

Class 24 - Millikan's Evolutionary Biological Solution to the Kripkenstein Paradox<sup>1</sup>

I. Millikan's goals.

Millikan's paper is broadly concerned with a defense of the correspondence theory of truth against some verificationist objections.

Verificationists argue, approximately, that we can only justify knowledge of assertability conditions for sentences, not truth conditions, since we are cut off from the external world which would make our sentences either true or false.

For any sentence *p*, whether it is correspondence-true depends on whether its truth-conditions obtain in the world, or which we are only mediately aware.

Whether *p* is assertable depends mainly on our evidence, of which we are immediately aware.

We will ignore the material on truth in the last couple of sections, focusing on the portions of Millikan's paper that are relevant to the Wittgenstein/Kripke problem.

In those first six sections, Millikan attempts to provide a straight solution to the Kripke paradox, an account of our use of plus, instead of quus.

In order to solve the problem, she appeals to our biological purposes, or functions.

Two failed attempts to solve the problem of justifying our standard counting or measuring schemes, or for using plus rather than quus, involved pointing and conscious intent/meaning.

Kripke calls such attempts straight solutions, and argues that they are unsuccessful.

In particular, he argues that we can not rely on our conscious intent to determine that we should use the standard rules.

Kripke designs his thought experiment so that the differences between plus and quus are precisely only in cases where we have no prior intent.

In a section of Kripke's paper which Martinich does not reprint, but which Millikan cites, Kripke draws the direct (and obvious) analogy to Goodman's new riddle of induction.

II. An aside on Goodman and the problem of induction

Both the rule-following paradox and Goodman's new riddle of induction are questions about projecting from past experience.

I thought it might be useful to mention something about Goodman, though you could skip to §III of these notes without loss.

Induction is the process by which we generalize over limited cases.

If we see some apples falling off of trees, we might come to a general law about bodies falling to the ground.

---

<sup>1</sup> The Kripke/Wittgenstein problem of justifying our uses of standard rules, for addition and counting, and also for other terms (e.g. red), rather than deviant rules, has come to be known as a paradox. It is not a paradox. A paradox is an argument all of whose premises are plausibly taken to be true, but which results in a contradiction. What Kripke and Wittgenstein present is a puzzle about how to explain our uses of standard rules, rather than deviant ones. Still, I lapse into common usage in places.

We might generalize these cases into Newtonian Gravitational Theory. Similarly, we might notice a correlation between cigarette smoking and cancer, and come to a general claim that smoking causes cancer. Much, if not all, of empirical science proceeds by induction.

We can distinguish three problems of induction:

- I1. The weak problem of induction
- I2. The strong problem of induction
- I3. The new riddle of induction

I1, the weak problem, is that we can not be certain of our inductive claims because we have limited intelligence and experience.

There may not be enough evidence to discover the highest-level unifying laws.

If we were smarter or had more time, we might solve I1.

This problem is just a problem of limitations on evidence.

Sometimes there are two or more equally well-supported theories about the world, theories which agree on all the empirical evidence we have gathered.

Even if we presume that physical laws will be uniform and stable, we do not know which theory to use.

The weak problem is solved by gathering more evidence.

It is not really a philosophical problem.

Hume developed I2, the strong problem of induction: even given all possible evidence from the past, we can not know that the laws of nature will not shift radically and unexpectedly.

Hume points out that we lack any sense experience of the causal connections among events.

We experience only bare regularities; we infer their connections.

Such inferences are beyond the limits of our experience.

So, I2 says that we have no knowledge of physical laws.

Despite I2, we do make successful predictions.

Consider dropping a book in mid-air.

Prediction #1: The book will rise.

Prediction #2: The book will fall.

We predict the latter, even if experience does not support this.

The strong problem of induction is Hume's worry that we can not know that the laws of nature will remain uniform and stable.

Hume agrees that the laws remain stable, but he challenges us to support that belief in the absence of sufficient evidence for it.

I3, the New Riddle of Induction, gets its name from Nelson Goodman.

See his *Fact, Fiction and Forecast*; here is [the most relevant chapter](#).

You know what it means for an object to be green.

Consider the property called 'grue'.

An object is grue if it is green until 1/1/2010, when it suddenly turns blue.

How can you tell if a plant, or an emerald, is green or grue?

All evidence for its being green is also evidence for its being grue.

Green things and grue things are exactly alike until 2010.

One objection to 'grue' is that it is not simple, or uniform.

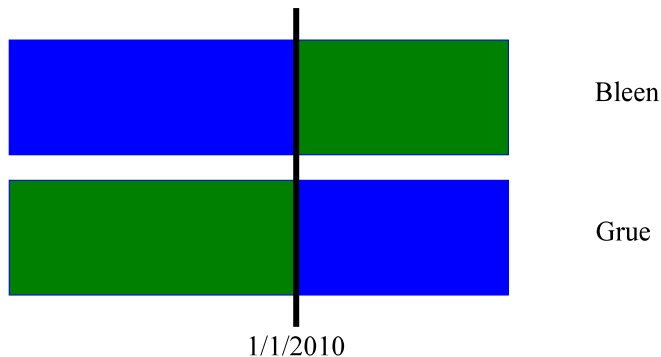
But notice, 'grue' is complex only if we start with the predicates 'green' and 'blue'.

Consider that something is bleen if and only if it is blue until 1/1/2010 and then turns green.

If we start with grue, then an object is green if and only if it is grue until 1/1/2010, and then turns bleen.

And, an object is blue if and only if it is bleen until 1/1/2010, and then turns grue.

That is, we can define green and blue in terms of grue and bleen just as easily as we can define grue and bleen in terms of green and blue.



Goodman's riddle shows that Hume's problem is not just about physical laws.

We also have difficulty justifying our uses of even common terms.

One could construct indefinitely many other artificial properties, like the property of being a papod.

A papod is a piece of paper which, on 1/1/2010, turns into an Ipod.

All papods look exactly like pieces of paper right now.

There is, in principle, no way to tell them apart.

Hume's problem of induction was to justify that hypotheses which were confirmed in the past would continue to hold.

Goodman's problem of induction is to figure out which hypotheses are really confirmed in the first place.

Kripke's rule-following problem, like Goodman's riddle, asks us to justify our choice of rules, plus or quus.

Though she accepts Kripke's analogy, Millikan distinguishes the Kripke problem from Goodman's problem.

She claims that the Goodman problem is epistemological: how can we know how to project?

But Kripke's problem is ontological: what do our determinate meanings consist of?

Still, the similarities should be obvious.

Let's return to the Kripke/Wittgenstein problem.

### III. Failed solutions

Kripke and Wittgenstein presented two failed straight solutions: intent and pointing.

In order to intend a particular method of counting, or plus rather than quus, or green rather than grue, we have to have some sort of mental representation of those intentions, some thought about which we intend. But, we have no mental representation of the rule in precisely the cases in which deviant interpretations are possible, *ex hypothesi*.

This what Millikan means when she says,

Arguments of this sort take hold only if we reject the possibility that intentionality is a *sui generis* feature given to consciousness. We must assume that what comes before the mind, whatever it is that enters or informs consciousness when one means something, does not *itself* determine a use for itself, a purpose for itself, a particular kind of connection that it is to have with one's activities... What lies before consciousness does not determine its own significance; knowing what one means is not a matter, merely, of apprehending the contents of one's mind. If there is such a thing as meaning something, say, meaning addition, its nature must lie in part in what is *not* simply given to consciousness (640-1)

Like intentions, appeals to pointing turned out to be question-begging, since they presupposed rules for the pointing.

That is, if we could legitimately appeal to rules for pointing to determine how to follow rules for counting or measuring, we could just appeal to the rules for counting themselves.

The problem is that we are wondering what justifies our uses of certain rules, including rules for pointing, over deviant ones.

The interpretations of rules are precisely what are at issue, here.

(Lewis Carroll has an amusing piece about how rules can not determine their own interpretations, which I've put [here](#).)

So, any straight solution to the problem will have to appeal to factors beyond our intentions.

Wittgenstein appeals, if Kripke is right, to the community's values.

It followed from Wittgenstein's solution both that there are serious questions about the status of our conscious states, and that the community which sets the standards which fix the meanings of our terms has freedom to choose alternate rules.

The freedom to use alternate rules was evinced by Wittgenstein's examples of the wood-sellers in the *Remarks on the Foundations of Mathematics* handout.

In the sections about the wood-sellers, Wittgenstein imagines lots of different ways that a community could measure wood, and fails to justify one method over the others.

The questions about the status of our conscious states (especially our sensations) are discussed in the traditional sections of the PLA, especially around §304, where Wittgenstein says that sensations are not a something but not a nothing.

Millikan is proposing a different kind of solution, but one which accepts the constraints that Kripke and Wittgenstein place.

In particular, she accepts that intentions and pointing are not up to the task, and that whatever justifies our use of a rule will have to be non-representational.

#### IV. Proximate and distal rules

Millikan's solution to the Kripke/Wittgenstein paradox appeals to the implicit rules that guide our behavior as a result of evolutionary development.

She distinguishes proximal rules from distal rules, using mating hoverflies as an example.

A proximal rule is one the following of which depends only upon incoming sensory information and an intact physiology. Following a distal rule depends, in addition, upon the actual state of the world. In many cases, the function of proximal rules is to effect the following of distal rules, while the function of distal rules is to aid the organism in surviving in its normal environment. (Anthony Chemero, Review of Ruth Garrett Millikan: *White Queen Psychology and Other Essays for Alice*. <http://ejap.louisiana.edu/EJAP/1994.may/chemero.html>)

The distal rule for male hoverflies that she considers is:

DHR: If you see a hoverfly, catch it.

In order to catch the female, the male hoverfly has a more specific proximal rule, which takes into account (pp 642-3) the size of the female, the distance at which the female is ordinarily detected, the velocity of the female hoverfly, and his own rate of acceleration.

PHR: Make a turn that is  $180^\circ$  away from the target minus  $1/10$  of the vector angular velocity of the target's image across my retina.

Note that there are other possible proximal rules that conform to the distal rule.

For example, there are rules about how and where to hover, and what to do when the female hoverfly is intercepted (which we will ignore, since this is a family show.)

So, the distal rules are more general, proximal rules more specific.

The distal rules are justified by biological purposiveness.

Following a proximal rule is a means of following a distal rule.

The reason to follow a proximal rule is to follow a distal rule.

So, if there are normative justifications of a distal rule, if one ought to follow the distal rule, then that imperative will hold for the proximal rule as well.

Since it is part of their biological purposiveness, all hoverflies have justification for following PHR.

To say that conformity to the proximal hoverfly rule is a means to conformity to the distal rule is the same as to say that the mechanism that has historically accounted for the overwhelming majority of ancestor hoverflies' successes at conformity to the distal hoverfly rule begins with conformity to the proximal rule. That is, the normal explanation for conformity to the distal rule contains the specification that the hoverfly first conform to the proximal rule (645).

Of course, there will be failures inherent to evolution: individuals will fail to be able to procreate even after following the rules; some will be blind or crippled, as Millikan notes (644); environmental factors (wind, predators) may interfere.

Moreover, some proximal rules will impede flourishing even though they support distal rules that are generally beneficial.

Millikan presents an example of a rat who shuns soap, using the proximal rule which says that it should not eat anything which is followed within three hours by illness.

The rat's distal rule is to avoid eating poisonous substances.

So, the rat in question, which coincidentally became ill after eating soap, will avoid soap, even though it does not make the rat ill.

Despite such imperfections in matching proximal rules with distal rules (and the facts in the world), the hoverfly's actions will accord with their proximal rules as a matter of evolutionary imperative.

Hoverflies who do not follow PHR are selected out.

The evolutionary imperative to propagate the species thus supports or justifies the normative force of PHR and DHR via biological purposiveness.

If knowing a language involves having a competence in following certain rules for construction and interpretation of sentences, the purpose that informs this competence...is a biological purpose (642).

#### V. On biological purposes

Millikan's solution, indeed any straight solution, must take into account Wittgenstein's claim that intent can not ground our following of rules, since the rules do not interpret themselves.

Wittgenstein's defense of this claim is found at the very beginning of the *Investigations*, e.g. in the example of the five red apples.

There, he illustrates his claim that the meanings of words are not representations, but guidelines for using those terms.

One way to respond to Wittgenstein's claim is to show that rules do indeed wear their interpretations on their sleeves, that there are unique correct interpretations of rules.

Such a direct response could be favored by a defender of an anti-Fregean, thin notion of sense, on which sense does not determine reference.

The skeptical worries about rule-following would not denigrate the meanings of the rules.

The puzzle of Wittgenstein and Kripke are really problems for the theory of reference.

Such an intensionalist response denies the claim that nothing representational could solve the puzzles.

See Katz, *The Metaphysics of Meaning*, Chapter 3.

Millikan, in contrast, responds to Wittgenstein's claim by accepting that the justification for our choosing the standard rule over the deviant rule depends on something non-representational.

She traces the purposiveness which grounds both distal and proximal rules to basic purposes which are not expressed in terms of their representational content.

Indeed, her example of the hoverfly is chosen just so we have a case in which we have no temptation to ascribe representational content to the subject even though we do ascribe purposiveness to it.

To mean to follow a certain rule is to have as a purpose to follow it...To understand what it is to have an explicit purpose that one represents to oneself we must first understand what it is to have a purpose the content of which is *not* represented. Basic or root purposes must be *unexpressed* purposes (641-2).

Thus, we can follow a rule, in the sense of purposefully conforming to an implicit or unexpressed rule, without opening ourselves up to Wittgenstein's objection that the rule that guides us is itself in need of interpretation.

## VI. The evolutionary biological response to Kripke and Wittgenstein

To respond to Kripke's puzzle, Millikan constructs a plus/quus analogy for the hoverfly.

Suppose that there were never a male hoverfly approached by a female hoverfly such that the angular velocity of the image on his retina were between  $500^\circ$  and  $510^\circ$  per second.

Then, DHR would be equally compatible with a deviant rule in place of PHR:

PHR\*: If the angular velocity of the image on my retina is not between  $500^\circ$  and  $510^\circ$  per second, make a turn that is  $180^\circ$  away from the target minus  $1/10$  of the vector angular velocity of the target's image across my retina;  
If the angular velocity of the image on my retina is between  $500^\circ$  and  $510^\circ$  per second, go get a pizza and play some video games.

PHR\*, which Millikan misleadingly calls the proximal quoverfly rule (it is still about hoverflies following DHR), is the analogue of Kripke's quus rule.

We suppose that the standard rule is not directly supported by any previous experience.

Then, we realize that our previous behavior/distal rule is consistent with a deviant proximal rule.

Finally, we wonder how to justify the standard rule.

Just as Wittgenstein and Kripke worried that pointing and mental representations (intuitions) could not ground the standard rule, Millikan could worry how to justify PHR\*.

But, just as Kripke admitted that it would be crazy to use quus instead of plus, there is no real worry about the hoverfly and deviant rules.

The proximal quoverfly rule...fits all past actual cases of successful female encounters. But it is not a rule the hoverfly has as a biological purpose to follow. For it is not because their behavior coincided with *that* rule that they hoverfly's ancestor's managed to catch females... (644).

As a matter of course, the hoverfly will use PHR rather than PHR\*, just as we will use plus, rather than quus.

Millikan's claim is that whatever justifies the hoverfly will equally justify our uses of standard rules for counting or adding (or green over grue).

The normative force which arises out of biological purposiveness transfers to PHR even in novel circumstances.

The hoverfly that currently has an image at a  $60^\circ$  angle with an angular velocity of  $100^\circ$  per second currently has as a biological purpose to make a turn of  $130^\circ$ . Notice that the hoverfly has this biological purpose quite independently of whether or not any hoverfly has ever been in exactly this experiential position before (646).

Similarly, we are justified in using plus, rather than quus, or for counting in the standard manner, by the rules which are grounded in our biology.

Whether this biological purposing is innate... or whether it is derived via learning, mechanisms of concept formation, etc., it must *ultimately* derive its content from the details of our evolutionary history. So, unless doing arithmetic results from a total breakdown of the cognitive systems... then *whatever* you mean to do when you encounter "plus," that content has been determined by your experience coupled with evolutionary design (648-9).

## VII. Two small critical comments

Millikan provides what she calls a straight solution: a biological justification of our use of the standard rule.

Kripke only provides what he calls a skeptical solution: we don't have a method of justifying the standard rule, but we don't need one.

It's difficult to see, though, how these two solutions are really different.

They agree that there are no facts about pointing or about intentions that ground our choice of one over the other.

They agree that there are factors outside the individual that explain why we use the standard rule rather than the deviant one.

And, they agree that those factors are not inevitably the way that they are.

Though, the claim that the mathematical rules we use may vary is clearer in Wittgenstein (e.g. the wood-sellers) than in the Kripke selection.

The main difference between Kripke/Wittgenstein and Millikan seems to be that Millikan derives a normative conclusion from her evolutionary biological solution.

She says that it provides a standard, how one ought to add or count, and which predicates one ought to use (or see as justified in using).

It is not clear to me that any evolutionary explanation can provide the kind of normative force that we ordinarily ascribe to mathematical claims, especially pure mathematical claims.

While we might defend an economy of free wood, or even of selling wood by the strength of the woodcutter, it seems that there are no real alternatives for measuring the wood.

We ought to multiply in particular ways, add in particular ways, and count in particular ways.

Biological purposiveness only supports rules which are conducive to survival.

Mathematical facts and rules may be, and are traditionally, seen as independent of evolutionary imperatives.

Of course, we might give up the traditional interpretation.

Here is another worry.

At the beginning of §VI, Millikan claims that there must be a finite number of rules that we ave biological purposes to follow.

I'm not sure why this is so.

If the rules were representational, then I could understand this restriction.

But, since the rules are imposed on us as implicit explanations of our behavior, I'm not sure why we couldn't be following a much larger stock of them.

If we had an infinite stock of distal and proximal rules among which to choose, the plus/quus problem would arise among the various possible ascriptions of rules.

The evolutionary explanation would not get off the ground.

This second worry points directly at Millikan's claim that biological purposiveness aims directly at PHR rather than PHR\*.

It seems to me that Kripke could merely challenge that assumption, accusing Millikan of begging the question.

If the male hoverfly never encountered an approaching female with an angular velocity of between  $500^\circ$  and  $510^\circ$  per second, why wouldn't biological purposiveness support PHR\* (or something a bit more reasonable)?