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Morality is Not Like Mathematics: The Weakness of the Math-Moral Analogy

Introduction

In the 17th and early 18th centuries, rationalist philosophers used an analogy between mathematics and morality to develop their view that morality originates in reason alone. David Hume attacked this view, arguing that sentiment plays an essential role in the origin of morality, and that the mathematics-morality analogy misled more than it illuminated.

The debate between rationalists and sentimentalists continued, of course, in the centuries after the early modern period. But the mathematics-morality analogy largely fell into abeyance, playing a diminishing role in support of rationalism (especially in Kantian-inspired positions). Recently, however, the analogy has gained a new lease on life, with numerous contemporary philosophers arguing that there are essential features of morality that are crucially similar to mathematics.

In Part 1, I'll explain how the mathematics-morality analogy figured in the work of four early modern rationalists—Locke, Cudworth, Clarke, and Balguy. In Part 2, I'll explain how Hume argued against the analogy. In Part 3, I'll describe three recent versions of the analogy—by Justin Clarke-Doane, Christopher Peacocke, and Debbie Roberts—and I will argue that these recent versions of the analogy fail to establish important similarities between mathematics and morality.

1. The early modern mathematics-morality analogy

It is self-evident that two plus two equals four. Also self-evident is that it is wrong to kill an innocent person without any reason or provocation at all (see Clarke 609). The self-evidence of these two propositions is the heart of the early modern rationalists' mathematics-morality analogy.[1]

Descartes had raised the worry that we could be wrong about even those things that seem self-evident to us. The rationalists denied that such Cartesian skepticism is coherent. They held that our certainty about mathematics is self-verifying—that its being self-evident to us that two plus two equals four is sufficient for establishing that it is true that two plus two equals four (see Cudworth 137-43). But we are just as certain that it is wrong to kill an innocent person as we are that two plus two equals four. There can be no doubt, therefore, that it really is wrong to kill an innocent person. The moral belief has the same impeccable epistemic bona fides as the arithmetical belief.

The rationalists maintained that another way in which our belief that it is wrong to kill an innocent person is the same as our belief that two plus two equals four is that we arrive at both through the use of a priori reason alone. It is not experience that teaches us that two plus two equals four or that killing an innocent person is wrong. Both of these propositions are such that we cannot but affirm them as soon as we understand the relevant terms. Both propositions "force the Assent of all Men" regardless of the experiences we have or have not had (Clarke 615). From the fact that we cannot but assent to certain mathematical and moral propositions—from the fact that it is impossible to understand the propositions and yet deny their truth—the rationalists thought it followed that both propositions are not just true but necessarily true. Two plus two has to equal four. It could not have been otherwise. And killing an innocent person has to be wrong. According to the rationalists, moral truths, like those of mathematics, hold on every possible world.

This modal claim — that moral propositions are not just true but necessarily true — was of great importance to the rationalists' principal philosophical goal: to refute the view that morality originated in the arbitrary will of a powerful being.

[1] For fuller discussion of the early rationalist view and sentimentalist responses to it, see Gill 2007.

There were two types of this will-based view that the rationalists sought to refute: the voluntarist type and the Hobbesian type. The voluntarists held that morality originated in the will of God, that God created good and evil, just as He created every other thing in the universe, and that if God had chosen to make it right to kill an innocent person then such killing would be right. The Hobbesian view, at least as the rationalists interpreted it, implied that the sovereign has the power to make things right or wrong, so that if the sovereign ordered you to kill an innocent person then killing the innocent person would be right. Voluntarists and Hobbesians could claim that, as it has turned out, God did make it wrong to kill an innocent person and the sovereign has not commanded us to kill an innocent person. But the voluntarist and Hobbesian views, at least as the rationalists construed them, were committed to holding that killing an innocent person could have been right, that it is only contingently true that killing an innocent person is wrong (see Cudworth 14, 16-27; Clarke 596-7, 608-10, 612- 613, 616, 626-7, 631-637; Balguy 1731, 7-8 and 1733, 41-42, 51). According to the rationalists, however, any theory with such an implication has to be false. For it is obviously absurd to hold that mathematics is merely contingent or dependent on the arbitrary will of God or sovereign. It is obvious that mathematics is necessary, that not even God or sovereign could have made two plus two equal five. And morality, because it is self-evident in the same way mathematics is, has to have the same modal status as mathematics. Morality has to be necessary, independent of the will of God or sovereign, as well.

The early modern rationalist contended that mathematics and morality are also crucially similar with regard to proofs or deductions. As the early modern rationalists conceived of things, mathematical proofs begin from fundamental, self-evident axioms and then move by deductive, logically valid steps to further conclusions (although, as we will see, Clarke-Doane argues that this does not accurately describe contemporary mathematics). If the axioms truly are self-evident and the steps truly are logically valid, then the conclusions must be true. We can construct moral proofs, the early modern rationalists believed, in the same way. There are self-evident moral principles, and we can deductively derive from them judgments about specific moral duties. The certainty of the first principles is carried along by the validity of the deductions, so that we can be absolutely sure of our specific duties.

In elaborating on this idea of moral deductions, Clarke contended that there were "three great and principal branches" of morality (Clarke 618). The three branches consisted of general statements of our duty of gratitude toward God, of our duty of benevolence and equity toward others, and of our duty of self-preservation toward ourselves. That we have each of these duties, the rationalists contended, "is a Proposition self-evident to all that rightly understand the Terms, as manifest as the Relation of Equality between twice Three and Six" (Balguy 1733, 45-6). And from these three general duties we can derive all the specific duties of morality. As Clarke explains, "I might deduce *in particular* all the several duties of morality or natural religion [from] the three great and principal branches, from which all the other and smaller instances of duty do naturally flow, or may without difficulty be derived" (Clarke 618). Locke makes the same point.

> I am as capable of being certain of the truth of [these moral propositions], as of any in mathematics [and these propositions] if duly considered, and pursued, afford such foundations of our duty and rules of action, as might place *morality amongst the sciences capable of demonstration* wherein I doubt not, but from self-evident propositions, by necessary consequences, as incontestable as those in mathematics, the measures of right and wrong might be made out. (Locke 549)

According to the early modern rationalists, then, the math-moral analogy revealed that moral philosophy should take Euclidean geometry as its model. The appropriate aim for a moral philosopher is to produce a "moral science," a "moral mathematics," a "moral geometry."

2. Hume's criticisms of the mathematics-morality analogy

Eighteenth century sentimentalist philosophers raised a number of differences between mathematics and morality that seemed to them to vitiate the rationalist analogy. I will focus on three of these differences as Hume developed them: motivational influence, disagreement, and lack of proof.

First, Hume argued that morality has a motivational influence that mathematics and other purely rational endeavors lack. According to Hume, if a person judges that she is morally obligated to act in a certain way, then she will possess some motivation to act in that way. But there is no such connection between a person's mathematical beliefs and her motivations to act. From a person's moral judgments alone we can draw conclusions about some of the motives that will sway her conduct, but from a person's mathematical beliefs alone we can conclude no such thing. Hume writes, "Mathematics, indeed, are useful in all mechanical operations, and arithmetic in almost every art and profession: But 'tis not of themselves they have any influence" (Hume 1739-40, 265). As he also puts it, "Morals excite passions, and produce or prevent actions. Reason of itself is utterly impotent in this particular" (Hume 1739-40, 294).

Second, Hume maintained that there is significant disagreement about morality, and that the existence of such disagreement supports the view that morality is founded "on sentiment, more than on reason" (Hume 1757, 227). Hume gave numerous examples, citing moral differences between the Greeks, the Romans, the French, and the English. Hume acknowledges that it may *seem* like there is universal agreement on which actions are right or wrong, and that "this great unanimity is usually ascribed to the influence of plain reason" (Hume 1757, 227). But in fact, he argues, "the difference among men is really greater than at first sight it appears," with much of what seems to be agreement being an illusion of language. Words like "virtue," "justice," and "charity" imply praise. So everyone everywhere praises virtue, justice, and charity. But in fact people disagree significantly about what kinds of conduct constitutes virtue, justice, and charity. We may all pass positive moral judgment on what we think is virtuous, just, and charitable, but we may still disagree about what courses of conduct are moral.

Third, Hume claimed that rationalists have no grounds for their belief that morality admits of the same kind of proof as mathematics. Hume supports this claim by pointing out that while we have systems of demonstrative proof in other rational areas of thought, there is a conspicuous lack of such proof in morality. He writes, "There has been an opinion very industriously propagated by certain philosophers, that morality is susceptible of demonstration; and tho' no one has ever been able to advance a single step in those demonstrations; yet 'tis taken for granted, that this science may be brought to an equal certainty with geometry or algebra" (Hume 1739-40, 298). Hume argues that the relations that make up the demonstrative proofs we know of are incapable of funding any meaningful and robust moral conclusions. Perhaps there are other relations that can ground moral proofs, but the rationalists have failed to produce any that will do the trick. "To this I know not what to reply, till some one be so good as to point out to me this new relation. 'Tis impossible to refute a system, which has never yet been explain'd. In such a manner of fighting in the dark, a man loses his blows in the air, and often places them where the enemy is not present" (Hume 1739-40, 299).

Hume argued that the best explanation of these features of morality — the motivational influence associated with moral judgments, disagreement about what is virtuous, and lack of demonstrative proof of moral conclusions — is that morality does not originate in our rational faculty but inevitably involves affective, or non-rational, aspects of our psychology. The involvement of affection explains the three features of morality, since affections on their own can motivate (motivational influence), people commonly have different affective responses to the same thing (disagreement), and affections are not the product of rational proof alone (lack of proof).

3. Contemporary mathematics-morality analogy

Recently, some philosophers have sought to resurrect the mathematics-morality analogy. I will discuss first Clarke-Doane's view that moral justification is the same as mathematical justification, second Peacocke's view that morals and mathematics are a priori in the same way, and third Roberts' view that morality figures in explanation in the same way as mathematics.[2]

3.1 Clarke-Doane on justification

Essential to the 18th century rationalists' attack on voluntarism and Cartesian skepticism was the idea that we can construct mathematical and moral proofs that begin from self-evident premises and proceed by demonstrable inferences to conclusions that we know with absolute certainty must be true. Clarke-Doane shows that mathematical proofs do not have that character. Axioms in mathematical proofs are not self-evident, and mathematicians don't even agree on them. Moreover, mathematicians argue for axioms by showing how they allow one to prove other propositions we have confidence in, and then they evaluate the relative merits of different mathematical models based on the values of reflective equilbrium. "If there is a method by which we arrive at *a priori* justified mathematical beliefs, it rather resembles the 'method' by which we are often said arrive at such moral beliefs — *reflective equilibrium.* We begin with particular propositions that we deem plausible and seek general principles which systematize those propositions. Such principles, in turn, often pressure us to reject the propositions with which we began as we seek optimum harmony

[2] For a trenchant discussion of several other critical ways in which the analogy between mathematics and morality breaks down, see McGrath 2014. McGrath focuses her discussion mainly on "relaxed" moral realists, who believe they can concede many disanalogies and yet still maintain a crucially important similarity between mathematics and morals. The views I address in this section are not relaxed in the same manner. (I should note that McGrath concludes by suggesting that the analogy, taken in a non-relaxed manner, may in the end be sustainable and moral realism subsequently vindicated.)

between the two" (Clarke-Doane 2014, 240). This picture of mathematical justification is very different from what the early modern rationalists had in mind, and would not have served their anti-skeptical and anti-voluntarist purposes. While the early modern rationalists argued for the similarity of morality and mathematics by trying to show that morality could rise to the standards of self-evidence and demonstrable truth, Clarke-Doane argues for the similarity by showing that mathematics aims only for the lower standards of reflective equilibrium and non-self-evident axioms. While the early modern rationalists lifted morality up to the level of mathematics, Clarke-Doane brings mathematics down to the level of morality. Clarke-Doane's mathematics-morality analogy is thus new wine in old bottles. That is not a criticism. Many people believe that moral judgments have dubious justificatory credentials while mathematics is beyond reproach. Clarke-Doane's point about the shared method of reflective equilibrium and lack of self-evident axioms is that whatever justificatory respectability mathematics possesses there is every reason to think morality possesses as well. That's an important point, even if it would have discomfited the early modern rationalists.

If Clarke-Doane's point is merely that the justificatory standards of mathematics are less lofty than the early modern rationalists believed, then I have no objections. But if he means to argue that this shows that mathematical is no more certain, no more demonstrable—no more limited by non-intuitive, purely rational considerations—than moral justification, then I do not think he succeeds. Mathematical justification is not as rationally elevated as had previously been thought, but that doesn't show that morality can be as rationally justificatory an enterprise as mathematics.[3]

[3] For a different response to Clarke-Doane, see Sharon Berry (2017). Berry argues that we can consistently be mathematical realists and moral irrealists because we have philosophically stronger ways of accounting for our access to mathematical truths (i.e., for the connection between our mathematical beliefs and real entities) than we do for accounting for our access to ethical truths. Further discussion of the companions in guilt argument in Clarke-Doane and others can be found in Christopher Cowie (2018).

The fundamental problem with Clarke-Doane's argument is that the notion of reflective equilibrium is too broad to fund a meaningful justificatory analogy between morality and mathematics. If the method of justification in some field is reflective equilibrium, then in order to justify a judgment in that field you will have to show that it fits well into a coherent overall view that includes both general and specific propositions. That the method of justification is reflective equilibrium will also mean that none of the general principles has unassailable status; any principle may have to be revised if the overall coherence of the view requires it. The problem is that those features of justification characterize many different endeavors — mathematics, natural sciences, and morality, yes, but also certain forms of judicial interpretation, literary theory-construction, grammar, rule-changing in baseball, plotting in novel-writing, etc. That a discursive activity demands coherence and lacks self-evident first premises is insufficient grounds for assimilating justification in that activity to justification in mathematics, insufficient ground for claiming that such activity can be as rational as mathematics.

Crucial to the question of how similar a particular activity's method of using reflective equilibrium is to that of mathematics is the extent to which rationality constrains the steps from one aspect of the activity to another. In mathematics that constraint is powerful. The axioms in mathematical proofs may be contested, but in a great many cases there is consensus about whether a given set of axioms implies a certain proposition. There are widely accepted standards that almost always settle whether a move from one proposition to another is valid. Different mathematicians may disagree about which overall view is best, but there is widespread agreement on whether the steps *within* each view are rationally justified. Clarke-Doane writes, "With regard to the Axiom of Replacement, proof tells us that this axiom implies an array of plausible propositions... However, whether such results show that we ought to endorse or reject the Axiom of Replacement is left open. That depends on which alternative would facilitate equilibrium among our mathematical beliefs" (Clarke-Doane 2014, 240). There may be disagreement about whether the Axiom of Replacement is part of the best overall mathematical view. But that there is agreement about whether the axiom implies certain other propositions.

About what constitutes a valid step in moral theorizing there is radically less agreement. Moral argumentation is much less well-behaved than mathematical argumentation, its practitioners at least as likely to disagree about what follows from general moral principles as they are to disagree about the general principles themselves. Many philosophers are willing to take seriously Kant's Categorial Imperative, but there is nothing like consensus about what mid-level principles the Categorical Imperative implies, let alone what particular action-types follow from it. Many are willing to take seriously an Aristotelian view of virtue and eudaimonia, but interpretations about what follows next are all over map. Ditto for natural law. Clarke-Doane tells us that the Axiom of Replacement "easily implies such dramatic results as that there is an ordinal greater than all f(x), where f(0) = Aleph_0 and f(x+1) = Aleph f(x) for all natural numbers, x" (Clarke-Doane 2014, 239). No basic moral principle that is taken seriously "easily implies … dramatic results." There are not the same accepted rational standards about what constitutes a valid step in morals as in mathematics. Clarke-Doane writes, "What is called a 'proof' of a given mathematical proposition, p, is really just a *deduction* (or deduction-sketch) of p from the relevant axioms. In other words, a mathematical proof of p shows that *if* the relevant axioms are true, *then* so too is p. Moral propositions are open to analogous 'proof'. We could deem a set of moral propositions 'axioms', and then show that the relevant propositions deductively follow from them" (Clarke-Doane 2014, 239). But moral propositions are not open to analogous proof, because any moral argument worth making will involve crucial steps from one proposition to another that do not "deductively follow." At one point, Clarke-Doane says, "there is a gap between consistency and truth in set theory, just as there is supposed to be a gap between (logical) consistency and truth in ethics" (Clarke-Doane 2015, 101). I don't disagree with the surface of that statement. But the statement seems to suggest that logical consistency in ethics gets you as far as consistency in set theory, and that's not the case. Logical consistency in ethics doesn't get you very far at all. The standards of "what follows from what" (Clarke-Doane 2015, 101) are not equally bound by rationality in ethics as they are in mathematics.

Consider the example of Rawls' argument in *A Theory of Justice*, which is the *locus classicus* of reflective equilibrium in moral philosophy. Rawls develops the concept of a fair original position, and then tries to argue that from such a position it will be rational for people to choose his two principles of justice. But he readily acknowledges that the step from his original position to the two principles of justice doesn't meet standards of justificatory validity we would expect from mathematics or any of the exact sciences.

> I should like to show that their acknowledgement [of the two principles of justice] is the only choice consistent with the full description of the original position. The argument aims eventually to be strictly deductive… We should strive for a kind of moral geometry with all the rigor which this name connotes. Unhappily the reasoning I should give will fall far short of this, since it is highly intuitive throughout. (Rawls 121)

> The decision of the persons in the original position hinges as we shall see, on a balance of various consideration. In this sense, there is an appeal to intuition at the basis of the theory of justice… The argument for it is not strictly speaking a proof, not yet anyway; but, in Mill's phrase, it may present considerations capable of determining the intellect. (Rawls 124-5)

Rawls must appeal to intuition to justify his case that the original position leads to the two principles of justice. He thinks there is a balance of considerations that speaks in favor of the two principles, but he acknowledges that he has not produced deductions or proofs. What distinguishes Rawls' justificatory method from that of mathematics is that in *A Theory of Justice* intuition and weighing of considerations occurs not only in the judging of one overall view against another. It occurs *within* the view as well, when trying to determine what a particular claim implies. And Rawls was right to admit that the steps of his argument were not constrained by universally-accepted rules of validity. Harsanyi accepted Rawls's conception of the original position, but then presented a plausible argument that it led to a utilitarianism at odds with the two principles of justice. Tomasi accepted Rawls's conception of the original position, but then presented a plausible argument that it led to a libertarianism at odds with the two principles. Strong rational constraint is lacking not only in the assessment of overall views but also in judging the individual steps within each view.

What kinds of moral arguments might Clarke-Doane have in mind? When discussing the a priori nature of moral thinking he says that "we seem to arrive at some conclusions of the form, 'if x is F, then x is M, where 'F' is an intuitively descriptive predicate, and 'M' is an intuitively moral predicate, independent of such evidence. This is how we are often said to arrive at 'pure' mathematical conclusions — such as that 2 is prime or that any set of real numbers with an upper bound has a least upper bound" (Clarke-Doane 2014, 239). On its own, this is a very impoverished example of moral argument. Moral arguments from first principles to more particular claims are generally considerably more complex than that. Consider the argument: "if an action treats humanity as an end in itself (is virtuous; is in accord with natural law; etc), then it is morally permitted; action x treats humanity as an end in itself (is virtuous; is in accord with natural law; etc); therefore action x is morally permitted." On its own such an argument does hardly anything. Even if we grant the first premise, a tremendous amount of work would need to be done to move from that to the second premise. And the move from the first premise to the second premise would require argumentation of a sort much less constrained by rules of validity than a step in an argument to the conclusion that 2 is prime or that any set of real numbers with an upper bound has a least upper bound. Perhaps moral arguments that fit with Clarke-Doane's picture of moral deduction are hedonic Utilitarian arguments of the form: "the right action is that which maximizes pleasure (where pleasure is defined in rigorously non-evaluative terms), action X maximizes pleasure, therefore action X is right." Indeed, one of Bentham's primary goals in developing a strict hedonic Utilitarianism was to make morality into something scientific, something that would support an incontrovertible moral logic, something in which intuition played no role. But of course strict hedonic Utilitarianism is not the predominant, let alone the only, model for moral thinking. In most of the other models—many of which have considerably more currency than strict hedonic Utilitarianism—moral argumentation of the deductive form Clarke-Doane describes does not take you very far. As examples of these other models, I've mentioned Kantianism, virtue theory, and natural law. But we should also include in this list all pluralist moral theories (including pluralist consequentialisms), which imply that moral thinking ineluctably involves non-deductive intuitive weighing. And then there are the moral theories, such as intuitionism and particularism, that are premised on the rejection of moral deduction the mathematics analogy seems to rely on.

None of that is to say that there aren't any better or worse ways of arguing for moral conclusions, or that there are no standards for when a step in a moral argument is legitimate. My point is that those steps, those ways of arguing, operate in a justificatory realm that does not resemble mathematics. They operate in an realm whose use of reflective equilibrium shares something with judicial interpretation, literary theory-construction, grammar, and baseball rule-adjustment that mathematics' use of equilibrium does not. The use of reflective equilibrium in both mathematical and moral justification does not give us any reason to think that morality is more like mathematics than it is like judicial interpretation, or grammar, or baseball rule-adjustment.

But perhaps Clarke-Doane's point about "what follows from what" should be given a different construal from what I have been arguing in this section, and that on this different construal my objection I collapses. Perhaps we should take Clarke-Doane's "what follows from what" to involve only what is a first-order logical consequences of what, in which case there would be, trivially, equal agreement in every area about what follows from what. It's true that mathematicians systematize their premises so that logical consequences are clearly drawn in a way that most ethicists (with the possible exception of strictly monistic hedonic utilitarians) do not. But that's merely a contingent sociological truth. Kantian and Aristotelian ethicists could formalize their premises in ways that allow them to regiment their theories such that each step involves only what is a logical consequence of what. There would of course then be great disagreement about which formal premises are correct, but that's exactly the same kind of disagreement we find in mathematics. And so the parallel between mathematics and morality remains.

My response is to push back on the idea that it's *merely* a contingent sociological fact that ethical justification doesn't involve the formal premises and regimented theories that mathematics does. It is very hard to give any concrete specification to the thought that the entirety of Aristotelian and Kantian moral thought could be put entirely into deductive form—and even harder to conceive of how any of the wide range of pluralist theories such as Ross's could be put into such a form.[4] The premises such theories would have to have would be so complex—so different from the kinds of principles actually part of real moral justification—that it's difficult to know what they would look like (and perhaps impossible to conceive of premises of pluralist theories such as Ross's that could

[4] For further discussion of the nature of pluralist ethical theories, see Gill 2014.

serve this function). On this construal, Clarke-Doane would be drawing a comparison between actual mathematical justification and a kind of ethical justification unlike just about anything anyone actually engages in.

And I would contend that ethical justification isn't typically put in the kind of logical form that would make its steps deductive because of crucial differences between the subject-matter of ethics and mathematics. Consider that one could claim that judicial interpretation and baseball rule-making can be formalized and regimented so that they too would involve only logical deduction. But it's not merely a contingent sociological fact that judicial and baseball-rule arguments aren't put entirely in the deductive form of mathematical proofs. Those arguments don't have that form, rather, because the kinds of complex premises that would involve would not fit what is actually at issue. The same is true for ethics. Ethical justification isn't put in purely logical form (with complex premises from which every other claim could be deductively derived) because such a form would not conform to what is at issue in ethical thinking.[5]

[5] One objection to what I say here is that while we don't actually determine a give rule of baseball or figure out what we morally ought to do by deducing consequences from regimented baseball or moral axioms, we could in theory do this. And even particularlist moral theories could in theory be systematized under highly-disjunctive axioms from which moral conclusions could be proved. My response is that it's not simply an accident that these sorts of "in theory" justifications don't play a role in how baseball and morality actually function in our lives. That it's logically possible to do these things doesn't mitigate the fact that what actual moral justification looks like is different from what actual mathematical justification looks like. (The referee also points out that most mathematical proofs don't start from first axioms, but that does not mitigate the fact that most of the steps of most actual mathematical proofs are more rationally determined than most of the steps of most moral justifications. My point in this section is that there's a difference between the rational determinedness of the steps of moral and mathematical justification, regardless of whether either type of justification goes all the way back to first axioms.) We can think of the argument I'm making here in terms of best explanation. What's the best explanation of the fact that the steps of most actual moral justifications are less rationally determined than the steps of most actual mathematical proofs? My claim is that the best explanation is that what we're doing when we're engaged in moral justification is something in which non-rational aspects (such as sentiments, as Hume argues) play a more significant role than they play when we're engaged in mathematical justification.

Ethics is about how to conduct ourselves. When we're thinking about how to conduct ourselves we confront prior commitments to values and principles and particular judgments, and we try to determine what practical implications follow from those commitments. Coming up with fantastically complex premises from which all ethical conclusions would follow purely deductively is an exercise that doesn't connect with such real ethical justification (and, again, looks to be incompatible with pluralist ethical theorizing). No one thinks it would be an improvement—more elucidating, more conforming to the subject matter, more ethically valuable, truer to the purpose of ethical thinking—to translate the moral and political writings of Aristotle and Kant into purely deductive form. This difference between ethics and mathematics is reflected in the nature of disagreement in the two fields. If two mathematical systems with different sets of premises each has worked out correctly the logical implications, and if there is no obvious reason to prefer one set of premises over the other, we may take the systems to be equally acceptable and feel no need to choose between them (until and unless further considerations come to light).[6] But that's not the case in ethics. I said before that no one thinks it would be more elucidating to translate the writings of Aristotle and Kant into purely deductive form. But even if their positions could be put into perfectly deductively form, no one would feel even the slightest temptation then to say that there is no actual

[6] Admittedly, this is a controversial view. It will be rejected by realists. But we can once again think about this issue in terms of best explanation. What's the best explanation of the fact that we would be tempted to believe that there is no real important disagreement left were this situation to occur in mathematics while there would be no temptation to believe the same thing were this situation to occur in morals? What is the explanation of the difference between the plausibility of thinking that the disagreement in mathematics would turn out to be trivial and the implausibility of thinking the same thing about the disagreement ethics? Clarke-Doane (2015) suggests that the best explanation may be that ethics is more objective than mathematics (2015). But I think the Humean explanation is much more powerful: that ethics essentially concerns human conduct (including the need to coordinate our actions with other people, the need to resolve what Stevenson calls "disagreement in attitude") in a way that mathematics does not—that ethics is connected to human desires and aims in ways that mathematics is not. And this also explains why it's not an accident that actual moral justification looks so different from actual mathematical justification, as I discuss in the previous footnote.

disagreement between Aristotle and Kant. And the reason disagreement doesn't dissipate in the case of ethics is that in the case of ethics we're trying to figure out how to conduct ourselves. To accept an ethical system is to accept that one ought to conduct oneself in certain ways. If you and I accept different ethical positions, you and I will commit to doing different things, and this can lead you to be motivated to do something that is incompatible with what I am motivated to do. Ethical differences lead to actual practical conflict, and that's because of the very nature of what ethics is about. This is the fundamental point Hume makes when he argues that morality involves motivation in a way that mathematics does not, and one does not need to be a full-blown Humean to acknowledge its cogency.

When we turn to the activities of ordinary folk, moreover, the difference between justification in mathematics and morality is even more striking. Mathematics plays a significant role in the lives of ordinary folk — in accounting, pricing, bridge-building, etc. In those arenas there is, so far as I can tell, virtually no significant disagreement about what follows from what. Long trains of mathematical reasoning are accepted by all, the rules of validity beyond dispute. Mathematical justification in everyday life looks a lot like what the early modern rationalists thought: certain starting points that lead by demonstrable steps to certain conclusions. Morality also plays a significant role in the lives of ordinary folk. But disagreement about moral justification is an exceedingly familiar phenomenon. There are the high-profile hot-button issues: abortion, immigration, gender, taxation and economic inequality, etc. There are also disagreements about fine-grained decisions in everyday life: when exactly it is okay to deceive?, is this a case of immoral cheating?, are you engaged in legitimate punishment or mere vindictiveness? These disagreements aren't settled by chains of reasoning with numerous steps. Justification in everyday morality doesn't look anything like justification in everyday mathematics. When ordinary folk disagree about something mathematical, we assume things can be worked out with a pencil. The moral disagreements of everyday life cannot be worked out with a pencil. In everyday life there is virtually no persistent disagreement about what is mathematically justified while there is pervasive persistent disagreement about what is morally justified. Justifying everyday moral judgments often involves reckoning with controversy in a way justifying everyday mathematical beliefs does not.

Nor is philosophical thought about morality insulated from the hurly-burly. While higher mathematics may be unruffled by the activities of the hoi polloi, moral philosophers of every stripe always at some point attempt to connect their views with morality as it functions in everyday life. Justification in moral philosophy involves ordinary thought in a way justification of higher mathematics does not. The differences between these two realms of justification are more significant than the similarities.

3.2 Peacocke on a prioricity

Peacocke has argued that morality and mathematics are the same in that both are epistemically a priori.[7] Peacocke writes, "Every moral principle that we know, or are entitled to accept, is either itself a priori, or it is derivable from known a priori principles in conjunction with nonmoral propositions that we know." Peacocke contends that the "primary reason for accepting" the thesis that morality is as a priori as mathematics is "not theoretical at all" but rather "the consideration of examples."

[7] For a different way of arguing that moral knowledge is a priori, see McGrath (2011). I do not think that the arguments I raise against Peacocke's a priori view apply to the view of math as a priori that McGrath (2011) explores. The main objection I would advance against the view McGrath explores is that the definition of the a priori that she is working with is too broad, so that while both morality and mathematics fit under that definition, it's only because the broadness of the definition makes it insensitive to important epistemological and ontological differences. But developing that objection will have to wait for another time.

> The epistemic situation in the case of moral principles seems to me broadly similar to that concerning the status of logic and arithmetic. All sorts of heavy-duty theories can be offered to support the view that logic and arithmetic are a priori but none are more convincing than the fact that we are justified in accepting that 2+2=4, or that AvB follows from A, without justificational reliance on the content of our perceptual experiences, or other conscious states. There is the same kind of strong prima facie support for the moral a priori thesis from consideration of examples.

Peacocke gives three examples to make his point:

- *Prima facie* it is good if the institutions in society are just
- *Prima facie* it is wrong to cause unavoidable suffering
- *Prima facie* legal trials should be governed by fair procedures

These moral claims, according to Peacocke, have the same status as '2+2=4' and that 'A implies AvB.' We know them to be true, and we know them to be true a priori. They play the same role in our moral thinking that those other principles play in our mathematical and logical thinking. Our moral epistemology is thus on a par with the mathematical.

I think Peacocke fails to establish his point because of three ways in which his examples of moral claims differ from the mathematical claims to which he compares them: [1] his moral claims do not have the same a priori certainty as the mathematical claims he compares them to, [2] his moral claims include *prima facie* clauses, and [3] there can be conflict between his moral claims.

Peacocke's moral claims might initially appear to be as certain as the simple mathematical and logical principles. But actually there is less certainty than meets the eye. The best way to explain this point is through an argument Hume and Hutcheson made against the early modern rationalists long ago.

Hume acknowledged that it may *seem* that there is universal agreement on certain moral claims, and "this great unanimity is usually ascribed to the influence of plain reason." But in fact, as we've seen Hume argue, "the difference among men is really greater than at first sight it appears," with much of what seems to be agreement being an illusion of language, which lends support to those who hold that morality is founded "on sentiment, more than on reason" (Hume 1757, 227). Words like "virtue," "justice," and "charity" imply praise (Hume 1757, 228). So everyone everywhere praises virtue, justice, and charity. But in fact people disagree significantly about what kinds of conduct constitutes virtue, justice, and charity. We may all pass positive moral judgment on what we think is virtuous and just, but we may still disagree sharply what courses of conduct are virtuous and just. Homer and Fenelon, for instance, both praise heroism and prudence, but the particular patterns of conduct Homer praises as heroism and prudence in Achilles and Odysseus are actually very different from the patterns of conduct Fenelon praises as heroism and prudence in Telemachus. While it might look like Homer and Fenelon agree on the moral value of heroism and prudence, they actually disagree, since Homer endorses instances of violence and deception that Fenelon condemns.

Hutcheson made a similar point about the moral propositions that the rationalists of his day exhibited as evidence of their position. Clarke gave this example: "whoever first attempts, without the consent of his fellows, and except it be for some public benefit, to take to himself more than his proportion is the beginner of iniquity." Wollaston offered the proposition that it is wrong for someone to live "as if he had the estate which he has not." Hutcheson did not deny that everyone would agree with those propositions in a way that suggested their a prioricity. What he argued is that everyone agrees to those propositions because the positive moral status of respect for property and the negative moral status of theft are built into the descriptions of the relevant actions. He writes, "Some writers treat the pronoun 'his' as if it were the sign of a simple idea and yet involve under it the complex idea of property and of a right to natural liberty, as the Schoolmen made space and time to vanish into nothings by hiding them in the adverbs" (Hutcheson 213-4). Clarke said that it is wrong for someone to take more than is *his*. Wollaston said that it is wrong for someone to make use of something "which he *has not*." But to say someone is taking more than is *his*, or that she is taking something she *has not*, just is to say that she is taking something she ought not to take. We all agree to the propositions because of their tautologous aspects. Once we try to specify the propositions — once we try to determine which particular actions are forbidden and which allowed — disagreement floods in.

Hume and Hutcheson's point still holds: widespread agreement to some moral claims does not necessary reflect deep moral agreement. Agreement on the wrongness of, say, taking someone else's property may be quite thin, lying atop deep disagreement about what the moral limits of ownership are. There may be widespread agreement to the claim that it is wrong to kill babies, but that does not show that there is actual deep moral agreement since there is significant disagreement about what a baby is. There may be widespread agreement to the claim that it is morally better to promote happiness rather than unhappiness, but there is significant disagreement about what constitutes happiness.

The moral claims that Peacocke gives as examples of a priori morality are bedeviled by the same characteristics as those criticized by Hume and Hutcheson. "It is good if the institutions in society are just" seems certain because to call an institution "just" is to imply that it is good. But there is vast disagreement about what constitutes the justice of an institution. So if "it is good if the institutions of society are just" is certain, it's only because we're focusing on the semantic connection between the thin moral content of "just" and "good." But as soon as we try to use the claim in any moral argument, we need to specify what a just institution is. Peacocke's a priori thesis holds that that specification will be "derivable from known a priori principles in conjunction with nonmoral propositions that we know." But the least familiarity with political philosophy—and arguments about politics more generally—gives us reason to doubt that the specification of "just institutions" will be like that. The same point applies to Peacocke's other two examples. To call suffering "unavoidable" is to imply that it is wrong to cause it. But we still require a specification of which suffering is avoidable and which unavoidable. (Some will contend that eating meat causes unavoidable suffering; some will deny it. Some will contend that military drone strikes that cause collateral damage cause unavoidable suffering; some will deny it.) To contend that a procedure should govern a legal trial is to imply that it is fair. But we still require a specification of which procedures are fair. And Peacocke has given us no reason to expect that it's possible to specify what makes suffering "unavoidable" or a procedure "fair" with only non-moral premises and certain moral claims.

While it appears that people agree to the same general proposition, in fact they conceive of that proposition in such different ways that the agreement is only apparent: what one person assents to when she affirms respect for property, or a prohibition on killing babies, or the goodness of happiness may be different from what another person assents to, since they have different understandings of what the terms mean. Such disagreement about the specification of a moral claim does not characterize mathematics. To move from Peacocke's moral claims to any moral conclusions requires moves that involve much more controversy than would be involved in moves from Peacocke's mathematical and logical claims. There is no reason to think that those moves can be made entirely "from known a priori principles in conjunction with nonmoral propositions that we know" instead of requiring moral principles we have no grounds for thinking a priori.

The second significant disanalogy between Peacocke's moral examples and a priori claims in mathematics is that the former but not the latter have *prima facie* qualifications. Two plus two always equals four. A or B always follows from A. There's no *prima facie* about those claims. But Peacocke tells us that we our legal trials should be governed by fair procedures only *prima facie*. What does that amount to?

To say that we ought to X *prima facie* is, roughly, to say that we ought to X when something morally more important doesn't imply not-Xing. In order to use a moral claim to decide what to do, therefore, we have to be able to determine whether anything morally more important implies something contrary to the original claim. Determining this is absolutely central to the epistemology of ethics. Trying to figure out what's right to do is primarily a matter not of determining whether it's generally right to do what's fair, but of determining which procedures are fair and whether there is any morally more important consideration that speaks against implementing that procedure. The existence of the moral claims Peacocke cites give us no reason to think these answers can be gleaned entirely from "known a priori principles in conjunction with nonmoral propositions."

Indeed, Ross originally developed the notion of prima facie clauses explicitly to *distinguish* morality from mathematics. Ross believes that "the general principles of duty come to be self-evident to us just as mathematical axioms do" (Ross 32). "In our confidence that these propositions are true there is involved the same trust in our reason that is involved in our confidence in mathematics" (Ross 30). But Ross then goes on to explain that "there is an important difference between rightness and mathematical properties… Moral acts have different characteristics that tend to make them at the same time prima facie right and prima facie wrong" (Ross 33). Ross recognized that the task of dissolving prima facie clauses is absolutely central to the moral life—and non-existent in mathematics.

Why do the moral claims have *prima facie* clauses that mathematical claims lack? It's because of the third significant difference between those two domains: moral principles can come into conflict with each other in a way mathematical claims cannot. It would be exceedingly odd to add a *prima facie* clause to 2+2=4 or A implies A or B. And that's because we are never faced with situations in which other considerations might throw into question whether 2+4=4 or A implies A or B in this particular case. Whatever other mathematical and logical considerations we might need to take into account, none of them will raise the possibility that in this particular case 2+2=5. But there may be considerations that throw into doubt whether in a particular situation we ought to follow a fair legal procedure, and that's because there may be other moral considerations that conflict with following a fair legal procedure. Referring to Peacocke's examples, there may be a case when following a fair legal procedure will cause great suffering. That is why the *prima facie* clauses are there: to signify that the particular actions these individual moral claims imply are not always right.

If morality is a priori in the way Peacocke claims, then all conflicts between a priori moral principles can be resolved by other "known a priori principles in conjunction with nonmoral propositions." But there is nothing in the contemplation of examples of moral claims that gives us reason to think such resolutions are always possible. Such resolutions might very well require claims that are evaluative but lack the certainty that Peacocke points to as evidence of a prioricity. And, most relevantly for our discussion, finding such resolutions is central to moral thinking in a way they it is not to mathematics.

3.3 Roberts on explanatory indispensability

Roberts argues that mathematics and normativity play the same kind of indispensable role in explanations of observable phenomena. She cites examples of the kind of mathematical explanations she has in mind, and then points to examples of normative explanation that she claims function in the same way. Here are two examples Roberts gives of mathematical explanation:

A. Periodical Cicadas. The best explanation of why periodical cicadas have the life-cycle periods that they do is that prime periods are evolutionarily advantageous. This is because having a life-cycle period that minimizes intersection with other (nearby/lower) periods is evolutionarily advantageous.

B. Throwing Sticks. Suppose that you throw some sticks into the air with a lot of spin, so that they separate and tumble about as they fall. Freeze the scene at some point during the sticks' descent. Why are more of them near the horizontal axis than near the vertical rather than in more or less equal numbers at each orientation? The best explanation of this fact appeals to geometric facts. Roughly speaking, there are many more ways for a stick to be near the horizontal than near the vertical. (Roberts 190)[8]

Here are three examples Roberts uses to make her case that normative notions function in explanations in the same way as the mathematical:

C. Donald is rude. Suppose that Donald behaves rudely. He shouts 'This is utter rubbish', loudly, in the middle of a visiting speaker's talk. The other members of the audience become embarrassed and annoyed with Donald. What explains the audience's embarrassment and annoyance? Plausibly, Donald being rude.

D. Growth of political protest movements. The growth of political protest movements and social instability is to be explained by the *injustice* of the society.

[8] Roberts takes the cicadas example from Baker (2005, 203) and the sticks example from Lipton (1991, 33-4). For discussion of the ways in which mathematics figures in these explanations, see McGrath 2014, 191-2.

E. Systematic lack of self-esteem. Widespread lack of self-esteem in members of certain groups in a society can be explained by *degrading* (for example, racist or sexist) socio-political structures that systematically undermine the perceived worth of members of these groups. (Roberts 188-9)

Let us grant for the sake of the argument that in C-E normative properties do play an important explanatory role. What I wish to argue is that there is nonetheless a crucial difference between the kinds of explanatory roles normative and mathematical properties play, and that this difference undermines the claim that normative properties have an ontological status similar to mathematical properties.[9]

The difference is this: the mathematical explanations (A and B) work without implicating human mental states while the normative explanations (C-E) work only by implicating human mental states. The primeness of cicada life-cycle periods and the geometric facts about sticks explain observable phenomena without any human mental states' playing any role. But the rudeness of Donald explains people's walking out only because the people who walked out had a certain response in the situation. The injustice of certain institutions explains people's protesting only because the people had a certain response to their situations. The role of human mental states is especially clear in E, as in that case what is being explained is the existence of the mental state of self-esteem itself.

This difference is important because it reveals the possibility that normativity lacks a mind-independent status that mathematics possesses. It *could* be the case that normative properties exist

[9] Jack Woods (2018) develops an argument against the indispensability argument for moral realism that is different from (but compatible with) the one I develop here. Woods argues that the difference between moral properties and mathematical and logical properties is that the former are self-effacing in a way the latter are not.

independently of human mental states, and that human mental states are responses to those mind-independent properties. But for all the explanations tell us, it's equally possible that the normative is downstream of the mental—that the latter explains the former rather than the other way around. There are numerous routes such explanations could take. One is the response-dependent route, according to which normativity is constituted by human responses to non-normative features of the natural world. A second is the expressivist route, according to which normative predicates serve as expressions of humans' mental states. A third is the route of error theory, according to which normativity does not exist and it is only humans' belief that normativity exists that does the explanatory work.[10] Each of these routes toward normativity is left open by C-E, while the corresponding mind-dependent routes toward mathematics are not left open by A-B.
Consider the following two explanations:

F. The disgustingness of the food explains why they didn't eat it.

G. The food's being treif explains why they didn't eat it.

F and G are as cogent as C-E. But we do not think that establishes any significant ontological similarity between mathematics, on the one hand, and disgustingness and treifness, on the other. For disgustingness and treifness depend on human mental states in a way that mathematics does not. The point I wish to make is that C-E give us no reason *not* to assimilate normative properties to disgustingness and treifness. Indeed, because C-E implicate human mental states—because C-E resemble F-G in a way they do not resemble A-B—there is *more* reason to assimilate the normative to disgustingness and treifness than to mathematics.

Figuring in explanation is too broad a category to fund any robust similarity between

[10] Mary Leng makes a similar point in criticism of Enoch, pointing out that what is indispensable to deliberation is "*belief* in irreducibly normative truths" as opposed to the actual existence of irreducibly normative truths (2016, 214).

mathematics and normativity—just as using reflective equilibrium is too broad a category to fund any robust similarity between mathematics and morality. For properties that are clearly significantly different from mathematics, such as disgustingness and treifness, figure in explanation too. And when we look closely at Roberts' examples of normative explanations we find that they are in fact more similar to those involving disgustingness and treifness than to those involving mathematics.

Conclusion

The line of thought I have been discussing is an attempt to bring morality and mathematics to similar justificatory, epistemological, and ontological levels. The arguments for this conclusion are arguments by analogy between morality and mathematics. Of course whenever someone gives an argument by analogy we will be able to point to *some differences* between the two items under discussion. For the two items are two different things, after all, and there will always be some differences between two different things. Simply pointing to some differences is insufficient for undermining an argument by analogy. But there's another side to that coin. Just as you can always point to some differences between two items, even if they are crucially similar in important respects, you can also point to *some similarities* between two items, even if they are crucially different in important respects. There are differences between all analogues, sure, but there are also analogies between virtually all things no matter how important the differences between them actually are. I don't deny that there are analogies between mathematics and morality. What I have tried to show is that when we delve beneath the surface of those analogies we do not find anything that gives us reason to think that moral justification, epistemology, and ontology are importantly similar to mathematical justification, epistemology, and ontology. For all the analogies tell us, the moral looks at least as much like other human phenomena (such as judicial interpretation, grammar, rule-making for baseball, food tastes, and treifness) that are very non-mathematical indeed.

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