

Evolutionary Anamnesis

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Abstract

In the *Meno*, *Phaedo*, and *Phaedrus*, Plato outlines the controversial thesis of *a priori* knowledge that all learning is a form of recollection—*anamnesis*. He uses this as an argument for the immortality of the soul via reincarnation. Because of this latter claim, the thesis is widely mocked by contemporary evolutionarily-informed materialists. But we can safely reject the metaphysical claim without abandoning the insight of the epistemological one. And indeed, modern evolutionary theory can explain how learning—at least of the sort that depends on certain *a priori* concepts—*can* be a kind of recollection. Through this metaphor, natural selection is a process by which information about the world is transmitted across time. When we learn by reasoning about *a priori* knowledge, then, we in an important sense rely on information in our genomes—if not our souls—information acquired by the process of natural selection—if not conscious acquisition.

Thinking of *a priori* knowledge with the metaphor of *anamnesis* elucidates two essential features of the relationship between epistemology and ontology. First, it emphasizes that there is necessarily a time-delay between our *a priori* knowledge and the universe to which it bears a relationship, if any. Second, it clarifies that *a priori* knowledge is knowledge that enhances reproductive fitness—which could well be because it reflects ontology faithfully, but could as easily be a kind of innate nominalism.

1. Introduction

Plato . . . says in *Phaedo* that our “imaginary ideas” arise from the pre-existence of our soul, are not derivable from experience—read monkeys for pre-existence.

Charles Darwin (Ghiseline 1973)

$a^2 + b^2 = c^2$. This is *knowledge*, at least in the sense that it is a propositional claim about truth believed indeed to be true (Kitcher 1980). And we think of it as *a priori*, at least in the sense that learning about it is phenomenologically different from learning about most things—it carries with it a sense of necessary, irreducible, non-analytic truth, deducible from reflection

alone (Summerfield 1991). The question is what do we do when we learn (or, as many, maybe most, people experience it, “discover”) that $a^2 + b^2 = c^2$? And what is the relationship of this epistemic process, if any, to ontology?

Plato, famously or infamously, had a theory about this. His theory, in short, was that everyone is born with certain innate *a priori* knowledge—at least of (and his strongest examples are about)—mathematical and geometric truths like the Pythagorean Theorem and basic logical concepts like equality, identity, and the law of noncontradiction (Samet 2019). Everyone, Plato argues, has access to this store of knowledge, and reflection will bring it out (Plato 380 BC trans. G.M.A. Grube). Like memory, learning about *a priori* truths seems experientially to come from within, from reflection. “Learning” about these kinds of things, Plato argues, is like the experience of remembering; “recollection.” “*Anamnesis*,” in the Greek.

To many modern materialists, fair enough (Ruse 2021; Gontier & Bradie 2021; Chomsky 1986; Pinker 1994). Locke, the Empiricists, and post-Structuralists might *disagree*, but there is nothing facially implausible about the possibility of innate knowledge (Samet 2019). And maybe “recollection” is a reasonable enough metaphor for what we do when we access it.

What Plato needed was a *mechanism*. He reasoned that everything that is *known* must have, at some point, been *learned*. And that is where things got weird. To solve the paradox of our being born with knowledge that must already have been learned, Plato posited an immortal soul—our souls did the learning about basic concepts and truths before we were born, and they will persist with this knowledge long after our death (*Phaedo*, trans. Hugh Tredennick). This mechanism is, to our eyes, plainly wrong. Contemporary metaphysics makes no allowance for immortal souls nor the World of Forms. For this reason, contemporary philosophers have broadly rejected Platonic *anamnesis* writ large—associated as it is with mysticism and claims about immortality (McCoy 2011; Fine 1992; Cobb 1973).

But it’s possible to reject the mechanism without abandoning the insights of Plato’s picture of *a priori* knowledge—to reject the metaphysical but not epistemic claims of *anamnesis*—if there is an alternative mechanism (Sandis 2008). My argument in this paper is that there is, and it is a thoroughly materialistic one—evolution by natural selection. DNA (along with epigenetic processes that operationalize it) is a mechanism for transmitting information to new individuals acquired before that individual was born. And natural selection is a process for obtaining that information. *A priori* knowledge, from this perspective, is knowledge acquired through natural selection and transmitted through genes and gene expression.

In an important sense, a theory of evolutionary *anamnesis* vindicates Plato—learning about *a priori* knowledge *is like* recollection. It isn’t *your* memories, or the memories of *your* immortal soul, but it is in a material sense memory of an earlier time; memories stored in your genome. To take the metaphor further, we might imagine our genomes as kinds of genetic souls, or the information contained in the human genome as a universal soul of the species.

At stake here is not merely a cute metaphor or the aesthetic vindication of Plato. The metaphor of evolutionary *anamnesis* helpfully sheds light on the *nature* of *a priori* knowledge

and its relationship to ontology. Indeed, it elucidates two essential things about the relationship between epistemology and ontology. First, as the metaphor of *anamnesis*—*remembrance*—emphasizes, there is a necessary time-delay between our *a priori* knowledge and the ontology with which it has a relationship (if any). In reasoning about *a priori* truths we learn nothing (except by extrapolation) about our universe *now*, but about our universe some hundred-thousand odd years ago. Second, it tells us that indeed there is a necessary relationship between *a priori* knowledge and metaphysical reality (Vollmer 2004). But it is not necessarily a relationship of truth or direct correspondence. Instead, the relationship is grounded in the fitness-enhancing properties of the information, which could be characteristic of its truth, but could be achieved in other ways.

Of course, the general relationship between Darwinian evolution and innate knowledge has been widely observed before. Indeed, as quoted above, Darwin *himself* observed the implications evolution has for Plato's theory of *anamnesis* in his early journals (although he never elaborated upon it), (Ghiseline 1973), and the connection laid the groundwork for a growing field of evolutionary epistemology (Gontier & Bradie 2021; Ruse 2021; Millikan 1984). This paper makes two contributions to this literature. First, it offers a full-throated resuscitation of Plato's *anamnesis* as an epistemic metaphor—explaining how modern evolutionary theory offers a basis for the ways in which understanding reasoning about *a priori* knowledge as a kind of recollection is worthwhile. Second, it explains the ways in which this metaphor can concretely help clarify debates in phenomenology, epistemology, and metaphysics more broadly.

The argument has six parts. First, I clarify the bounded nature of the discussion by qualifying what I mean by "*a priori* knowledge." It is not really *knowledge* (necessarily), and I am not talking about *all a priori* knowledge, just that which can be fairly categorized as innate. Next, I summarize Plato's articulation of *anamnesis* as an epistemic and metaphysical theory of *a priori* knowledge. Third, I discuss the status of *a priori* knowledge as unconscious information; fifth, natural selection as a process of information acquisition; and sixth genomes as mechanisms of information transmission—the "souls" of Plato's language. Finally, I discuss the implications of this theory for epistemology and metaphysics—what it tells us about the nature of *a priori* knowledge.

2. "A Priori Knowledge"

Knowledge, philosophers tell us, is justified true belief (Chisholm 1977). Or it is something else (Zagzebski 1994). But either way, that is not what I am talking about by "*a priori* knowledge" throughout. The primary topic of analysis, the thing the nature and status of which we are trying to understand, is at bottom a *phenomenological* experience—a kind of experience of knowledge. In other words, we begin with a phenomenological claim—*a priori* knowledge is that which we experience as discovering as fundamentally and irreducibly true as opposed to consciously learning and committing to memory. By family resemblance, if that is more helpful, we're talking about $2 + 2 = 4$, the Pythagorean Theorem, or the law of non-contradiction. The

starting point of the analysis is the claim there is something phenomenologically different about learning about these propositions than about what might be called “standard” or “emergent” propositional knowledge in the form “Vienna is the capital of Austria,” or that today it is snowing (Summerfield 1991). The goal of the inquiry is to understand the nature of this difference and its implications.

Because we are starting with phenomenology, the *a priori* knowledge we are talking about cannot be presumed to be *true* (or, for that matter, justified). It might be that we have all kinds of information built into our minds that we experience learning about as “discovering” “truths” but which are patently false. Indeed, we *know* that we have innate tendencies and biases that are routinely false—the tendency to anthropomorphize nature, for instance, or to see faces in clouds (Varela 2018). And entirely at issue in our inquiry is the nature of justification with respect to *a priori* knowledge. In that sense, what I am referring to cannot be presumed to be “knowledge” in the traditional sense that requires it be true (Ichikawa & Steup 2017). However, starting with a phenomenological understanding of *a priori*-ity (and focusing on that which can be thought of as *a priori*) clarifies a longstanding challenge to Platonic *anamnesis*—that Plato is simply descriptively wrong that we experience learning in a way analogous to the experience of recollection (Rousseau 1981; Cobb 1973). We are analyzing only the kind of learning that we do.

Regardless, we are analyzing propositional beliefs (*that* $2 + 2 = 4$; *that* no two contradictory statements can be true at the same time), and they are at least *about* truth. Part of the experience of coming to discover that $2 + 2 = 4$ is the experience of determining it to be something *true* (and generally, we think, necessarily so) (Kitcher 1980). If it is not knowledge in the formal, traditional sense, it is at least *apparent* knowledge; so call it “*a priori* apparent knowledge” if you like. But I am going with “*a priori* knowledge” for two reasons: (1) the phrase naturally evokes a class of purportedly fundamental “truths” (mathematics, logic, the basic concepts and categories of thought) that I *do* intend to refer to in substance without presuming their truth; and (2) it is cleaner.

Moreover, “*a priori*” is often used to refer to several different kinds of propositions in the literature. We might distinguish three. The first set of “*a priori*” statements are *analytic* or *definitional*—“All bachelors are unmarried.” The marker of analytic *a priori* truths are that they remain true where synonyms are substituted for the words in the initial proposition, because they are simply true by virtue of definition—“All unmarried men are legally single,” is equally true and *a priori* in the same sense (Russell 2008). These are not the kinds of propositions under analysis. This is because they are *phenomenologically not like* the truths of mathematics or logic—we have to affirmatively, consciously experience learning them. Even if we don’t remember the moment when someone told us that “bachelor” *means* “unmarried man,” we know someone must have (or that we otherwise inferred the way these terms are used from those around us). The “*a priori*” nature of analytic propositions is a feature of language, and no one thinks them to have any particularly significant implications for epistemology or ontology.

In contrast, philosophers also use the term “*a priori*” to refer to propositions like “ $2 + 2 = 4$ ” or the law of noncontradiction (Summerfield 1991). That is precisely the sense that I am using

the term here. *These* are the propositions that we experience learning about as a kind of recollection, truths for which it *seems* that in principle we could discover without any language or at least no language that anyone else speaks. These are the claims that Plato's *anamnesis* is facially most plausible, and indeed, these are the primary examples he using in the dialogues in which he outlines the theory, discussed below (Samet 2019).

Finally, philosophers also sometimes refer to *ethical* claims as "*a priori*"—"it's wrong to torture people for no reason," etc. (Boghosian 2021). This category of "*a priori*" claims we can set aside for now. It is certainly descriptively true that many, perhaps most, people experience coming to these truths in a way that is *analogous* to coming to the truths of mathematics. Maybe there is a sense in which they are *a priori* in the same way. But this is obviously much more controversial. In short, the boundaries of this category of "*a priori*" statements as opposed to the "*a posteriori*" statements the truth of which we must consciously experience learning may be somewhat indeterminate (some would hold that certain basic legal or moral propositions are experienced in this way), but we can bracket that debate for now. Assume that there is some class of propositions (including, least controversially, core principles of logic and math), learning about or manipulating in the mind is phenomenologically *a priori*—experienced as though the knowledge were within us without our conscious understanding the whole time. The project of this paper (and of Plato in several of his dialogues) is to understand the nature and status of these propositions.

3. Knowledge as Recollection

In the *Meno*, Meno challenges Socrates with a famous paradox on inquiry and learning:

[A] man cannot search either for what he knows or for what he does not know. He cannot search for what he knows—since he knows it, there is no need to search—nor for what he does not know, for he does not know what to look for.

(Plato 380 BC trans. G.M.A. Grube)

So posed, Meno's paradox is a challenge to philosophy. If conceptual philosophy is understood as a search for Truth, then by hypothesis we do not know the Truth at the outset. On the other hand, if we don't know what truth is or looks like, we won't be able to recognize it when we've found it.

Not so, Socrates responds. This is because we are equipped with what we would now call *a priori* knowledge. Socrates summons an uneducated slave of Meno's and begins to reason with him about geometry. Their exploration is successful—the slave comes to an understanding of the Pythagorean Theorem based only on his intuitions and internal manipulations of geometry and guided by Socratic probing. This knowledge of Truth, Socrates explains, was within the slave the

whole time, and he could have reached emergent conclusions about geometry on his own. The same, Socrates reasons, must be true of all people. This is because such knowledge is innate, and we experience “learning” it as true *a priori*—fundamentally and irreducibly true analytically prior to any experience of the senses.

From this, Socrates posits that to the extent we are born with innate knowledge, this knowledge must, at some point, have been *learned*—knowledge has to come from somewhere, so there can be no knowledge without learning. And if by stipulation we are all born with this knowledge and do not consciously learn it during our lifetime, it must have been learned beforehand. This, Socrates explains, is possible because the slave’s soul—as all of our souls—is immortal. It has “seen all things both here and in the other world, has learned everything that is.” (Plato 380 BC trans. W.K.C. Guthrie). Thus, from this perspective, “seeking and learning are in fact nothing but recollection,” vindicating (in the eyes of Socrates and his interlocutors), the project of a conceptual philosophy built on these *a priori* truths. (Plato 380 BC trans. W.K.C. Guthrie).

Plato builds on this theory in the *Phaedo* and *Phaedrus*. In the *Phaedo*, the theory of knowledge as recollection—“*anamnesis*”—is described as an important feature of Socratic philosophy, “that theory which you have often described to us.” (*Phaedo*, trans. Hugh Tredennick). And we are given further elaboration and examples of what the theory entails. Recollection in general, Socrates explains, is a phenomenon caused by “similar or by dissimilar objects,” (*Phaedo*, 74a) upon prompting with which a person “not only becomes conscious of that thing but also thinks of a something which is an object of a different sort of knowledge,” (*Phaedo*, 73c) as when one thinks of one’s lover while looking at musical instrument (*Phaedo*, 73d).

An example of this more to the point that Socrates offers is the concept of equality. Socrates argues that equality is a concept that we all understand, distinct from specific instances of equality—such as the equality of two sticks that are the same length or two stones the same size. (*Phaedo*, 74a). This concept—absolute equality—is not something we could learn merely by experiencing some particular instances of equality. (*Phaedo*, 74c). Indeed, Socrates makes the first known “poverty of the stimulus” argument most famously made in modern times by Noam Chomsky in arguing for innate grammar (which he’s referred to as “Plato’s problem”)—as with the concept of equality, human children simply do not intake enough stimulus for it to be plausible that they learn basic grammatical structures (Chomsky 1986). Indeed, it’s not clear that it is *possible* to deduce general concepts like equality from particular instances of equality (at least not with the kind of reasoning that takes place in human minds) absent *a priori* a concept of equality (Bealer 1992). Thus, these concepts must be innate, and to the extent innate, knowledge that must have been learned prior.

In short, Socrates argues (perhaps alluding to his conversation with the slave boy in the *Meno*):

[W]hen people are asked questions, if the question is put in the right way they can give a perfectly correct answer, which they could not possibly do unless they had some knowledge and a proper grasp of the subject. And then if you confront people with a diagram or anything like that, the way in which they react is unmistakable proof that the theory is correct.

(*Phaedo*, 73b)

The theory of knowledge as recollection, then, makes three essential claims about *a priori* knowledge. The first is essentially phenomenological—the *experience* of reasoning with *a priori* knowledge is distinct—possible through the careful posing of questions. (To be clear, Plato doesn't make this distinction explicit. But it's implied by his claim that in *some* areas like math people give the right answers in response to questioning, which they presumably do not do if asked the capital of Macedon unless they had previously experienced learning it). The second—and perhaps the heart of the theory—is epistemological. We have innate knowledge underived from experience and, to a large extent, learning (at least about some things; certain concepts and their entailments) is in this sense recollection of things that we already knew. When we see two sticks of equal length, we “recall” the concept of equality.

The question then, of course, becomes *how* we have this knowledge that can be uncovered by questioning and reflection. This is where the theory makes its third basic claim—the hard-to-believe metaphysical one. Socrates has a revealing exchange with Simmias, one of his followers:

[Socrates:] When do our souls acquire this knowledge? It cannot be after the beginning of our mortal life.

[Simmias:] No, of course not.

[Socrates:] Then it must be before.

[Simmias:] Yes.

[Socrates:] Then our souls had a previous existence, Simmias, before they took on this human shape. They were independent of our bodies, and they were possessed of intelligence.

(*Phaedo*, 76c)

Embedded in this argument are two assumptions, one epistemic and the other metaphysical. Indeed, let us understand *anamnesis* as responding to two interrelated basic

difficulties about *a priori* knowledge. The first we'll call the *learning problem*—that everything that is *known* must have, at some point, been *learned*; it is impossible to have information that was not acquired. Second, if we accept this premise, we are confronted with the *entity problem*—to say that an entity at time T_1 *has* learned proposition X, implies the *existence of the identical* entity at time T_0 when that learning took place.

Socrates accepts that the learning problem presents a real problem. Indeed, mechanism aside, the learning problem is apparently unobjectionable—it amounts to the claim that information is acquired or developed, not sprung fully-developed at the advent of the universe. If there is knowledge, it must have been learned. Accepting this premise, Socrates endorses a challenging metaphysical claim to address the entity problem. Because we each have innate knowledge, that is, knowledge immanent in our consciousness from the beginning of our experiential lives, and because this knowledge must have been learned (but cannot have been learned *during* our lives, by hypothesis), it must have been learned *before* our lives. But how could that be possible? How could *we* acquire knowledge before *we* exist? Socrates rejects the premise of the question. The conclusion, he suggests, is that we have always existed—that what he terms our “souls” must have existed with intelligence before our material bodies and acquired knowledge about the concepts of the universe.

We can, of course, confidently reject this metaphysical claim. Our contemporary understanding of what exists allows no place for an immaterial, immortal soul, gathered somewhere in non-existence before being plucked and made flesh, or flitting from one body to the next in reincarnation. Our physics doesn't allow for it and our metaphysics does not need it. But the epistemological claim *does not entail* the metaphysical one. Indeed, an alternative, more plausible metaphysical account can more compellingly ground an epistemology of “learning” *a priori* knowledge as *a kind of* recollection. All the epistemic claim requires is: (1) conscious understanding of *a priori* knowledge depends on unconsciously acquired and transmitted information; (2) information can be acquired unconsciously; and (3) a mechanism for the transmission of unconsciously-acquired information over time. We can then meaningfully refer to conscious reflection on *a priori* concepts as a kind of recollection of the prior acquisition of such concepts at an earlier time. It resolves the paradox of the acquisition of *a priori* knowledge. As I argue below, modern evolutionary theory can robustly ground each of these three claims.

And indeed, an evolutionary theory of *anamnesis* may *more* plausibly ground *a priori* knowledge acquisition than Plato's theory on its own terms. A problem with Plato's theory is that, in the first instance, he argues that it is impossible to consciously deduce concepts like equality from instances of equality—this is, after all, the basis for his rejection of the empiricist claim that we simply learned these concepts as children or by inference. But in resolving the learning paradox, Plato posits an apparently-conscious immortal soul. What is not clear is how a conscious immortal soul could acquire foundational concepts that by stipulation a conscious human being cannot. Plato must simply assert that these immortal souls are different in the nature of their conscious experience than we are. Fair enough. I suppose that while we are positing immortal souls, we can posit whatever we want, but there is a lot of hand-waving going

on here. In contrast, an evolutionary theory of *amamnesia* offers an explanation for a distinction between the acquisition mechanisms of conscious and *a priori* knowledge, and an account of their different mechanisms of transmission.

4. *A Priori* Knowledge as Unconscious Knowledge

What *is* the kind of *a priori* knowledge under analysis here? We are talking about a kind of information with two essential characteristics. The first is that it is, perhaps contrary to perceptions, propositional knowledge, or propositional in form. That is, it is fundamentally *knowing-that* rather than *knowing-how*, *knowing-of* or some other form of knowledge, although it is very much built into the essential fabric of our thought (Besson 2008). Consider the law of noncontradiction. It is indelibly woven into how we think about the world—we are born knowing that no statement and its contradiction can be true simultaneously. But we are born knowing *that* no statement and its contradiction can be true simultaneously. It is a descriptive statement that could have (as a matter of linguistic semantics, at least, not to say anything about the necessary structure of the universe) been otherwise.

Same for mathematics, geometry, and the other laws of logic. It's knowledge with real content; knowledge about the world and the way that it works (Holyoak & Morrison 2005). Consider computer programming. A naïve computer program easily *could* return contradictory results—it could be programmed to state “it is raining” and “it is not raining” simultaneously. To “know” or even just to express otherwise requires incorporating into the programming affirmatively propositional information—that the program is not to express “X” and “not X” at the same time. No matter how difficult and abstract it may be to think of core *a priori* knowledge similarly to arbitrary propositional knowledge, it is the same *kind* of thing. Knowledge that $2 + 2 = 4$ is the same kind of thing as knowing that a certain category of plants is poisonous.

The second essential point about *a priori* knowledge is that it is *unconscious*—unconsciously acquired and, for the most part, unconsciously relied on (Bargh & Morsella 2008). The experience of reflecting on logic or mathematical truths is in many ways the experience of making conscious unconscious ways in which our minds process information. Indeed, as this example suggests, the unconscious nature of *a priori* knowledge accounts for its essential phenomenological distinction between *a priori* knowledge and other kinds, which we experience consciously acquiring and relying on. When a teacher in a class tells us that Napoleon won the Battle of Austerlitz in 1805, we consciously experience *learning* this piece of information—consciously acquired propositional knowledge. On the exam, when we come across a question asking when the Battle of Austerlitz was and who won, we consciously search our knowledge for this fact—we sift among other facts that we know and which present themselves, rejecting those that we do not affirmatively remember to be about the Battle of Austerlitz. Maybe, indeed, we consciously remember consciously learning the fact, can picture in our mind the moment the teacher said it, and told us to remember it for the exam. Maybe we don't, but we nevertheless know that we were taught it, and even if phenomenological details of the moment escape us, we

know they must have happened and (roughly) what they were like. This is not what Plato was discussing with the slave in the *Meno*, and not what we are discussing here.

The essence of the phenomenological distinction between *a priori* and other forms of knowledge, then, is in the fact that *a priori* knowledge is *unconscious*—unconsciously obtained and (for the most part, outside of seminars on formal logic and epistemology) unconsciously manipulated and relied upon. We don't generally consciously think "if it's true that Napoleon won the battle of Austerlitz in 1805, then it can't also be that he didn't win the Battle of Austerlitz in 1805," we just know that. When asked to reflect on why we know that (as with Socrates and the slave), we will produce something like the law of noncontradiction as irreducibly imbedded in our thought and unconsciously relied on.

5. Natural Selection and Information Acquisition

Come fall in the Northern Hemisphere, the days get shorter and the birds begin to leave (Ritter 2015). These massive annual migrations are triggered by shortening days and are guided by stimuli from the sun, stars, and magnetic field of the earth (Mouritsen 2018). How do the birds know where to go? To the extent that "know" implies consciousness, they don't. But the birds are relying on information about the universe that they are born with, wired into their mental and biological structures—days get shorter, certain changes in perception of the magnetic field mean warmer, safer climates (Lohmann 2018). There is propositional information embedded in the process, like with our *a priori* knowledge—knowing *that* when days get shorter it is time to fly south; *that* changes in perception of the magnetic field mean one is on the right path. And this information is unconsciously accessed and relied upon. In short, as with our *a priori* knowledge, birds too appear to have unconscious propositional information that structure their interactions with the world (Wiltschko & Wiltschko 2009).

Where did it come from? With birds or other animals the answer is straightforward and largely uncontroversial—Darwinian natural selection (Åkesson & Helm 2020). Birds born with the ability to detect changes in the magnetic field and navigate by them were more fit than those that could not—they could have access both to large breeding grounds with few predators and ample food in the cold months. Birds born to fly south during the winter were more likely to reproduce rather than die of exposure. If this particular example doesn't work for you because you believe birds are conscious or migration patterns primarily socially transmitted, take any number of countless other examples—moths to light; bacteria to food, reptiles recognizing mates. The point the world of life is *filled* with unconscious information (Hogeweg 2011).¹

¹ Especially as for some of these more complex behaviors, such as avian migration, there's a great deal of scientific controversy over whether they are straightforwardly "genetic" or better accounted for with a more complex evolutionary development perspective that includes substantial contingent environmental components (Carroll 2008). However, the point here is simply the less controversial observation that these behaviors have unconscious informational content and arose by natural selection (Rappole 2013). For discussion of the mechanism by which this information is transmitted across generations, see below, section 6, and footnote 2 in particular.

Indeed, there is an important sense in which natural selection is *nothing but* a mechanism of accumulating information (Frank 2012; Williams 1992). Darwinian natural selection takes place under two conditions in a reproducing population of organisms, where (1) the variable characteristics of individual organisms correspond to differential reproductive success, and (2) variable characteristics are heritable (Darwin 2003). The former might be thought of as the mechanism of *acquiring* information while the latter the mechanism of *transmitting* it. We'll focus on the acquisition mechanism for the moment, and it is worth noting that something like information acquisition by differential success could take place even if that information were not transmitted by heredity—in other words, if the mechanism of evolution were more Lamarckian than Darwinian—just replace “reproductive success” with some other metric of success in resource acquisition or longevity (Sarkar 2013).

Information about the environment is acquired where the variable characteristics of individual organisms correspond to differential reproductive success. In these circumstances, more individual organisms are born than can survive to reproductive maturity, or otherwise be able to reproduce. In this competitive state, those individuals who happen to be (for whatever reason) better adapted to the environment in which they live will reproduce more successfully, we say they have higher *fitness*. Assuming the heritability of characteristics, over time characteristics with higher fitness will come to predominate in a population—those individuals who had them will reproduce, those who did not will die off (Grafen 2015). Thus, on an island with small seeds, birds with smaller beaks will have greater reproductive success than birds with larger beaks; they will reproduce more, more birds with larger beaks will die before reproducing, and over time the proportion of birds with smaller beaks will increase.

This process generates information any time differential reproductive success correlates with facts about the environment (Caporale & Doyle 2013; Frank 2009). For example, when only those bacteria on a plate resistant to azithromycin survive to reproduce, information about the environment is generated—the plate contains azithromycin. The bacteria, of course, don't have conscious access to this information. It is *unconscious* information. But the bacteria, in some sense, rely on it—they produce proteins necessary to survive azithromycin. In short, differential reproductive success has generated information, and there is an important sense in which the bacteria population on the plate has “learned” that their environment contains azithromycin. Natural selection is, in this way, a kind of algorithm of information acquisition.

This process could explain the development of our *a priori* knowledge. Like more banal information about the environment—whether it contains azithromycin, for instance—our *a priori* knowledge is unconscious propositional knowledge. It could have been generated in the same way—differential reproductive success. As discussed at greater length below, if this hypothesis is descriptively correct, it implies a certain relationship between our *a priori* knowledge and actual characteristics of our environment. But for now the important point is that natural selection is a process of information acquisition, and the *kind* of information under analysis—unconscious propositional knowledge, has correlates and analogues throughout the living world (Carey 1998).

The process of differential reproductive success, then, can answer the learning problem outlined above. Socrates is *right* that information that exists must have been developed or acquired, it must have been in some sense learned. His mistake is to assume that the process of acquisition of *a priori* knowledge is identical to the process of acquisition of general propositional knowledge like the name of the capital of Austria. It is not. Indeed, it is *plainly* not. General propositional knowledge is acquired by consciously-experienced teaching and learning. *A priori* knowledge is not acquired that way—we never consciously experience learning these things. But this doesn't mean that Socrates is wrong when he says that all knowledge must have been learned. He's just wrong about the process. Natural selection, not conscious learning, describes the acquisition of *a priori* knowledge.

6. Genomic “Souls”

As discussed above, there are two essential preconditions of natural selection as a process of information acquisition and transmission: (1) differential survival as a mechanism of information *acquisition*, and (2) heredity, as a mechanism of information *transmission*. It is time to discuss the latter. Many characteristics of organisms on earth are *heritable*—that is, transmitted from parent to child through reproduction—the best understood mechanism of which stores information in large molecules of deoxynucleic acid (DNA) that is replicated in the reproductive process (Harden 2021).² This ensures that those heritable characteristics that raise reproductive success (as opposed to, say, characteristics of reproductive *serendipity*—there just being a large number of individuals of the opposite sex or large quantities of food, for instance) will be saved and propagated through a population.

DNA molecules are essentially long strings of molecular code—they are *themselves* information—that is coded through cellular processes into proteins that govern a broad array of emergent characteristics (Hood & Galas 2003). Heritability of traits through DNA (alongside related, less well-understood epigenetic mechanisms), then, is the mechanism by which the information produced through reproductive competition is stored and transmitted across time and generations. To take the example of information development in bacteria above. The population

² In recent years, there has been growing controversy in biology and the philosophy of science over the extent to which DNA and in particular coding genetic sequences are primary mechanisms of the transmission of information across generations. In light of discoveries on the extent to which phenotypic expression depends on “epigenetic” (or non-DNA, at least non-coding DNA) molecules (including RNA and protein) and regulatory mechanisms, some have argued for a “post-genomic” paradigm that understands information to be transmitted through complex, interrelated, genetic and epigenetic means (Stotz & Griffiths 2013; Pradeu 2016). Baetu, for instance, defends a non-reductionist view of biological information in which genes are understood to be a part of the informational content of deterministic, heritable “genomic programs” that depend also on epigenetic mechanisms (Baetu 2012). Others continue to defend the causative primacy of the information contained in DNA sequences (Weber 2016; Kjosavik 2014; Waters 2007). The precise causal relationship between genetic and epigenetic forms of information storage and transmission are beside the point here—the argument requires only that there be relatively stable, heritable, materialistic media of biological information, whether simple (as the traditional view of DNA syntax as biological information) or more complex (as multi-level genomic programs). I primarily refer here to “genomes” and the informational content of DNA syntax for simplicity and familiarity, but nothing would change philosophically to substitute “genomic program” for “genome.”

of bacteria has in some sense acquired information about its environment—it contains azithromycin. And this information is stored and transmitted to future generations of bacteria in the genomes of the individual bacteria, each of which contains the code to create proteins that render the bacteria resistant to azithromycin.

From this perspective, a genome—the aggregate of an individual’s genes—can be understood (at least in operative part) as a compendium of information previously acquired by an individual’s ancestors. To be sure, genomes are not *only* a compendium of information about the environment—it is widely recognized that natural genomes contain large quantities of useless “junk DNA” that does not contain fitness-enhancing information (Eddy 2013; Doolittle 2013). But at their coding, efficacious core, genomes compile and operationalize information about the environment. Moreover, although genomes evolve over time through mutation, sexual reproduction, and the continuing pressures of natural selection, they have a definitive continuity and stability. Any individual genome is overwhelmingly identical to that of its immediate ancestors and, indeed, other contemporaneous members of its species. Changes are made every generation—every individual has unique mutations that, for the most part, have no phenotypical effects—but the bulk of the thing stays the same. A genome is in this way somewhat like an excessively wordy encyclopedia, edited and updated each generation, but consistently containing vast amounts of information acquired previously (along with ample irrelevant diversion) (Gregory 2011).

Genomes, then, can solve the entity problem of *a priori* knowledge mentioned above—an understanding of genomics can resolve the problem for which Socrates looked to immortal souls for an answer. Recall that the entity problem, as posed by Socrates, can be understood as the challenge that to say that an entity at time T_1 has learned proposition X implies the *existence* of the *identical* entity at time T_0 when that learning took place. If the relevant entity is the mortal individual, *a priori* knowledge makes a paradox of the entity problem—it posits that the individual must *have learned* something they have *always* known. Socrates posits an immortal soul. But the genome can do the same thing. That is, if the relevant entity is the *genome*, rather than the individual, the entity problem is straightforwardly resolvable. An individual’s genome existed in the meaningful sense when the information within it was acquired—indeed, the process of natural selection inscribes the information it acquires into an evolving genome (Zhegunov 2012; Ridley 1999). The *genome*, not the mortal individual, is the entity that learns information that from the perspective of the individual is phenomenologically *a priori*.

To take the metaphor further, we might consider genomes *a kind of* immortal soul along the lines Plato had in mind. Of course, it is hardly the kind of anthropomorphized soul the continued existence of which would have given solace to Socrates’s followers around his deathbed. But it gives us all a meaningful *pre-existence*—a concrete connection to the prior individuals of our species and those from which we evolved in the information that constitutes us. Genomes, moreover, are not *literally* immortal, and perhaps unlike the souls Plato had in mind, they aren’t static and constantly change and multiply. It is hard (perhaps conceptually impossible) to say whether and when a new genome has arisen, or whether it is meaningful to

speak of every living individual—of any species—connected by a single, unbroken, evolving genome to the origins of life. But genomes are real, materially-existing entities, they persist over time, and they store and transmit information learned about the world that life inhabits. They are, in short, *much like* the souls that Plato had in mind—learning the fundamentals of the universe before our birth, and laying the basic architecture of our bodies and minds as we grow.

7. Evolutionary *Anamnesis* and its Implications

This paper has illustrated that natural selection can offer a robust empirical grounding to vindicate something like Plato’s doctrine of recollection—his theory that learning about and reasoning with core *a priori* propositions is a kind of memory. The doctrine of recollection, then, can be understood as a useful metaphor for the basis of *a priori* knowledge. In short, differential reproductive success is a mechanism by which information is generated, information that is stored and transmitted across time in heritable genomes. Thus, when we “learn” about this information, we are in an important sense “remembering”—not the conscious experiences of individuals, but information from a prior time encoded in our genes.

Plato was wrong, then, about the details of the mechanism by which *a priori* ideas are learned and transmitted, but he was on to something important at a high level of abstraction. He was wrong about the metaphysics, and perhaps wrong about the kind of learning that led to the development of *a priori* knowledge. But he was right that we have innate ideas and they were learned prior to our birth. In place of conscious learning by souls, we have unconscious information acquisition through the differential reproduction of genomes. We do not literally experience “remembering” *a priori* knowledge, because it was never consciously learned, but the idea of *a priori* knowledge as remembrance is an evocative metaphor.

The metaphor of evolutionary *anamnesis* is about more than whether, under some ways of thinking about the question, Plato was right about epistemology. This way of thinking about *a priori* knowledge has important implications for both epistemology and metaphysics, and perhaps more broadly as well. As Samet has pointed out, debates about the existence and nature of innate ideas are rarely merely about the narrow empirical question of developmental biology they purport to be about (Samet 2019). Plato’s discussion of *anamnesis* is not really just about whether random slaves can be induced to draw various geometric shapes by reliance solely on their own reflection. Even setting aside the role the discussion plays in building an ontology populated with immortal souls, for Plato the discussion matters because he assumes the *a priori* knowledge Socrates’s questioning reveals to be *true*. In the *Meno*, this is clear. *Anamnesis* is what resolves Meno’s paradox—it makes the project of philosophy worthwhile by grounding our inquiry with in the profound truths already residing in our minds. We can know philosophizing can lead us to the truth, this analysis tells us, because we know the truth when we see it.

Over the following centuries, many philosophers have accepted this assumption and made claims about metaphysics on the basis of the supposed *a priori*-ity of the propositions—arguments for particular kinds of God issuing particular kinds of mandate are the most common

and controversial case-in-point (Cottingham 1998). In response, Locke and other critics of the kind of God offered denied the existence of innate ideas entirely. In short, much of the historical controversy of the innateness of ideas is about the *truth* of ideas proffered to be innate (or about other emergent principles of political philosophy and ethics thought to follow from innateness) (Meyers 2016).

But as Kant was perhaps the first to point out, the fact that an idea appears to us *a priori* need not necessarily say anything about its truth (Zoeller 1989). Kant believed in innate ideas that appear to us fundamentally and irreducibly true—indeed, this is the basis of the metaphysics of his ethics. But he also believed in a radical disconnect between the content of our phenomenology and the world as it is in itself—that which is true to or for us need not have any necessary connection to Truth-with-a-capital-T, the Truth out there of the universe (Marshall 2013). Indeed, abstractly, Kant is right that the mere fact that we are born with a particular idea, even born with the unshakeable confidence that a particular idea is right *a priori*, does not necessarily tell us *anything* about the idea's ontological correspondence.

The metaphor of evolutionary *anamnesis*, however, can give us a solid framework for understanding the relationship between ontology and epistemology, and between things that feel as though they must be true (although no one has ever taught them to us) and that which is, in fact, true. Evolutionary *anamnesis* tells that *a priori* knowledge is that which helped our ancestors reproduce more effectively than alternatives. This means that all *a priori* knowledge (or at least the overwhelming majority of it) must be fitness-enhancing (Dennett 1995; Dawkins 1983; Mayr 1983). Because that which is fitness-enhancing is driven by ontological realities of the environment, evolutionary *anamnesis* tells us that *a priori* knowledge bears *some* relationship to ontology.

Indeed, it tells us two particular things about the necessary relationship between *a priori* truth and metaphysical reality. First, as the *a priori* truth as *recollection* metaphor emphasizes, the relationship between our *a priori* intuitions and metaphysics is necessarily *time-lagged*—the information in our genomes is information that bore a fitness-enhancing relationship to ontology *at some point in the past*. After all, natural selection as a mechanism of information accumulation is necessarily always delayed temporally by at least one generation, and often much longer than that. In the case of *Homo sapiens*, it is generally accepted that there haven't been substantial evolutionary pressures and changes to our genomes—at least that portion structuring our minds—for the last twelve thousand years or so (Bennett 2020). The relationship of our *a priori* knowledge to ontology, then, is primarily the relationship of present *a priori* knowledge to the ontology of the African savannah from 2.6 million to 12,000 years ago—what evolutionary biologists call the environment of evolutionary adaptedness (Tooby & Cosmides 1992). What we consider irreducibly true is a memory of that time.

Of course, we have no reason to believe that the fundamental structure of the universe has changed over the past ten-thousand years (and presumably, if it had, that would have exerted substantial selection pressure), but it is important to reckon with the fact that that possibility cannot be excluded. At a more pedestrian level, the necessary time-lag of information acquisition

under evolutionary *anamnesis* reminds us that many of our intuitions (perhaps especially our moral intuitions) are related to very different circumstances of the species. This relationship has been commented on by many working in evolutionary biology (Bourrat & Griffiths 2021; Cofnas 2016; Wilson 2015; Pinker 1997). And we may want to consider that some aspects of our *a priori* knowledge may not be adaptations, strictly speaking, at all, but *exaptations*—traits that arose initially for some other or no purpose but were later coopted as adaptive in solving another problem (Gould & Vrba 1982).

Moreover, the substantive relationship of information's fitness-enhancing characteristics to background ontology (or, narrowly, the background ontology of the environment of evolutionary adaptedness) can take place in at least three discrete ways. It is possible that our *a priori* knowledge all bears one of these relationships to ontology, but it is perhaps equally plausible that different pieces of knowledge are adaptive in different ways.

The first, the cleanest, and presumably a common one, is that the Rationalists had it right and that indeed our *a priori* knowledge is ontologically *true*. After all, information can rather straightforwardly improve fitness if it is indeed an accurate reflection of the world as it is (Lehar 2003; Geisler and Diehl 2003). The truth might set us free, knowledge is power, and all that. In many cases it might be that the best explanation for, say, the development of information in bacteria about the presence of azithromycin and surviving it is because those things are indeed true—there really was azithromycin in the environment. Although evolutionary *anamnesis* does not compel the conclusion that our *a priori* knowledge is correct in every case (or indeed in any of them), it is important to remember that the truth of a piece of information of knowledge is a powerful way in which that information can enhance fitness. At a minimum, ontological truth serves as a constraint on what can be fitness-enhancing. If there really is no grounding in reality for the substance we call “azithromycin”—literally nothing for bacteria to respond to—they could not possibly have evolved to do so.

Next, it might be that *a priori* knowledge is *trueish*—not wrong but importantly incomplete or distorted in some way. This could happen where an approximation of truth is enough to enhance fitness for us having evolved on earth, where certain *a priori* knowledge is more *useful* than true (Mark et al. 2010). Consider, for instance, the way in which our vision is limited to the visible spectrum of electromagnetic radiation. We know now, by means of the development of *a posteriori* knowledge, that this is far from the only electromagnetic radiation that exists in the universe. It just happens to be the most helpful for seeing things through earth's atmosphere. Of course, creatures like us could in principle be more fit than us if they could see all electromagnetic radiation—have perception that is more true. But natural selection is a zero sum game, and the energy spent on this greater perception may not be worth the benefit, or perhaps it simply hasn't happened yet. Instead, we are left with a sense that is *pretty good*, a *rough approximation*, of the world as it is, but which misrepresents it in important respects. (Sznycer et al. 2017). If we were to reason from the *a priori* proposition that we can only see light in the visible spectrum to the metaphysical claim that in fact it is all that exists, we would be making a big mistake—not a mistake that would have mattered much to our ancestors trying

to survive, but a mistake about fundamental ontology. As behavioral economists and psychologists never tire of telling us, this may well be the relationship of many of our intuitions to reality—a rough approximation, useful in the environment of evolutionary adaptedness, but often wildly out of touch with reality.

Finally, it might be that our categories and concepts group underlying matter in ways that do not exist at all but—for a variety of reasons—might be fitness-enhancing. This is a relationship not about metaphysical realism or antirealism generally, but the realism or nominalism of specific concepts or categories (Mark et al. 2010). Suppose (as seems possible) that as a matter of metaphysics nothing exists save a vast morass of particles. It might nevertheless be that the intuitive grouping of some of these particles—or generalizations about the way in which particles organize—could be useful to survival. That is, it could well be that there is no place for the concept of numbers to exist in the fabric of the universe—all that exists is matter, and numbers are not matter. But if the rules by which this matter organizes itself are best understood through numerical concepts, evolving to understand them could confer a fitness advantage (Faye 2016).

8. Conclusion

Plato, it's trite to say, started so much in Western philosophy. Everyone acknowledges that his work contains the seeds its major themes (Whitehead 1979). Fewer recognize the ways in which he might have been right. This paper sought to resuscitate the insights of Plato's theory of learning as recollection, grounding its epistemological insights in modern evolutionary biology and jettisoning its implausible—and unnecessary—metaphysical conclusions. In short, what we perceive as *a priori* knowledge might have been, as Plato would have it, learned before our lives—not by our personal immortal souls but the accumulation of information in our genomes by the process of natural selection. More importantly, this theory of *a priori* knowledge—its genesis and status—offers a robust basis for theorizing.

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