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# Holding For the Most Part: The Demonstrability of Moral Facts

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## CHAPTER 8. HOLDING FOR THE MOST PART: THE DEMONSTRABILITY OF MORAL FACTS<sup>1</sup>

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This paper seeks to make a contribution to the growing body of scholarship devoted to showing that ‘Aristotelian ethics is much more like a science than it is usually represented as being’ (Reeve 1992: 27). In this paper I focus on the explanatory side of the issue. Does Aristotle think there could be a science of ethics whose goals include, among other things, generating scientific explanations of matters of conduct?<sup>2</sup> According to the *Posterior Analytics* explanations in science take the form of demonstrations. We can be said to know a thing in the scientific sense only when we grasp its corresponding demonstration.<sup>3</sup> The question I wish to explore here is whether or not Aristotle thinks matters of conduct are among the things that are capable of scientific demonstration. One of the reasons most often cited in favour of a negative answer to this question is the fact that matters of conduct hold only for the most part (*hōs epi to polu*), while demonstration deals with necessary phenomena that are incapable of being otherwise. The central thesis of this paper is that, if it does turn out that Aristotle thinks there cannot be *epistēmē* of moral phenomena, it is not because matters of conduct hold only for the most part. But let me start with a qualification.

When some scholars talk about an ‘Aristotelian science of ethics’ what they have in mind are scientific demonstrations whose conclusions yield action-guiding principles that tell us what to do in a particular situation (e.g. Winter 1997: 187-89). To me this sort of project is ruled out by Aristotle’s insistence in *EN* 6.5 that deliberation does not amount to a demonstrative proof (*apodeixis*) that such-and-such an action will necessarily bring about one’s desired end nor is practical wisdom a form of scientific understanding (*epistēmē*). But this is not my focus here.<sup>4</sup> The type of demonstrations I have in mind are not practical syllogisms whose conclusions are (prescriptions

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<sup>1</sup> I am grateful to Joe Karbowski, Karen Nielsen, David Reeve, James Lennox, Marko Malink, and Charlotte Witt for their helpful comments and suggestions for revision. I am also grateful to James Allen for pushing me to think harder about the meaning of *hōs epi to polu*, which provided the original impetus for this paper.

<sup>2</sup> Given Aristotle’s views about the practical aims of ethics (e.g. *EN* 1.3.1095a2-6; 2.2.1130a26-31), one might think the answer to this is obvious: No. However, Aristotle allows that practical disciplines (like ethics) can have theoretical knowledge among their *proximate* goals, even if it is not their *ultimate* goal. Such knowledge is pursued, not for its own sake, but for the sake of acting. For further discussion of this point see the Introduction to this volume.

<sup>3</sup> This seems to be the upshot of *APo.* 1.2-6. In this paper I am concerned only with scientific knowledge in the strict and unqualified sense (*epistēmē haplōs*). That *epistēmē* in this sense is restricted to demonstrative knowledge is implied by (e.g.) 71b18-25. There Aristotle tells that, while non-demonstrative syllogisms (those that do not meet the conditions specified at 71b20-3) yield some kind of epistemic grasp, they don’t yield *epistēmē* (or, more precisely, those syllogisms are not demonstrations precisely because they do not yield *epistēmē*). I understand Aristotle to be making the claim that demonstration is the only type of syllogism that is productive of scientific understanding in the strict sense defined at *APo.* 1.2.71b9-16. It is true that he sometimes uses *epistēmē* (and its cognates) in a way that does not depend on demonstration. For example, he uses *epistasthai* at 71b16-17 to refer to the kind of grasp we have of first principles. But I take this to be a looser sense of ‘knowing’ that does not refer to scientific understanding in the strict sense. For when Aristotle finally turns to that kind of grasp in *APo.* 2.19 he explicitly denies that it is *epistēmē* on the grounds that it does not come about through demonstration. I am grateful to Marko Malink for pressing me on this point.

<sup>4</sup> For a discussion of this see Nielsen (this volume).

for) actions but causal explanations that yield scientific understanding of matters of conduct.<sup>5</sup> Those explanations would seek to establish, through demonstrations, such ethical ‘theorems’ as the fact that virtues of character are acquired by habit (1103a25), that it is in our power to be virtuous or vicious (1113a14-15), that brave men are fearless in the face of death (1115a23-b7), that the just man is fair (1129a35), that the happy man necessarily has friends (1169a21), that no pleasure is a change (1174a18-19), and so forth. For this reason I shall put to one side the issue in *EN* 6.5, which is about the character of the reasoning employed by the *phronimos* in determining how to act in particular situations.<sup>6</sup>

#### SECTION 1: THE ANALOGICAL ARGUMENT

Aristotle uses the expression *hōs epi to polu* (‘for the most part’, ‘usually’, ‘typically’) as a statistical concept to express the relative frequency of a given event or state of affairs. To say that *F*s are *G* ‘for the most part’ means that most (as opposed to all or few) *F*s are *G*. For-the-most-part (FMP) propositions therefore do not state universal laws that occur invariably without exception.<sup>7</sup> Rather, they are statistical generalisations that tell us how things are in the majority of cases with the understanding that there are (or at least could be) cases where they do not hold. Traditionally the fact that propositions about matters of conduct hold only for the most part has been seen as evidence that Aristotle thinks there cannot be scientific knowledge of ethics in the strict sense, since the objects of scientific knowledge cannot be otherwise (*APo.* 1.2, *EN* 6.3). Some scholars have responded to this by noting that Aristotle also thinks natural phenomena hold for the most part and yet allows that the study of nature qualifies as a proper demonstrative science. This is supposed to put a science of ethics back on the table (Reeve 1992; Reeve 2012; Anagnostopoulos 1994; Irwin 2000; Winter 2012). The analogical argument runs as follows:

- (1) Matters of conduct are analogous to natural phenomena in that both hold only for the most part.<sup>8</sup>
- (2) Aristotle thinks we can acquire scientific knowledge of natural phenomena despite holding for the most part.

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<sup>5</sup> On the relation between deliberation and the practical syllogism see Allen’s contribution to this volume. My point does not turn on the issue raised in that chapter.

<sup>6</sup> This reading depends on a distinction between the theoretical and practical sides of ethics (or ‘dogmatic’ and ‘parainetic’ in the language adopted in the Introduction). On my reading determining what to do in a particular situation, which involves deliberation and practical wisdom, is a different enterprise than the sort of theoretical investigation of moral phenomena that Aristotle is engaged with in the ethical-political treatises themselves. This makes the ‘moral particularism’ debate, which concerns the practical (action-guiding) side of ethics, orthogonal to my project. This is not to deny that the knowledge possessed by the person of practical wisdom includes a scientific grasp of matters of conduct (cf. *EN* 1.7.1141a16-19, 1141b8-23, Nielsen this volume). But, on my reading, generating that knowledge is not the domain of practical wisdom.

<sup>7</sup> Most scholars deny that ‘for the most part’ has a purely statistical sense. While the account that follows does not turn on any particular interpretation of the meaning of *hōs epi to polu*, it is worth noting that Aristotle consistently uses the *hōs epi to polu* interchangeably with words that express frequency (e.g. *en tois pleistois*: *Topics* 129a6-17, *GA* 725a16-17; *ta polla*: *PA* 663a25-7; *to pleistakis*: *GA* 770a21 and surrounding context; *panta... schedon*: *GA* 771a22). Contrast Irwin (2000: 106-13).

<sup>8</sup> For a denial of this premise see Joachim (1926: 15, 108-11).

- (3) Therefore, the fact that moral phenomena hold only for the most part does not disqualify them as candidates for scientific knowledge.

This argument takes it for granted that Aristotle uses *hōs epi to polu* in the same way in each domain. However, as we shall see, a survey of the works on natural science shows that the extension of Aristotle's concept includes three different kinds of FMP phenomenon. And not all kinds are suitable candidates for demonstration. This calls into question the warrant for extrapolating from natural science to ethics, since it could turn out that natural phenomena and matters of conduct do not hold for the most part in the same way.

The tripartite classification of FMP propositions set out below can be summarised as follows. All FMP propositions can be divided, first, into two main categories depending on whether or not the phenomenon captured by the proposition is governed by an underlying cause: Category A includes propositions that state causal regularities; Category B includes those that state correlations without causation.<sup>9</sup> Category A can then be sub-divided into (A1) those propositions that express *ceteris paribus* laws<sup>10</sup> and (A2) those that are related to the more-and-less.<sup>11</sup> As we shall see the essential difference between these two sub-categories has to do with the nature of the exceptions. In A1 the proposition expresses what holds under normal conditions when the causes are operating as they should while exceptions are explained by the malfunctioning of those mechanisms. In A2 exceptions to the proposition are not abnormal occurrences that result from a breakdown in the causal mechanisms; rather, they are due to normal fluctuations in those underlying mechanisms (those mechanisms are 'plastic' as it were). Let me begin with Category A.

Category A1: *ceteris paribus* laws. In some cases the proposition '*F*s are *G* for the most part' expresses a causal regularity where the fact that the two predicates are causally linked explains why most *F*s turn out to be *G*. A survey of the works on natural science reveals that Aristotle's causal use of *hōs epi to polu* can be divided into two sub-categories.

Aristotle often says that things that occur by nature happen only for the most because they are governed by reliable, but defeasible, causal mechanisms. While there is some cause that explains why most *F*s are *G*, natural causes are such that something can impede their operation so that some *F*s fail to be *G*. Here propositions of the form '*F*s are *G* for the most part' function like *ceteris paribus* laws that range over those normal cases where the causal mechanisms are functioning as they should (cf. *Physics* 2.8.199a25-6: 'In things produced by nature the sequence is invariable *if* nothing impedes it.'). Because natural phenomena involve defeasible causal relations, they are capable of being otherwise (*GA* 4.4.770b9-24). For example, in *GA* 4.8 Aristotle observes that females do not conceive while they are producing milk because milk production and menstruation make use of the same limited physiological resources. So females who are lactating do not menstruate. But this fact holds only for the most part. Aristotle says that 'in the natural course of

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<sup>9</sup> Contrast Winter (2012: 50), Ferejohn (1991: 119-20).

<sup>10</sup> A *ceteris paribus* law is a general law whose scope is restricted to what occurs under normal circumstances and therefore excludes cases where certain factors interfere with the normal causal relationships.

<sup>11</sup> The 'more-and-less' (*mallon kai hēttōn*) is a technical concept in Aristotle that has its origins in the metaphysical machinery of Plato's *Philebus* (see Lennox 2001: 162-3). Aristotle uses the expression to signal that the attributes of some wider kind *K* exhibit variation within a certain range of values, which serves to differentiate one species of *K* from another (see *HA* 1.1, *PA* 4.12). For the association between 'for the most part' and 'the more and less' see *HA* 583b3-9.

events (*kata phusin*) females do not conceive while lactating ‘unless, that is, something occurs by force and contrary to what happens for the most part, which is just to say that it is contrary to nature (*para phusin*). For, in those cases where it is not impossible for things to be otherwise but where they are capable of being otherwise, it is what happens for the most part that is in accordance with nature.’ (GA 4.8.777a3-21) The proposition that no lactating female is able to conceive is not an inviolable rule. Instead it is meant to capture what happens when the causal mechanisms involved are operating under normal conditions. Menstrual fluid and milk are produced from the same raw materials, and normally women do not generate enough of those materials to produce both at the same time. Thus in normal females milk production and menstruation do not occur simultaneously. But there may be cases where the biochemical mechanisms do not work as they should leading to an over-production of those raw materials. In this way the proposition that no lactating female is able to conceive admits of exceptions, which is why it holds only for the most part. But Aristotle insists that those exceptions are abnormal cases that occur contrary to nature.

Category A2: the more-and-less. Other instances of *hôs epi to polu* are associated with cases of more-and-less variation where the range of variation is due to the fact that the causal mechanisms that govern the phenomenon are highly plastic. In these cases *F* exhibits a range of different values from *G* to *K* where the proposition ‘*F*s are *G* for the most part’ is a generalisation that is meant to capture the fact that most instances of *F* cluster around the *G* part of that range. For example, Aristotle tells us that in dogs milk production typically (*hôs epi to polu*) begins in females five days prior to giving birth, though it can occur anywhere between four and seven days before (HA 574b6-7). The idea is this. In mammals milk production is triggered by certain biochemical processes that can be studied by natural science (it is a causal phenomenon). In dogs, while these processes are triggered anywhere between four and seven days prior to birth, they typically occur at the five day mark. FMP propositions in Category A2 differ from those in A1 in that exceptions to them are due to normal variations in the underlying causal mechanisms rather than to their malfunctioning. By saying that, for the most part, lactation begins five days prior to parturition Aristotle does not mean that all normal dogs begin to lactate at that time *unless* something occurs contrary to nature. He means that in most cases that is when milk production commences, although there are plenty of perfectly normal cases where it begins earlier or later. When they do, this is not because something has gone wrong in the dog’s body but because the operation of the causal mechanisms involved naturally varies within a normal range.<sup>12</sup>

Category B: correlation without causation. However, not all FMP propositions express causal regularities. Sometimes Aristotle uses *hôs epi to polu* to refer to correlations that are nothing more than observable regularities. These are cases where *F* and *G* are statistically correlated but not causally related. I shall call these ‘mere’ correlations to indicate the lack of causal connection. There are at least two examples from the works on natural science where the *hôs epi to polu* relation is explicitly associated with a mere correlation.

In GA 4.4 Aristotle observes that the type of foot an animal has is usually correlated with the number of offspring it produces. This generalisation does not hold in every case, however,

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<sup>12</sup> Since all natural causes are defeasible, all A-type propositions can be understood as involving *ceteris paribus* laws. But that is not what Aristotle means to convey by *hôs epi to polu* in A2-type cases. Rather, he means that the phenomenon exhibits a normal range of variation with most cases clustering around a certain point on that range (expressed by the *hôs epi to polu* claim).

since the elephant (for example) is a fissiped but gives birth to only one offspring at a time. The reason this correlation only holds for the most part, Aristotle tells us, is that type of foot and number of offspring are not causally related:

For the most part animals with solid hooves produce a single offspring, those with cloven hooves a few, while fissipeds produce many. The reason for this is that for the most part sizes are delimited according to these differences. At the same time, however, this does not hold good for all of them because size (the greatness or smallness of the body) is the cause of producing few or many offspring not the fact that the kind is cloven-hoofed, solid-hoofed, or fissiped. (*GA* 771b2-8)

Aristotle thinks there is a causal connection between the size of an animal and the number of offspring it produces. This is because the same physiological resources that are used to nourish the animal's body are also used to generate its offspring, so that animals that devote most of these resources to maintaining a large frame will have less to spend on producing offspring. That is why the elephant produces only a single offspring while smaller fissipeds (e.g. rabbits, mice) have large broods. By contrast there is no causal relation between type of foot and number of offspring (the one does not causally depend on the other) so that the number of offspring an animal produces is only *typically* correlated with the type of foot it has.<sup>13</sup>

The other example of a FMP phenomenon that exhibits correlation without causation again comes from *GA*:

For the most part the periods of gestation for each animal happen (*tunchanousin*) to be delimited by their length of life. For it is reasonable that the development of the long-lived animals should take a longer time. Yet, this is not a cause; rather, it just happens (*sumbebēken*) for the most part. For although the larger and more complete blooded animals do live a long time, not all of the larger animals are also longer-lived. (*GA* 777a32-b3)

Observation shows that gestation times tend to be correlated with lifespan so that longer-lived animals usually take longer to develop. But Aristotle is explicit that this is a *mere* correlation. Gestation time and life span just so happen (*tunchanousin*, *sumbebēken*) to be correlated, but the one is not the cause of the other. The high degree of correlation between the two may make the generalisation more probable so that if we find an animal has a long life span then it is statistically more likely that it also has a long gestation period. But this is only a *probable* inference.<sup>14</sup> Because there is no intrinsic causal relation between the two attributes, there is no guarantee that they will always be found together in the same subject. Thus we should not be surprised if we find exceptions to the generalisation (as with humans and horses).

What these two examples show is that not all FMP propositions involve some sort of intrinsic causal relation (pace Ferejohn 1991: 120; Winter 2012: 50).<sup>15</sup> In some cases *hōs epi to polu* captures nothing more than the fact that *F* and *G* happen to be correlated with one another in most cases, even though there is no cause that explains that correlation. Indeed, in the second of our

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<sup>13</sup> Aristotle does not say why these two properties are correlated with one another, but that is irrelevant to the point.

<sup>14</sup> Aristotle associates *hōs epi to polu* with what is probable or likely (*to eikos*) at *Rhetoric* 1402a13-1403a3. See also *APr* 2.27.

<sup>15</sup> Of course there may be an incidental (*per accidens*) causal relation in these cases, but incidental causes are not objects of Aristotelian science (*APr* 1.13, *Metaph.* 11.8).

two examples Aristotle explicitly contrasts this use of *hōs epi to polu* with cases where two properties are directly linked by a cause ('this is not a cause; rather, it just happens for the most part').

With this taxonomy in hand, let us return to the Analogical Argument.

Defenders of the Analogical Argument argue that the fact that propositions about matters of conduct hold only for the most part does not disqualify them as candidates for scientific demonstration. For natural phenomena also hold for the most part, and Aristotle accepts that the study of nature is a proper demonstrative science. It should be clear by now why the appeal to natural science is problematic here. Since Aristotle does not use the concept of *hōs epi to polu* in a unified way, we cannot extrapolate from natural science to ethics in such a straightforward manner. For (as we shall see) not all FMP propositions are equally capable of demonstration. The lesson from the preceding discussion, then, is that if the Analogical Argument is to go through we must show that matters of conduct hold for the most part in the appropriate sense. My aim in the remainder of this paper is to do just that.<sup>16</sup>

Before proceeding it will be useful to consider a rival taxonomy. Irwin (2000) argues that the extension of Aristotle's concept of *hōs epi to polu* includes two kinds of phenomena, 'the normal' and 'the frequent', and that only the former is relevant to the analogy with ethics. While this superficially resembles my distinction between Categories A and B, Irwin's distinction is between cases that involve teleological regularities — his category of the normal is a normative category that involves reference to 'natural norms' (e.g. facts about human nature) — and those that involve non-teleological regularities. As such his category of 'the frequent' becomes a dumping ground for any FMP propositions that do not invoke natural norms. I think it is a mistake to focus on teleology as the key difference here. On my reading Categories A and B are distinguished by whether or not the phenomenon in question is governed by a causal mechanism, while A1 and A2 are further distinguished by whether the exceptions are due to a breakdown of that mechanism or to its natural plasticity. While some FMP phenomena do involve final causes, whether the phenomenon is teleological or not is irrelevant to understanding Aristotle's use of *hōs epi to polu*. For example, in *GA* 5.1 Aristotle discusses the biochemical processes responsible for eye colour. Under normal conditions, those processes result in two eyes of the same colour. Heterochromia is a disorder that occurs when the causal mechanisms governing those biochemical processes malfunction resulting in eyes of different colour (780a10-13). So the fact that animals have two eyes of the same colour holds only for the most part because certain factors may interfere with the operation of those mechanisms resulting in exceptions to the rule. This counts as an example of A1 even though eye colour does not exist for the sake of anything or contribute to the animal's good (778a32-4). So A1 subsumes Irwin's category of 'the normal' but also includes non-teleological phenomena.

The fact that Aristotle uses the concept of *hōs epi to polu* to express different relations affects the validity of the Analogical Argument. For the fact that propositions about natural phenomena are demonstrable despite holding for the most part is only true for a sub-set of cases, namely, those in Category A. As we shall see, this is not true for those FMP propositions that express mere correlations (Category B). So just because Aristotle thinks some natural phenomena are capable of demonstration even though they hold for the most part, this is not enough to secure the con-

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<sup>16</sup> In this sense my paper is meant to fill a gap in the arguments of Reeve, Anagnostopoulos, and Winter who all take it for granted that Aristotle uses *hōs epi to polu* in a unified way throughout the scientific and ethical treatises.

clusion of the Analogical Argument. For it could turn out that ethical generalisations state mere correlations. We still need to show that the two domains are analogous in the right way.

## SECTION 2. DEMONSTRATION AND HOLDING FOR THE MOST PART

At the beginning of *APo.* 1.2 Aristotle defines scientific knowledge in the unqualified sense (*epistēmē haplōs*) as the cognitive state we are in when we grasp the causes of necessary facts that are incapable of being otherwise:

We suppose ourselves to have scientific knowledge of each thing in the unqualified sense (and not in the incidental way in which the sophist knows) when we suppose that we grasp the cause on which that fact depends and it is impossible for it to be otherwise. ...Hence, if there is scientific knowledge of something in the unqualified sense, then it is impossible for it to be otherwise. (*APo.* 1.2.71b9-16; cf. *EN* 6.3)

The mechanism for generating scientific knowledge is demonstration (*apodeixis*), which is a special type of syllogism whose premises meet certain requirements (*APo.* 1.2.72a20-b4, *APo.* 1.4). For the purpose of this paper I shall focus on just three. In order for the proposition ‘*S* is *P*’ to be demonstrable, and thus an object of scientific knowledge, [1] there must be a cause *C* that explains why *S* is *P* (which is picked out by the middle term of the corresponding demonstration), [2] *P* must hold of every *S*, and [3] the relation between *S* and *P* must be necessary in the sense that it cannot be otherwise.<sup>17</sup>

It should be obvious why FMP propositions expressing mere correlations are not proper candidates for scientific demonstration: they fail to meet the causal condition. For example, there is no causal relation between having split toes and producing many young; the two predicates just happen to be correlated with one another in most cases. Since ‘fissiped’ and ‘many young’ are not linked by any intrinsic cause, we cannot generate a demonstration of the fact that most fissipeds happen to produce many young. By contrast, all propositions falling into Category A satisfy the causal condition insofar as the relation between subject and predicate is always grounded in the presence of a causal power (Mignucci 1981, Ferejohn 1991: 129-30, Winter 1997).<sup>18</sup> For example, there is a reason why female mammals lactate while pregnant: they possess a natural capacity (or *dunamis*) to produce milk, which is triggered by certain biochemical changes during the onset of labour. The fact that this cause is defeasible (the causal mechanisms could malfunction) explains why this holds only for the most part. What I want to argue is that such propositions can also be shown to meet the necessity requirement.

Aristotle sees necessity as an essential feature of scientific knowledge that distinguishes it from the weaker cognitive state of belief or opinion (*doxa*):

Scientific knowledge and its objects differ from belief and its objects in that the former concerns what is universal and proceeds through what is necessary, and what is necessary cannot be otherwise (*katholou kai di’ anankaiôn, to d’ anankaion ouk endechetai allôs echein*). So while there are things that are true and concern real beings and yet are capable of being otherwise, scientific knowledge clearly does not concern them. (*APo.* 1.33.88b30-4)

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<sup>17</sup> The latter two conditions are actually part of the same requirement that scientific predications must be appropriately ‘universal’ (*katholou*), which includes holding of it *per se* (*APo.* 1.4-6). I shall treat these conditions separately for the purpose of this paper.

<sup>18</sup> In what follows I will be concerned only with efficient causation, although *APo.* 2.11 tells us that there can be demonstrations of all four modes of causation where the middle term picks out the relevant *aitia*.



Now, since things that hold only for the most part are capable of being otherwise (*APr.* 1.13), one might argue that whatever holds for the most part must be outside the scope of Aristotelian science so that the best we can hope to achieve in those domains whose phenomena are of this sort (including matters of conduct) is mere belief. However Aristotle is explicit in the *Analytics* that science and demonstration include what holds for the most part:

There is no scientific knowledge of things that come about from chance, for what happens by chance occurs neither by necessity nor for the most part but happens apart from these. And demonstrations are concerned with one or the other of these. For every syllogism proceeds either through necessary propositions or through what holds for the most part. If the propositions are necessary, then the conclusion is necessary too; if they hold for the most part, so does the conclusion. Hence, if what happens by chance is neither for the most part nor necessary, then there will be no demonstration of it. (*APo.* 1.30)

This fits well with the fact that Aristotle treats the study of nature as a proper demonstrative science even though he insists that natural phenomena hold only for the most part (*PA* 640a1-9, *HA* 491a6-13, *DA* 402b17-403a2; Charles 2000; Lennox 2001; Leunissen 2010; Gotthelf 2012: Ch. 7).

Since Aristotle recognises demonstrations of what holds for the most part, and since he restricts demonstrations to universal propositions that express necessary relations between terms, then he must think that FMP propositions somehow involve necessity (cf. Reeve 1992: Ch. 1).<sup>19</sup> But how can what holds for the most part also be necessary? What I want to propose is the following. In the *Posterior Analytics* Aristotle cashes out the necessity that holds between the subject and predicate of a scientific proposition in terms of his technical *kath' hauto* (Latin: *per se*) relation. According to that account anything that holds 'in virtue of itself' is said to hold of necessity (Ferejohn 1991; McKirahan 1992: Ch. 7).<sup>20</sup> There are three uses of *per se* that are relevant to the theory of demonstration.<sup>21</sup>

*A* holds of *B* per se-1 iff *A* is an element in the definition stating what it is to be *B*, i.e. *A* is (fully or partially) constitutive of the essence of *B*.

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<sup>19</sup> What about *APo.* 1.30, which contrasts demonstrations of necessary phenomena with those that hold only for the most part? One way to reconcile this with the current interpretation is to take Aristotle to be contrasting what holds for the most part with 'absolute' (*haplós*) necessity. This leaves room for attributing another kind of necessity to FMP propositions. This is the interpretation I adopt below. This requires biting the bullet and accepting that the *Analytics* conflicts with *EN* 6.3, which explicitly requires that the objects of scientific demonstration be necessary in the absolute sense (1139a21-4). (But note that the conflict with *EN* is not confined to the modality of demonstrative propositions. The argument in *EN* 6.5 against identifying *phronêsis* and *epistêmê* depends on rejecting the claim that there could be demonstration of things that hold for the most part, which is *prima facie* incompatible with *APo.* 1.30 on any interpretation.) By contrast, some argue that Aristotle relaxes the necessity condition to allow for demonstrations of contingent (non-necessary) phenomena (e.g. Anagnostopoulos 1994). But there is little evidence internal to the *Analytics* that Aristotle ever meant to drop the condition that demonstration requires necessary objects (e.g. *APo.* 1.2, 4, 6). Indeed, this is precisely the feature of *epistêmê* that is supposed to mark it off from the weaker cognitive state of *doxa* (*APo.* 1.33.88b30-5). For a discussion of the various interpretations of the necessity condition see Winter (1997, 2012). My analysis shares affinities with Winter (2012: e.g. 71).

<sup>20</sup> Following McKirahan (1992: 101), I take Aristotle to hold that *A* necessarily belongs to *B* if and only if *A* belong *per se* to *B*.

<sup>21</sup> There is another (ontological) sense of *per se* that is not relevant for my purposes, which refers to a way of existing (viz. in virtue of itself [*kath' hauto*] versus in virtue of being predicated of something else). This is *per se-3*.

For example having three sides belongs *per se-1* to triangle, since it is contained in the definition of its essence (triangles are [= def.] three-sided plane figures). Having three sides is thus a necessary property of triangle in the sense that a plane figure could not be a triangle without having three sides by definition.

*A* holds of *B* per se-2 iff *B* (the subject) is an element in the definition stating what it is to be *A* (the attribute).

For example, female is a *per se-2* attribute of animal because animal is present in the definition of a female (cf. *Metaph.* 7.5, 10.9). Females are (=def.) animals that generate into themselves (*GA* 716a14-18), so that females are necessarily animals (though an animal is not necessarily female). Finally,

*A* belongs to *B* per se-4 iff *B* is the intrinsic cause of *A*.<sup>22</sup>

Aristotle explains this sense of *per se* in the following way:

Again, in another sense, if *A* holds of *B* because of [*B*] itself (*dia hauto*), then *A* holds of *B* in virtue of itself (*kath' hauto*). And what does not hold in this way is incidental to it. For example, if there was lightning while he was walking that was incidental. For it was not because of his walking that lightning occurred; that, we say, was incidental to his walking. But what holds *because of itself* holds *in virtue of itself*. For example, if something died from being slaughtered and in relation to its slit throat, it died on account of (*dia*) being slaughtered and being slaughtered was not incidental to its dying. (*APo.* 1.4.73a10-16)

Aristotle tells us that for something to happen ‘because of (or through) itself’ (*dia hauto*) is for it to happen ‘in virtue of itself’ (*kath' hauto*). Thus we say that *A* (the effect) belongs to *B* (the cause) *per se-4* iff *B* is a cause of *A* in virtue of itself and non-incidentally. One way to cash this out is to say that *A* belongs to *B* *per se-4* just in case *A* is the intrinsic object of a *dunamis* that is predicated in the nature of *B*, that is, if the nature of *B* includes a capacity to bring about *A* (see *Phys.* 2.1.192b21-3).

While Aristotle typically restricts his discussion of *per se* relations in the *Analytics* to *per se-1* and *per se-2*, there is no reason to think his view that scientific necessity is grounded in the *per se* relation does not extend to the *per se-4* relation. For many of Aristotle’s own examples of demonstrations in the *Posterior Analytics* include propositions that express such intrinsic causal relations (e.g. solidification of sap produces leaf loss, Athenian aggression triggers war, etc.). If this is right, then syllogisms involving FMP propositions in Category A will also satisfy the necessity condition insofar as they express intrinsic causal relations between natural kinds.

This interpretation faces a problem. At the core of Aristotle’s concept of necessity is the idea that something cannot be otherwise (*Metaph.* 5.5.1015a31-6). And yet Aristotle includes what holds for the most part among those things that *can* be otherwise:

Having made these distinctions we next point out that ‘what is capable of being otherwise’ is said in two ways. (1) In one way it means what occurs for the most part and falls short of necessity—for example: a man’s turning grey or growing or decaying or generally what naturally belongs to a thing (for this has not its necessity unbroken, since a man does not exist forever, although if a man does exist, it comes about either necessarily or for the most part). (2) In another way it means what is indefinite, which can be both thus and not thus: for example, an animal’s walking or an earthquake’s taking place while it is walking or generally what happens by chance; for none of these incline by na-

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<sup>22</sup> For a defence of this see Ferejohn (1991: 118-19). Compare *Phys.* 2.5.196a24-9.

ture in one way more than in the opposite. ...Science and demonstrative syllogisms are not concerned with things which are indefinite, because the middle term is uncertain. But they are concerned with things that are natural, and as a rule arguments and enquiries are made about things which are possible in this sense. Syllogisms indeed can be made about the former, but it is unusual at any rate to enquire about them. (*APr*: 1.13.32b4-22)

How do we reconcile the claim that FMP propositions in Category A satisfy the necessity condition with Aristotle's insistence that what holds for the most part 'falls short of necessity'?

In the *APr*: I 13 passage Aristotle contrasts two types of phenomenon that are capable of being otherwise: natural phenomena that occur in the same way for the most part (e.g. growing and decaying); and indeterminate events that come about by chance (e.g. walking during a full moon). While Aristotle denies that science and demonstration are concerned with chance events (cf. *Phys.* 2.5-6, *Metaph.* 6.2, 11.8.1065a5-20), he says quite clearly that they are concerned with things that occur by nature. Anagnostopoulos takes this to show that necessity is not in fact a requirement of Aristotelian science and that Aristotle allows for *epistêmê* of contingent facts. For Aristotle is explicit here that there can be science and demonstration of natural phenomena even though they are capable of being otherwise. But this way of reading the text conflicts with Aristotle's repeated claim that the objects of scientific knowledge must be necessary and incapable of being otherwise (*APo.* 1.2, 4, 33, *EN* 6.3, 5) while things that are not necessary are at best objects of belief (*APo.* 1.33). In order to avoid this conflict I propose that we look for a sense in which natural phenomena are incapable of being otherwise (and thus meet the necessity condition) even though they are changeable and hold only for the most part.

As Winter (2012: 59-65) points out, the *APr*: 1.13 passage does not claim that natural phenomena do not involve necessity; it says that 'they have not their necessity unbroken.' Now by 'unbroken' necessity Aristotle seems to have in mind unqualified or absolute (*haplôs*) necessity. Things that occur through absolute necessity (e.g. the motions of the heavenly bodies) cannot be otherwise in the strong sense of occurring eternally and without fail.<sup>23</sup> Thus by saying natural phenomena 'fall short of necessity' Aristotle means they fall short of *absolute* necessity. And saying 'they have not their necessity unbroken' means that their necessity is somehow intermittent rather than eternal and uninterrupted (Kupreeva 2010: 203-33; Leunissen 2010: 99-109). Aristotle's account of sex determination helps illustrate the difference.

According to Aristotle's theory of reproduction semen contains a high degree of natural heat that gives it the capacity (*dunamis*) to concoct the menstrual blood and assimilate it to its own hot nature (*anagêi eis to idion eidos*).<sup>24</sup> Since males are associated with a higher degree of natural heat, we can think of this *dunamis* as a capacity to make a male embryo. Now if the relation between this *dunamis* and its effect were necessary in the absolute sense, then animal generation would be an uninterrupted sequence of males producing males that occurred with the same everlasting continuity as the motions of the heavenly bodies. However, while Aristotle thinks that the

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<sup>23</sup> See *PA* 639a23-5. Aristotle also connects absolute necessity to eternity at *EN* 6.3.1139a19-26.

<sup>24</sup> *GA* 726a15-23, 729b5-28, 766a18-21. Note that 'hotter' and 'colder' here are not measures of sensible temperature; rather, they are measures of a thing's ability to do work. Specifically, they are measures of a thing's power to effect concoction (*PA* 648a25-6, cf. *Meteor.* 4).

mechanism of sex determination operates through a type of causal necessity, it is not necessary in this absolute sense. For menstrual fluid contains its own passive *dunamis* for resisting concoction, so that it sometimes turns out that the *dunamis* in the male semen fails to bring about its natural effect (*GA* 4.1-3). This is why animal generation sometimes produces males and sometimes females.

The causal necessity that underwrites natural phenomena is still a form of necessity, since it involves the core idea that what is necessary 'cannot be otherwise'. It simply requires the qualification that natural causes necessitate their effects *if nothing impedes them* (*Phys.* 2.8.199a25-6; cf. 199a13-19). The upshot of this is that propositions concerning changeable phenomena can satisfy the necessity condition on demonstration even though they do not exhibit the unfailing kind of absolute necessity that Aristotle associates with the truths of mathematics and the motions of the heavenly spheres. For there will always be cases in nature where various factors prevent causes from operating as they should.

The above analysis is especially suited for dealing with FMP propositions in Category A1, what I am calling *ceteris paribus* laws. Every *ceteris paribus* law is grounded in the interaction between correlative *dunamis* residing in the natures of the interacting substances. It is because the actualisation of a *dunamis* can be impeded so that the cause fails to bring about its effect that FMP propositions in this category hold only for the most part. Consider again the proposition that female mammals lactate while pregnant. What grounds this proposition is the fact that female mammals possess a natural capacity to produce milk, which is triggered by certain biochemical changes that occur in the days leading up to parturition. There is a necessary causal relation that holds between that *dunamis* and lactation such that, whenever the *dunamis* is activated, the animal produces milk of necessity *if nothing contrary to nature impedes the process* (cf. *GA* 777a3-21). However, since something could interfere with the process, it is possible that some particular female fails to manifest the property in question. This is why the proposition that female mammals lactate while pregnant holds only for the most part: the causal relation between the *dunamis* and its manifestation is defeasible.

Finally, propositions in Category A1 can be reformulated in such a way that they hold in every case (requirement [2]) by restricting their scope to those normal cases where nothing contrary to nature interferes with the actualisation of the *dunamis* in question. Thus the FMP proposition that pregnant female mammals usually lactate can be reformulated as the universally quantified proposition that all *normal* pregnant female mammals necessarily lactate if nothing impedes it (Irwin 2000).

When we turn to propositions in Category A2 things are more complicated. In these cases *F* exhibits a range of variation from *G* to *K* where the proposition '*F*s are *G* for the most part' is a generalisation expressing the fact that most instances of *F* cluster around the *G* part of that range. The problem is not that such propositions fail to meet the necessity condition. For the phenomena captured by such propositions are still governed by intrinsic causes that necessitate their effects (if nothing impedes them). For example, the biochemical processes that trigger lactation in female dogs usually occur around five days prior to giving birth but sometimes they occur earlier and sometimes later (*HA* 574b6-7). But *when* those biochemical triggers occur they *necessitate* milk production. The difficulty is how to render such propositions appropriately universal so that they hold in every case. The above strategy will not work here. For it is not true to say that all *normal* female dogs necessarily begin lactating five days before parturition *if nothing interferes with the process*. Exceptions to the generalisation arise, not because something contrary to nature causes

the mechanisms involved to malfunction, but rather because those mechanisms naturally fluctuate within a normal range of variation. Thus propositions in Category A2 cannot be made to cover all cases simply by restricting their scope to what happens when those mechanisms operate as they should.

Aristotle's discussion of dogs in *HA* 6.20 suggests a way to resolve this problem. There he offers the following empirical generalisation: 'For the most part the male dog lifts his leg to void urine at six months of age, although some do so later when eight months old while others do so before six months.' (574b20-2) This proposition describes a stereotyped behaviour in male dogs whose onset (like so many developmental milestones) exhibits a natural range of variation. Assuming there are certain *per se* causes that govern the development of this behaviour, the proposition in question will satisfy both the causal and necessity conditions for demonstration. However, as stated, the proposition is not appropriately universal. For it is not the case that all male dogs hit this milestone at six months unless something impedes their development. There are perfectly normal dogs that exhibit the behaviour earlier or later than that. However Aristotle suggests that this proposition can be rendered suitably universal by stating the account in an *unqualified* way: 'For one might say in an unqualified way (*hôs gar haplôs*) that they do so when they start to become strong.' Giving an account 'in an unqualified way' requires abstracting away from the variability (in this case timing) and formulating the cause in the widest possible terms so that it covers all cases. Thus we can say that all male dogs invariably lift their leg to urinate when they develop the appropriate muscle control to do so. We can then give separate demonstrations for each species of the phenomena by further specifying the precise timing of the onset of that cause. This reflects the explanatory method for dealing with more-and-less phenomena set out at *PA* 639a15-b6 (cf. *PA* 1.4). The *PA* method recommends that we first give a common account at the level of the widest kind to which the feature belongs (abstracting away from the variation) and then go on to give an account of those more-and-less variations that distinguish one species of the kind from another.<sup>25</sup>

### SECTION 3: ETHICAL GENERALISATIONS

We are now in a position to return to the Analogical Argument with which we began. Recall the argument:

- (1) Matters of conduct are analogous to natural phenomena in that both hold only for the most part.
- (2) Aristotle thinks natural phenomena admit of demonstration despite holding for the most part.
- (3) Therefore the fact that moral phenomena hold only for the most part does not disqualify them as candidates for demonstration.

The trouble with the argument should now be clear. Since Aristotle does not use the concept of *hôs epi to polu* in a unified way even in the works on nature, we cannot extrapolate from natural science to ethics in such a straightforward manner. For Aristotle could mean that ethical generalisations express mere correlations on a par with the proposition that fissioned bears many young. That would be bad news for the Analogical Argument, since mere correlations are not capable of demonstration and thus are not objects of scientific knowledge. In order for the Analogical Ar-

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<sup>25</sup> For an example of this method in action see *PA* 3.6. See also Lennox (2001: Ch. 7). This method has its roots in *APo*. (e.g.) 1.5, 2.14.

gument to go through, it must be shown that the two domains are analogous in the right way (they must both express generalisations falling into Category A). My aim in this section is to show that they are.<sup>26</sup>

Consider, first, what Aristotle says in the context of his methodological remarks at *EN* 1.3.1094b11-22:

What we say will be sufficient if we make clear statements in proportion to the subject matter under investigation. For the same level of precision is not to be sought in all accounts alike any more than in all products of craftsmanship. Now noble and just things, which politics investigates, admit of much difference and variation so that they are thought to exist only by convention and not by nature. And goods also admit of the same sort of variation because they bring harm to many people. For before now men have been undone by reason of their wealth and others by reason of their courage. Therefore we must be satisfied with exhibiting the truth about such things and from such premises only roughly and in outline and with drawing conclusions regarding things that hold only for the most part from premises of that same sort.

In this passage Aristotle tells us that the objects of ethics are among the things that ‘admit of much difference and variation’. For example, while acting courageously is usually good for the agent, it can sometimes result in harm.<sup>27</sup> Likewise, although wealth is typically beneficial, in some cases being wealthy can ruin a person (cf. *EN* 6.1.1120a1-5). For this reason, Aristotle says, ethical premises will yield conclusions that hold only for the most part with the understanding that there are (or at least could be) exceptions where they do not hold.

It is doubtful, in this context at least, that Aristotle means ethical generalisations express mere correlations (which would place them outside the domain of science). For example, he does not think that acting courageously just happens to be beneficial in the way that having split toes just happens to be correlated with (but not causally related to) bearing many young. Presumably Aristotle thinks there is a cause (discoverable by enquiry) that explains why being courageous turns out well for a person most of the time. It is also reasonable to suppose that Aristotle is thinking about exceptions to such ethical generalisations as situations where something beyond the agent’s control alters the circumstances so that things turn out badly. This would make propo-

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<sup>26</sup> Showing this is somewhat challenging because the frequency of actual occurrences of the phrase *hōs epi to polu* in the ethical treatises is rather low. The phrase appears five times in *EN* (1094a21, 1112b8, 1129a24, 1161a27, 1164b31) and six in *EE* (1220a13, 1228b4, 1231a27, 1247a32, a35, a27). Of these, most concern rules of conduct (e.g. *EN* 9.2) and so are outside the scope of the current paper (see above). Of the remaining passages, only a handful are relevant to our central question. I deal with some of these in what follows. For an alternative take on the status of FMP propositions in ethics see Witt (this volume).

<sup>27</sup> Irwin (2000: 109-10) takes Aristotle’s point to be that, while virtue secures happiness under normal conditions, when favourable circumstances do not obtain acting in accordance with virtue may cause a person’s life to turn out badly. While this fits the claim that some people are ‘ruined’ (*apōlonto*) by their courage, Aristotle cannot mean that virtuous action fluctuates with respect to its eudaimonic value (that it sometimes secures happiness and sometimes not). In *EN* 1.7 Aristotle defines happiness as an activity of soul done in accordance with virtue, which makes virtuous activity a *per se*-1 feature of happiness (it is an element in the account stating what it is to be *eudaimonia*). Thus acting virtuously necessarily secures happiness. If this is right, then the brave man necessarily does well *insofar as* he acts in accordance with virtue. In light of this, I propose that we take Aristotle’s point to be that virtuous actions normally produce additional benefits or external goods (e.g. honour) but may sometimes result in harm (e.g. disgrace or a disfiguring injury).

sitions such as ‘courage is beneficial’ *ceteris paribus* laws that tell us what happens under normal conditions when nothing interferes with the agent’s ability to exercise her virtue (Category A1).

There are several examples of ethical generalisations in the *Ethics* that seem to fit this same pattern. Consider the proposition that human beings are eusocial (*politikon*) animals that naturally live together in a *polis*, which serves as a premise in the *EN* 9.9 argument that friendships necessarily belong to the good man (1169b3-22). What grounds this premise is the fact that all humans have a natural disposition for eusocial behaviour that defines them as human beings and causes them to form political communities organised around a shared function (*Politics* 1.2). Like claims about the benefits accrued from virtuous activity, the proposition that humans live together in a *polis* is certainly one that holds only for the most part. For there should be exceptions to this generalisation where some particular human is prevented from realising his eusocial nature (e.g. he may find himself stranded on an island as a result of a shipwreck and thus unable to join a community). If this is right, then the proposition that humans naturally live together in a *polis* can likewise be understood as the universally quantified proposition that *all normal* humans necessarily live in a *polis* (unless something contrary to nature impedes them).<sup>28</sup>

Not all FMP propositions about matters of conduct need to express *ceteris paribus* laws in order to be capable of demonstration. In *EN* 6.5, for example, Aristotle says that ‘it is not easy to determine how, with whom, at what, and for how long one should be angry, and at what point right action ceases and wrong action begins; for the man who strays a little from the path, either towards the more or towards the less, is not blamed’ (1126a32-b4; cf. *EN* 2.9.1109a14-28; 4.5.1126a8-29). Unlike the previous examples Aristotle does not employ the language of *hôs epi to polu* in this passage. However, there is some reason to think that propositions detailing what counts as hitting the mean are among those that hold only for the most part in the sense of Category A2. For example, the good-tempered person is the one who exhibits anger at the right time, to the right degree, for the right duration, and so forth. Each of these dimensions of the mean will admit of a range of values that differ along a continuum according to the more-and-less (cf. Lennox 2001: 162-7). For this reason we cannot give a specific account of what exactly constitutes hitting the mean that will be true in all cases. At best we can offer FMP generalisations that tell us that the dimensions of a good-tempered person’s emotional response to a given slight will tend to exhibit certain values that cluster around the same part of that range. However, some good-tempered people will exhibit more and others less than those typical values. But those exceptions are not to be considered vicious (‘For the man who strays a little from the path, either towards the more or towards the less, is not blamed.’), since they are still within the normal range of variation for hitting the mean.<sup>29</sup>

## CONCLUSION

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<sup>28</sup> In *Politics* 1.2 Aristotle says that ‘he who is without a *polis* (*hê apolis*) by nature and not accidentally is either a bad human or beyond human’ (1253a3-4). I take this to be analytically true for him. Since humans are (= *def.*) eusocial animals that live together in a *polis*, no individual can *be* a human and lack that property. Since eusociality is a *per se*-1 feature of human, humans are necessarily eusocial in the way that triangles are necessarily three-sided so that the concept of a non-social human is like the concept of a four-sided triangle. The shipwrecked human, by contrast, is still human since he is only accidentally without a *polis*.

<sup>29</sup> Compare *EE* 1228b4, where Aristotle says that, for the most part, brave men seem to be fearless (*dokei d' ho andreios aphobos einai hôs epi to polu*).

In this paper I have attempted to show that, even if it turns out that Aristotle does not think we can acquire genuine scientific understanding (*epistêmê*) about matters of conduct, it is not because they hold only for the most part. Although a complete defence of this point would require analysing a much greater range of examples, my suspicion is that most of FMP propositions in ethics fall into Category A and are therefore capable of demonstration.<sup>30</sup> I want to close by suggesting that Aristotle's most famous methodological remarks in *EN* 1.3 about holding for the most part are actually not intended as a point about the demonstrability of moral phenomena at all but about the precision of our accounts of them.<sup>31</sup> The fact that propositions about matters of conduct hold only for the most part places constraints on what we can expect from our *accounts* of them. In particular, it means that we should not expect the same level of precision that we do from mathematics.

What Aristotle says at 1094b23-8 could be taken to rule out demonstrations of matters of conduct in spite of this. But the passage need not be read in that way. Aristotle may only be saying that the reader shouldn't demand demonstrative proofs *from the accounts that are to follow*, since the aim of the *EN* is simply to provide a rough sketch of the theory. Aristotle uses the carpenter analogy in *EN* 1.7 to make a similar point about the level of precision that one should demand from moral enquiry generally:

We must also remember what has been said before and not look for precision in all things alike, but in each class of things only such precision as is related to the subject-matter at hand and only as much as is appropriate to the enquiry. For a carpenter and a geometer look for right angles in different ways: the former does so insofar as the right angle is useful for his work, while the latter enquires what it is (*ti estin*) or what sort of thing it is, since he is an observer of truth. We must act in the same way, then, in all other matters as well so that our main task may not be subordinated to minor questions. (1098a20-31)

Since the ultimate aim of moral enquiry is action, the definitions and accounts the student of ethics formulates should be filled out only up to the point where they will be useful for action. While those definitions and accounts *could be* made more precise (just like the carpenter's account of the right angle), given the practical aims of ethics the theoretical part of the enquiry should not get bogged down by 'minor questions' (minor relative to the practical ends of ethics).<sup>32</sup> What Aristotle does not say in *EN* 1.3 is that holding for the most part places matters of conduct outside the scope of science and demonstration. Rather, he says that when premises hold for the

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<sup>30</sup> There is at least one example from the *Politics* where Aristotle does use *hôs epi to polu* to express a mere correlation between predicates. In *Politics* 4.4 Aristotle says that for the most part the rich are few in number while the poor are many (1291b10). We know from *Politics* 3 that this is a mere correlation. There is no causal relation between rich and poor, on the one hand, and few and many, on the other (1279a20-7). The essential feature that defines oligarchy and democracy are wealth and poverty, respectively (1280a1-3). The number of people who hold office in the city is only an incidental feature of its constitution, since it just so happens that the number of rich people in a city tends to be few and the number of poor many (1279b35-8). So the proposition that, for the most part, the rich are few while the poor are many is on a par with the proposition that gestation periods tend to be correlated with length of life. In neither case does the proposition express a causal regularity and so is incapable of demonstration.

<sup>31</sup> For a thorough discussion of precision in ethics see Anagnostopoulos (1994).

<sup>32</sup> See the Introduction to this volume ('ARISTOTLE'S ETHICAL THEORY') as well as Nielsen's contribution (Chapter 1).



most part we can 'reach conclusions that are no better.' But this should come as no surprise to readers of the *Analytics*. For Aristotle makes essentially the same point in *APo.* 1.30, where he says explicitly that things that hold for the most part *can be* demonstrated. Thus, while there may be other reasons why matters of conduct fall outside the purview of Aristotelian science, it is not the fact that propositions about them express generalisations that hold for the most part.