. Leiden: Brill.

Smith, R. (1989) *Aristotle: Prior Analytics*. Indianapolis: Hackett.

—— (1993) 'Aristotle on the Uses of Dialectic', *Synthese*, 96: 335–58.

—— (1997) *Aristotle's Topics*. Oxford: OUP.

Striker, G. (2009) *Aristotle: Prior Analytics, Book I*. Oxford: Clarendon.

Wians, W. (1989) 'Aristotle, Demonstration, and Teaching', *Ancient Philosophy*, 9: 245–53.

Woods, J. and Hansen, H. V. (1997) 'Hintikka on Aristotle's Fallacies', *Synthese*, 113: 217–39.

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