Skepticism and Naturalism: Can Philosophical Skepticism be Scientifically Tested?

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1. Introductory

It may be possible to scientifically test philosophical skepticism; at least this is what I shall maintain. The argument develops the naturalistic insight that there may be no particular reason to suppose that nature has selected *Homo sapiens' epistemic capacities such that we are ideally suited to forming a true theory of everything, or indeed, a true theory of much of anything. Just as chimpanzees are cognitively limited – there are many concepts, ideas, and theories beyond their grasp – so too might our conception of the universe seem limited from the point of view of some creature more “evolved” than humans. On the other hand, some physicists (et al.) have argued that humans are on the verge of discovering a “final theory of everything”. Such epistemic “optimism” seems to directly contradict the idea that we might be cognitively limited. To adjudicate between these views I shall suggest the outlines of several “crucial tests” that involve attempting to create creatures who stand to us, with respect to intelligence and wisdom, as we do to apes. A positive result from any of these experiments will indicate that the skeptical view is correct, while failure to create “higher” intelligences lends support to the epistemic optimists’ position.

2. Naturalism and Skepticism

What I want to argue, in other words, is that skepticism might be “naturalized”. This may seem counterintuitive since many naturalized epistemologists tend to regard skepticism as a “curio” from a bygone era of philosophy. Indeed, one of the primary reasons often cited for accepting naturalism, as opposed to a more traditional conception of epistemology, is that it allows one to avoid the seeming futility of skepticism. In the following passage, Devitt boldly states this view:
The thoroughgoing sceptic sets the standards of knowledge (or rational belief) too high for them ever to be achieved. Our best science shows this. It shows us, for example, that if knowledge is to be gathered, we must eliminate implausible hypotheses without being able, ultimately, to justify that elimination. It shows us that there is always an (empirical) possibility of error with any (normal) knowledge claim. Standards that our best science shows cannot be met short of instantaneous solipsism – a doctrine that is literally incredible – should be ignored. Scepticism is simply uninteresting: it throws the baby out with the bath water.

Having dismissed the quest for certainty, for rock-hard foundations, and for ultimate justification, what then remains for epistemology? It is left with the task of explaining our coming to know science (and common sense)... The epistemic relation between humans and the world itself becomes the object of scientific study. Epistemology becomes naturalized.¹

Like Devitt, many naturalists find themselves with a sense of ennui when confronted with the dialectic between “first-Philosopher” and skeptic.² Other naturalists have gone so far as to deny the intelligibility of the dialectic itself.³

What we are offered, then, is both a diagnosis and prescription for the ills of traditional epistemology. At root, it is alleged, the problem lies with a model of (philosophical) knowledge that sets what seems – at least in hindsight – impossibly high standards. As is well known, the idea was that knowledge ought to be secured by a “foundation”.⁴ The hope, as articulated by Descartes and others, was to find a small (or large) num-

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⁴ It seems quite possible, for example, to ask whether the sort of assessment offered by Devitt is sufficient to vanquish traditional skeptical questions. For as Stroud and others have argued, it might be possible to raise skeptical type worries independently of any assumption of a foundational epistemology. (Cf. Stroud’s Significance of Philosophical Scepticism, (Oxford: Oxford University Press, 1984) and Paul Moser’s Philosophy after Objectivity, (New York: Oxford University Press, 1993)). In effect, this sort of objection would state that naturalism is blind to certain epistemological difficulties that skepticism serves to highlight. What sort of difficulties? The skeptic might ask us, for example, what evidence we have that our belief-producing faculties are reliable. One difficulty, then, is to provide a non-questionbegging
ber of indubitable axioms or "basic beliefs"—self-justifying beliefs as it were. All other beliefs would ultimately trace their epistemic justification back to this foundation. One reading of the history of philosophy contends that this project is basically a non-starter. Thus, if Devitt is correct, there is a conspicuous absence of self-justifying beliefs of the appropriate type. In any event, the positive prescription is clear: philosophy ought to become naturalized.

On this view epistemology might act in concert with other empirical disciplines, e.g., psychology and evolutionary biology, to explain, as opposed to justify, our common sense and scientific beliefs about the world. The idea, in short, is that philosophy has


5 Of course since Descartes much work has been done on the question of how the various elements of the foundationalists' enterprise might be altered, e.g., empiricist phenomenologists seek to appeal to beliefs about one's own mind as a foundation for knowledge; and how the standard for an acceptable foundation might be relaxed, see, T. Triplett, "Recent Work on Foundationalism," American Philosophical Quarterly 27, (1990), 93–116.

6 There are some fairly sophisticated versions of foundationalism of recent origin that may address some of Devitt's concerns, e.g., Triplett, op. cit., and R. Chisholm's The Foundations of Knowing (Minneapolis: University of Minnesota Press, 1982).


8 One point to bear in mind is that naturalism is an "umbrella organization". For as Maffie observes, there is a continuum of possibilities between the purely a priori epistemology of Descartes, (or at least attributed to him), and the thoroughly empirical epistemology suggested by Boyd and Kornblith, there are a range of moderate positions which might allow for some mixture of both elements. To this end, Maffie distinguishes between 'unlimited naturalism' and 'limited naturalism', op. cit. p. 281. (P. F. Strawson seems to have a similar distinction in mind in his contrast between 'hard' and 'soft' naturalism in his Skepticism and Naturalism: Some Varieties, (London: Methuen, 1985), p. 1). Unlimited naturalism is characterized as the attempt to "fit epistemology into science" whereas limited naturalism attempts to "fit science into epistemology" (p. 283). Unlimited naturalists reject the a priori methodology of traditional epistemology in its entirety. A limited naturalist such as Goldman allows that a priori considerations are relevant at least to "foundational" issues in epistemology. See his Epistemology and Cognition, (Cambridge: Harvard University Press, 1986), p. 9. For the purposes of this paper I will use 'naturalism' to mean 'unlimited naturalism' with the hope of allaying the criticism that raising skepticism as an issue requires an appeal to the notion of an a priori methodology.
evolved from an a priori foundational discipline, to the view that "philosophy is itself a sort of empirical science."  

While it is true that naturalists often reject skepticism, it should be noted that the skepticism in question is of the a priori type associated with traditional philosophy. For as Maffie observes:

Naturalists typically leave open the possibility of a scientifically-based skepticism: whether or not we have knowledge of the external world is a contingent matter to be decided on the basis of the picture of human cognitive process, etc., given to us by science.  

Quine, for example, poignantly maintains, "skeptical doubts are scientific doubts", and Devitt too is careful not to completely dismiss all forms of skepticism. Naturalists, then, are interested in exiling only unscientific forms of skepticism, i.e., they hope to banish from epistemology the skepticism that issues simply from the demands of traditional epistemology.

3. The 'Evolutionary Argument' for Skepticism

Although naturalized epistemologists often entertain in principle the idea that an empirically based skepticism might be viable, it is apparent that it is often the case that very little is attached to this concession. Certainly skepticism does not have the pride of place in naturalistic epistemology that it enjoys in traditional philosophy. Furthermore, to the extent that skepticism is acknowledged as a serious issue in naturalized epistemology, it is often skepticism of a more "local" as opposed to a "global"

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10 Maffie, op. cit., p. 283.
12 Immediately following the passage quoted above in the text, Devitt parenthetically remarks:

(Though this form of skepticism is uninteresting, an example of Hartry Field (sic) brings out that something like it might not always be so. Suppose a person has the following theory. His life is humdrum except for his job. He works as the laboratory assistant for Superscientist, who has nineteen brains in a vat. Superscientist stimulates each of these brains to believe that it has a humdrum life except for its job. It believes that it is the laboratory assistant for Superscientist who has nineteen brains in a vat, each one being stimulated to believe...In these circumstances a sceptical hypothesis is certainly interesting). Op. cit., p. 75.
variety. Naturalized epistemologists, for example, are typically more interested in “local” phenomena such as the skepticism that might be associated with the well-known Müller-Lyre illusion, namely, that we ought to be skeptical in certain cases about our visual judgments about the lengths of lines.\(^\text{13}\) Such skepticism is hardly of the same order of magnitude as, say, Descartes’ evil demon hypothesis. Perhaps we ought to think of naturalized epistemology as rejecting global forms of skepticism.\(^\text{14}\) For it is certainly not easy to see how naturalized epistemologists could appeal to the results of science on the one hand, and allow the possibility of a global skepticism on the other – one might think that global skepticism engulfs the results of science itself.

In order to examine the question of a scientifically motivated skepticism let us turn again to the thought, noted in the introduction, that it might be possible to motivate skepticism based in part on the observation that *Homo sapiens* have a phylogenetic history in common with the other animals on our planet. Jerry Fodor and Noam Chomsky are two prominent thinkers firmly planted in the naturalistic tradition who raise exactly these sorts of issues. Thus Fodor:

> ...so long as the class of accessible concepts is endogenously constrained, there will be thoughts that we are unequipped to think. And, so far, nobody has been able to devise an account of the ontogeny of concepts which does not imply such endogenous constraints. This conclusion may seem less unbearably depressing if one considers that it is one which we unhesitatingly accept for every other species. One would presumably not be impressed by a priori arguments intended to prove (e.g.) that the true science must be accessible to spiders.\(^\text{15}\)

In a similar vein Chomsky writes:

> What is the relation between the class of humanly accessible theories and the class of true theories? It is possible that the intersection of these classes is quite small, that few true theories are accessible. There is no evolutionary argument to the contrary. Nor is there any reason to accept the traditional doctrine, as expressed by Descartes, that human reason is a “universal instrument which can serve for all contingencies.” Rather, it is a specific biological system, with its potentialities and associated limitations. It may turn

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\(^{14}\) I discuss the global/local distinction in greater length below.

\(^{15}\) *The Modularity of Mind*, (Cambridge: The MIT Press, 1983), pp. 125–6. I would be impressed if the spiders themselves made the arguments – although I am not sure I would believe the arguments.
out to have been a lucky accident that the intersection is not null. There is no particular reason to suppose that the science-forming capacities of humans or their mathematical abilities permit them to conceive of theories approximating the truth in every (or any) domain, or to gain insight into the laws of nature.\textsuperscript{16}

Both Fodor and Chomsky employ variants of the ‘evolutionary argument’ but with startling different conclusions: Chomsky’s claim that we have no particular reason to suppose that we can conceive of theories approximating the truth in any domain certainly indicates the possibility of a global form of skepticism, whereas, Fodor’s deployment of this argument concludes with what seems a local version of skepticism; the claim is merely that there are thoughts that we are unequipped to think. We shall discuss this difference in more detail below.

For the moment I would just like to underscore the point that the naturalistic credentials of the evolutionary argument appear impeccable, for there appears to be no scientific evidence that indicates that we are some crowning phylogenetic achievement in terms of conceptual ability. As Fodor notes, we believe that every other species on this planet is conceptually limited, hence, there does not seem to be any overwhelming reason to believe that we are not similarly bound. The idea that we are conceptually limited is one familiar from the history of philosophy and can be traced back at least as far as Heraclitus:

(Fragment 83) The wisest man will appear an ape in relation to God, both in wisdom and beauty and everything else.

(Fragment 79) Man is called childish compared with divinity, just as a boy compared with man.\textsuperscript{17}

While this skepticism may have a long and noble lineage, the writings of Fodor and Chomsky furnish the impression that it may be formulated in a suitably naturalistic fashion.

While there is perhaps no outright contradiction, I believe that there is at least a non-trivial friction between two lines of thought current among the naturalized school of epistemology. For on the one hand, we have seen that some naturalists are sympathetic to the suggestion that global


skepticism is typically the result of some sort of "philosophical hangover" from when we were intoxicated with the notion of a "first philosophy". Evidently this seems to be the case with naturalized epistemologists like Quine and Devitt who understand the central task of naturalized epistemology, in Devitt's words as "explaining our coming to know science" as opposed to attempting to provide wholesale justification for our epistemic claims. On the other, we have Fodor and Chomsky's evolutionary argument to the effect that there might be skeptical implications for science arising out of a naturalistic conception of the mind. In light of this I believe the following is a list of questions worth pursuing which naturalists (and skeptics) have yet to ask:

1. What (if any) is the relation between Quine and Devitt's rejection of skepticism and Chomsky and Fodor's evolutionary argument for skepticism?
2. In what sense (if any) is Chomsky and Fodor's evolutionary argument for skepticism in fact an argument for philosophical skepticism?
3. What theoretical considerations ought be brought to bear on the evolutionary argument for skepticism?
4. Is it possible to empirically test the evolutionary argument for skepticism?

The remainder of this paper is devoted to attempting to understand and answer these questions.

4. Justificatory Versus Noetic Skepticism

To see our way to answering the first question it will be helpful to distinguish between "justificatory" and "noetic" skepticism: the former concerns the limits of our ability to justify claims, the latter concerns the...

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limits of our thoughts. Although these limits are not always clearly distin-
guished, it seems both are relevant to the skeptical doctrine. A prelimi-
nary way to get a handle on this distinction is to think of it in terms of 
attributions of error and ignorance. Typically, justificatory skeptics pres-
ent their case via the possibility of error, while noetic skepticism is explic-
cated in terms of ignorance. An example may serve to illustrate. Let us 
suppose that there are just two contested hypotheses about the nature of 
the universe. The standard model, or big-bang theory, H₁, describes the 
universe as evolving from some primordial singularity. The steady state 
hypothesis, H₂, proposes that the universe has always been more or less 
as it is now. The justificatory skeptic might argue that we do not know 
that H₁ is true because there is at least a conceptual possibility that we 
are in error. While our best available empirical evidence supports H₁, it 
is logically possible that H₂ is true. We might be asked by a justificatory 
skeptic to imagine an evil demon has arranged all sorts of false clues; 
e.g., the “alleged” residual background radiation of the universe from the 
big bang was simply planted there by the epistemic fiend in an attempt to 
mislead us. The justificatory skeptic does not suggest that we are ignorant 
of the conceptual alternatives, for they allow that we might entertain the 
possibility that H₂ is true.

Noetic skepticism, in contrast, does not challenge the justification for 
any particular hypothesis, but questions whether we are capable of formu-
lating the correct hypothesis in the first place. Noetic skepticism claims 
that the hypothesis that correctly describes the truth might be beyond the 
"reach of our minds" – to use Nagel’s formulation. We cannot even

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19 This distinction seems to be operating at some level in Descartes and Kant’s work. Descartes is of course best known for his justificatory skepticism, but on occasion noetic skepticism seems at issue since Descartes speculates that the truth may exceed our cognitive grasp. Thus Descartes: “I would not even dare to say that God cannot arrange that a mountain should exist without a valley, or that one and two should not make three; but I only say that He has given me a mind of such a nature that I cannot conceive a mountain without a valley or a sum of one and two which would not be three, and so on, and that such things imply contradictions in my conception.” (Letter to Arnauld, 29 July 1648). Quoted in H. Frankfurt, “The Logic of Omnipotence” reprinted in Readings in the Philosophy of Religion, ed. By B. A. Brody, (Englewood Cliffs, N. J.: Prentice-Hall, 1974), p. 343, note 3. I discuss very briefly Kant’s noetic skepticism below in section 5. An extended discussion of Descartes and Kant’s noetic skepticism can be found in my, Becoming Gods (Unpublished Ph.D. dissertation, the Australian National University, 1994).

20 A closely allied distinction is made by Nagel in his The View From Nowhere, (Oxford: Oxford University Press, 1986), p. 90:
entertain the true hypothesis as a possible object of belief, according to this line of skepticism, never mind the subsidiary question of whether such a hypothesis can be justified. To extend the example above, the noetic skeptic might agree that H1 and H2 describe the only two hypotheses about the universe that are worthy of human scientific scrutiny. However, suppose the “complexity” hypothesis H3 is true. It suggests that the theory that best describes the universe must posit a billion billion billion billion billion initial conditions, and each of these initial conditions requires at least the same number of bits of information to describe it. Such a hypothesis, let us suppose, is far too complex for any human to conceive. The noetic skeptic then argues that the possibility of H3 demonstrates that we might forever be ignorant about the complete truth of the universe.

A brief look at the argumentative strategy typically employed by each might further clarify this issue.

**Justificatory Skepticism:** The justificatory skeptic argues that if (1) we believe some hypothesis, H, and (2) if there is at least one alternative hypothesis to H, H', that is within our ability to think or believe and logically compatible with all our evidence for H, then (3) we do not know H.

It is this sort of pattern of reasoning that is most often attributed to the Cartesian skeptic, particularly where the evil demon is involved. The

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In the last chapter we discussed skepticism with regard to knowledge. Here I want to introduce another form of skepticism – not about what we know but about how far our thoughts can reach. I shall defend a form of realism according to which our grasp on the world is limited not only in respect of what we can know but also in respect of what we can conceive. In a very strong sense, the world extends beyond the reach of our minds. His distinction is not exactly the same as the one discussed here. The difference lies in the fact that Nagel seems to suggest at certain points that the world does in fact transcend our ability to conceptualize it, whereas, the skepticism here asserts merely that we leave open the possibility of such a transcendence. Furthermore, it is not clear whether Nagel intends this to allow for a global or local form of skepticism.

21 For the present purposes I require only a fairly rough-hewn distinction between justificatory and noetic skepticism. It may well be that there are better – or at least less Cartesian sounding – ways to draw this distinction. This will not affect the point to be made here. I discuss this distinction in more detail in Walker *op. cit.* and “On the Fourfold Root of Philosophical Skepticism” *Sorites*. Volume 14, (October 2002) (http://www.sorites.org/Issue_14/walker.htm).
other type of skepticism of concern here might be defined as follows:

**Noetic Skepticism:** If there is some hypothesis H, which is (4) true, and (5) which is beyond our ability to think about or believe, (6) then we do not know H.22

This is the sort of reasoning that lies behind noetic skepticism from Heraclitus to Fodor.

We are now in a position to appreciate an obvious resolution to the tension within the naturalistic school noted above, namely: it may be that the two naturalistic "factions" are speaking past one another. It seems clear that Devitt and Quine have justificatory skepticism in mind, whereas Fodor and Chomsky are gesturing towards noetic skepticism with their evolutionary argument. Devitt's skeptic is worried about "possibility of error," while Chomsky's skepticism is concerned with our ability to "conceive of theories approximating the truth." Concerning the question of whether naturalists are correct to dismiss skepticism, it seems that Devitt and Quine are correct to reject skepticism, if we are speaking about justificatory skepticism. In any event, for the purposes of the argument here we will assume that it is correct for naturalized epistemologists to dismiss justificatory skepticism.23 Thus, for our objective, then, the more interesting question is whether Fodor and Chomsky are correct to endorse noetic skepticism and what this means for naturalized epistemology. We can divide this question into two subquestions: In the next section, we will investigate the *skeptical qualifications* of this naturalized noetic skepticism with the aim of determining whether it is permissible

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22 There are different ways of expanding on the locution 'beyond our ability'. It can be understood as a socio-historical hypothesis that says that with further cultural development future humans might be capable of grasping thoughts that we cannot have at present, just as we might suppose that developments in mathematics and physics mean that there are thoughts that we might formulate which the Ancient Greeks did not have the resources to formulate. For present purposes we will interpret noetic skepticism as a biological thesis: there are thoughts that humans are congenitally incapable of entertaining.

23 Just to be clear here: I am going to argue that skepticism is still a live issue within naturalized epistemology because noetic skepticism is naturalistically acceptable. I offer no arguments for or against thinking that justificatory skepticism is naturalistically acceptable. If there are good reasons for believing that justificatory skepticism is a problem for naturalized epistemology then naturalism will have to face multiple versions of skepticism.
to consider it a variety of 'philosophical skepticism'. Next, we will look in more detail at the naturalistic credentials of this type of noetic skepticism.

5. Global Noetic Skepticism

As we noted in section 3, when naturalized epistemologists reject skepticism it is typically a skepticism of a sufficient global type, i.e., what naturalized epistemologists have in mind is what is sometimes referred to as 'philosophical skepticism', which asserts that knowledge is impossible. Sometimes 'philosophical skepticism' is understood in a more restricted manner: it is said to apply to broad domains of (conjured) knowledge rather than applying to knowledge in general, e.g., one of the most common forms of philosophical skepticism is that knowledge of the external world is impossible. The question to be addressed in this section is whether the noetic skepticism suggested by the evolutionary argument is a form of philosophical skepticism. (Question 2 above).

I think it is fair to say that most philosophers do not think of philosophical skepticism in terms of noetic skepticism, for most see the skeptic as questioning the justification component of knowledge. However, at a certain level of abstraction it can be seen that the strategy of the noetic and justificatory skeptic is the same. Consider that the justificatory skeptic may be viewed as arguing that (some domain of) knowledge is impossible because one of the necessary conditions for knowledge is unsatisfied. If we accept that both belief and justification are necessary conditions for knowledge then the logic of the justificatory and noetic

\[\text{Note 24:} \text{Stroud, for example, understands skepticism about the external world as an instance of philosophical skepticism. See his The Significance of Philosophical Scepticism, op. cit.}\]

\[\text{Note 25:} \text{Certainly noetic skepticism is absent in most discussions including a recent collection that seeks to provide a contemporary overview of epistemology: The Blackwell Guide to Epistemology, edited by John Greco and Ernest Sosa, (Oxford: Blackwell, 1999). Noetic skepticism arises most often in discussions of Kantian epistemology, e.g., Robert Pippin in, Hegel's Idealism, (Cambridge: Cambridge University Press, 1989, p.6), uses the term 'thing in itself' for more or less what we are referring to as noetic skepticism. See also note 20.}\]

\[\text{Note 26:} \text{Obviously not all will accept this, for example H. A. Prichard argued that belief and knowledge are mutually exclusive states, (Knowledge and Perception, Oxford: Clarendon Press, 1950, p.86) and David Lewis argues that justification is not a necessary condition "Elusive Knowledge", Australasian Journal of Philosophy 74 (December, 1996): 549–67.}\]
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skeptic’s position is identical. For noetic skeptics too question one of the necessary conditions for knowledge; but it is the belief rather than the justification component. However, there remains the question of whether noetic skepticism can be formulated in a sufficiently global manner. Clearly, if noetic skepticism cannot be so formulated, then it would seem that we have good reason for rejecting the claim that philosophical skepticism is a live issue within naturalized epistemology.

There are, I believe, at least two ways of formulating a global version of noetic skepticism. One of these is what I shall term the ‘proper subset argument’; an argument suggested by Heraclitus’ ontogenetic analogy: human understanding is said to stand to an omniscient understanding as a child’s understanding stands to ours. How unflattering this analogy is to our level of comprehension depends on the details of the child’s stage of development. Plausibly, the average child of 15 is capable of understanding most of what an average adult can. Let us suppose – for illustrative purposes only, not that we could make much sense of such precise estimations – that an average 15 year old can understand and know 80% of an average adult’s knowledge. This comparison might plausibly be thought to generate merely a local skepticism. For if we stand to an omniscient being as the 15 year old stands to us, then we have the conceptual capacity to understand 80% of an omniscient being’s knowledge. However, if the comparison is between adults and a child of 2, and the average child of 2 knows (let us suppose) 20% of what the average adult does, then we have the basis for generating a global skepticism. For now we must imagine that it is possible for us to know only 20% of what the omniscient being knows, 80% of the set of possible claims are unknowable by humans. The discrepancy seems at least as large if we switch to Heraclitus’ phylogenetic analogy, for it seems quite likely that apes know well less than 20% of what a normal human adult knows. How far we can push this analogy is an interesting question. Stephan Körner suggests that our level of intelligence compared to a superintelligence might be like that of worms to humans.27 Worms are almost entirely ignorant about the nature of the universe so what values should we set here, or does the analogy become unintelligible at this point? It will take us too far a field to

investigate these questions.\textsuperscript{28} In any event, to the extent that we accept the proper subset argument, it seems in harmony with the skeptic's recommendation for epistemic modesty.\textsuperscript{29}

A second line of argument derives from Kant who developed a version of noetic skepticism about the external world considered as a thing in itself. If Kant's noetic skepticism can be given a suitably naturalistic interpretation then we should have in hand a naturalized version of philosophical skepticism. Let us look first, then, at a thumbnail version of Kant's noetic skepticism. The upshot of Kant's argument of the first \textit{Critique} is that some of the most basic features of our conceptual scheme may serve to distort the nature of things in themselves.\textsuperscript{30} For example,

\textsuperscript{28} I discuss these questions in \textit{Becoming Gods}, op. cit.

\textsuperscript{29} It is possible that there still might be some resistance to the idea that even the extreme cases of the subset argument -- as in the chimp or worm forms of the analogy -- constitute a form of global skepticism. The objection turns on the idea that so long as we think we know even the smallest aspect of the universe (or "being") then global skepticism is not at issue. We can see a parallel here with reactions to one answer to "brain-in-a-vat" skepticism. Following on Putnam's seminal work (\textit{Reason, Truth and History}, Cambridge: Cambridge University Press, 1981) others have argued that global skepticism can be thwarted (very, very, roughly) along the following lines: I cannot consistently hold the sentence "I am a brain-in-a-vat" true. If I am not a brain-in-a-vat then it is false, and if I am a brain-in-a-vat then it is false, because in this instance 'vat' must be interpreted as being about a computer simulation of a vat-like object. (Since by hypothesis I am a brain-in-a-vat and not a brain-in-a-computer-generated-simulation-of-a-vat-like-object this sentence is false.) The details of the argument are not to the point here, rather, we should note two types of reaction to this argument. One says that it shows global skepticism cannot be correct, because most of our beliefs are in fact true. What makes them true is that if I am a brain-in-a-vat then the contents of my belief are to be interpreted as being about the computer generated simulation. It is true that if we accept this argument, and I am a brain-in-a-vat, I do know something about the universe, since presumably the computer generated simulation is part of the universe. However, I think many find this unconvincing as a reply to global skepticism. The problem, of course, is that this reply in effect says that I cannot think about the universe outside of the vat world. In the terms developed here, an answer to justificatory skepticism -- what makes us think the warrant for our epistemic claims is sufficient -- is purchased at the price of a (perhaps non-biological) type of noetic skepticism -- the universe at large is beyond the reach of my thoughts expect for my tiny little "simulation corner". I offer a more fine-grained analysis of these issues in "Global Noetic Skepticism" in preparation.

\textsuperscript{30} Clearly, this "ontological" reading of the notion of the things in themselves offered is only one interpretation. The notion of the thing in itself, for example, has also been interpreted along epistemological lines by N. Rescher in "Noumenal Causality", in L.W. Beck edits, \textit{The Proceedings of the Third International Kant Congress}, (Dordrecht: D. Reidel Publishing, 1972). R. Butts provides an interesting methodological account in \textit{Kant and the Double Gov-
one of Kant's suggestions is that our space/time intuitions may distort the true nature of things in themselves, for we cannot rule out the possibility that God might intuit the world in a different manner, i.e., we have to contend with the possibility that He might not possess our sensuous form of intuition, but instead, work with an intellectual intuition. Kant also seems to think that God knows the world directly with his intellectual intuition, He does not have a discursive understanding like us since: "...all his [God's] knowledge must be intuition, and not thought, which always involves limitation." 31 Kant notes also that we cannot say much about how this form of intuition might work; it seems to be beyond our conceptual grasp.32 As with the proper subset argument, it seems that we must resort to analogies to clarify this skepticism, for obviously we cannot describe in any detail that which lies beyond the limits of our thought. An analogy that might be of some use is that of a map, a two dimensional representation of our planet, versus a three dimensional representation like a globe. It is well known that many standard maps tend to distort somewhat the exact spatial relations among the parts of our planet, e.g., Greenland often tends to get represented as much larger than it really is. Not only are maps usually inherently inaccurate (when held to the very highest standard) they are also incomplete, e.g., the shortest distance between any two points on the planet will almost always yield the wrong answer because maps ignore the three dimensional aspects of our earth, e.g., the shortest distance to China from Canada, as many children digging in their backyard know, is through the earth. To apply this analogy

to our cognitive situation we might image that our understanding of the external world (in itself) is like that of a map, whereas an omniscient being's is more like that of a globe. If this is the case then we can understand how our understanding is both conceptually capped—we fail to understand certain concepts just as a map fails to represent the three dimensional aspects of the world—and our understanding may be distorting, just as maps regularly represent parts of the planet as either too large or too small. Notice also that our analogy helps us understand how this form of noetic skepticism can be explained in a manner consistent with naturalism. We may suppose that the additional information of a "globe" type representation of reality—assuming that it is even available in the gene pool—may have conferred little or no additional survival value to our ancestors while taking up cognitive resources. That is, maps may be distorting and conceptually incomplete, but they can be extremely useful. If this analogy holds, then, we can make sense of the idea that the true representation of the external world is beyond our cognitive capacity, and perhaps, that our form of representing the external world may be false\textsuperscript{33}, but nevertheless, our form of representing the external world may be extremely useful. Thus, as these outlines\textsuperscript{34} of the proper subset and Kantian argument demonstrate, a complete noetic skepticism about the external world is at least logically consistent with naturalized epistemology.

\textsuperscript{33} An issue that I cannot discuss here is whether global skepticism ought to be understood as claiming that our beliefs about the external world are false; or, whether they are true of a phenomenal world, but not about the external world considered as a thing in itself (as Kant argued). If the latter then it seems that Kant's view is merely a sophisticated version of the proper subset argument. Part of the exegetical problem here is that Kant says things about the things in themselves that seem to support a justificatory skepticism about our knowledge of them—e.g., he says in a number of places that while we cannot know the things in themselves we can think about the things in themselves—and yet in other places he says that we should suppose that there are truths about the things in themselves that are beyond the reach of our minds—e.g., he suggests that the resolution of various antimonies like free will versus determinism might lie in a view (God's view) of the things in themselves that is beyond our ability to conceive. See for example, The Critique of Judgment, translated by J.H. Bernard, (New York: Prometheus Books, 2000), section 77.

\textsuperscript{34} Within the compass of this paper I can provide only an outline of these arguments. There is, for example, a long tradition of criticizing Kant's version of noetic skepticism (the thing in itself skepticism). See also note 54 for references to Davidson's argument against noetic skepticism.
6. Theoretical Evidence For and Against Noetic Skepticism

Thus far I have argued that noetic skepticism can be formulated as a form of philosophical skepticism that is logically consistent with naturalism. However, it is premature at this point to claim that global noetic skepticism can be naturalized, for we have yet to pay sufficient attention to its naturalistic credentials. So in this section we will examine some of the theoretical evidence for and against noetic skepticism. We may begin by noting that it is not difficult to imagine that naturalized epistemologists like Quine or Devitt might not be satisfied with the proposed resolution to the epistemological tension. For as we saw above, one of the attractive features promulgated by proponents of naturalized epistemology is that it allows us to move beyond the skeptical problematic that is said to have bogged down traditional epistemology. Naturalists, it seems, might rightly be disappointed if skepticism reappears in an (albeit) altered form. Indeed, at this stage naturalistic opponents of skepticism might be dubious of the naturalistic qualifications of noetic skepticism. They might argue that Fodor and Chomsky are correct to point out the logical possibility that we might be ignorant about vast domains of the universe; but that this no more threatens science than the logical possibility that we are deceived by an evil demon. Such “mere logical possibilities” are of no concern to science. Devitt, as we saw above, says that for the naturalized epistemologist: “if knowledge is to be gathered, we must eliminate implausible hypotheses without being able, ultimately, to justify that elimination.”

Yet it seems that Fodor and Chomsky’s skeptical concerns are more than the mere assertion of an “implausible hypothesis.” In effect, they are proposing an inductive argument to noetic skepticism. Neither bacteria, worms, spiders or even the great apes have the conceptual resources to grasp the complete truth of the universe, so it seems that we have every reason to suppose that humans are not up to this task either. One way to expand this inductive line of reasoning is to reflect on the familiar correlation between intelligence and brain size.35 Other things being equal, a

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35 The *locus classicus* on this subject is H. Jerison’s *Evolution of the Brain and Intelligence*, (New York: Academic Press, 1973). The correlation is actually between intelligence and brain volume versus the log of body weight. A direct comparison between humans and chimps is a little unfair, since the chimps’ body weight is less, on average, than a human’s. This does
larger brain correlates with greater intelligence. For example, our brain is larger than that of an Orangutan, and an Orangutan’s brain is larger than a Great Dane’s. The level of intelligence among these three species follows the same progression, i.e., we are more intelligent than Orangutans, and they are more intelligent than Great Danes. It seems plausible to hypothesize that a creature who had a brain size of 2200 cc ought to be more intelligent and have greater conceptual abilities than *Homo sapiens* with our measly 1300 cc. Certainly this is the sort of reasoning that is used to explain the vast difference in intelligence between humans and apes, i.e., apes (although similar in body weight) have much smaller brains. In any event, this line of reasoning seems to provide some additional evidence in support of Fodor and Chomsky’s musings.\(^{36}\)

Nevertheless, we might imagine that the anti-skeptical forces of naturalism might not be satisfied with this answer. For it is simply false that there are no scientific reasons for believing that human conceptual development is adequate for discovering most or the complete truth of nature. Consider that many scientists believe that we are close to discovering a final theory of everything. Perhaps the most prominent recent contribution to this debate is Stephen Hawking’s lecture “Is the End in Sight for Theoretical Physics?” where he argued that the goal of theoretical physics might be achieved by the end of the twentieth century.\(^{37}\) Realizing this goal would mean that we “have a complete, consistent, and unified theory of the physical interactions which would describe all possible observations.”\(^{38}\) Hawking is not alone among physicists in making such prophetic statements — although, for obvious reasons, most extend the time frame beyond the end of the twentieth century.\(^{39}\) If we are able to discover such a final theory, then even a creature with a brain the size of

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\(^{36}\) The counterfactual example Devitt cites of the Superscientist (note 12) also seems to be an inductive argument to the other type of skepticism, justificatory skepticism.


\(^{38}\) Ibid. p. 119.

a football stadium should not be capable of any significantly better conceptualization of the universe.\(^{40}\) Of course to avoid global skepticism one need only believe that the universe is by and large comprehensible and knowable by humans. It is important to see here that this line of argument seems naturalistically respectable, for the ‘success of science’ argument is not an a priori argument against noetic skepticism. It is perhaps possible that the universe might have been much too complicated for (unaltered) humans to adequately conceptualize; or that the development of the hominid line might have taken a different trajectory such that we did not develop the cognitive capacities that we in fact have. However, it seems that the remarkable success of science provides us with some good evidence that human conceptual capabilities are sufficient for knowing reality in all its complexity. In any event, I do not believe that this line of evidence is sufficiently appreciated by proponents of the evolutionary argument.

Notice that the success of science argument need not need deny that there may well be biological limits to our thoughts, that is, that Fodor may well be correct when he says that “nobody has been able to devise an account of the ontogeny of concepts which does not imply ... endogenous constraints.” Indeed, the proponent of the success of science argument might argue as follows: “Let us suppose that it is platitudinous that there are endogenous constraints on human concept formation, and hence, on the sorts of beliefs we might form. This in itself does not show that the universe is not fully comprehensible by humans. Perhaps the universe itself is not so complicated. It may well be that there are possible universes that are too complex for humans to fully or mostly comprehend, and perhaps other possible beings with a higher form of intelligence that understand these universes (but who are incomprehensible to us). This

\(^{40}\) I am assuming here, as is often done, that a unified field theory will yield a “final theory of everything.” In the absence of some sort of reductionist thesis this obviously does not follow, e.g., n-body problems or the nature of ball lightning might still resist adequate explanation, even given a unified field theory. Strictly speaking, then, our best understanding of what is required for a “final theory of everything” is a unified field theory perhaps supplemented with laws and explanations for emergent properties. If you think the idea of a creature with the brain the size of a football field is ludicrous consider the literature that speculates about brains the size of Jupiter!! For an insightful overview see Anders Sandberg’s “The Physics of Information Processing Superobjects: Daily Life Among the Jupiter Brains” *The Journal of Evolution and Technology*, www.jetpress.org vol. 5 (December 1999).
does not demonstrate that our universe is among the set of universes that are too complex for humans to fully or mostly understand. All this shows is that we might not be able to construct a science of all possible universes, but surely we would need some argument to show that such an ambition must be part of the naturalized worldview. As long as we are satisfied with fully or mostly understanding our own universe the fact that there are endogenous constraints on our concept formation need not necessarily lead to any form of global or even local skepticism. Proponents of the evolutionary argument might respond as follows: “While it is possible that the endogenous constraints on our belief system do not limit our ability to fully or mostly comprehend this universe, it does not seem probable. Genetically we are virtually identical with our hunter-gather ancestors. There is no particular reason to suppose that the evolutionary pressures on our ancestors selected for brains capable of fully or mostly comprehending this universe. If the universe is fully or mostly comprehensible surely this would have to be the grandest case of pleiotropy ever.”

The argument thus far might seem to indicate that this theoretical debate between naturalistic skeptics (of either a global or local stripe) and anti-skeptics is potentially interminable. That is, are we to believe the evolutionary argument or the success of science argument? The correct moral to draw, I believe, is that the theoretical evidence does not support either argument to the exclusion of the other.

7. A Family of Crucial Tests

However, there may be a way around this seeming impasse, for qua naturalists we ought to welcome a retreat from the purely theoretical plane to the world of experiment and observation, i.e., the most promising means to resolve this issue is by empirical tests of noetic skepticism. One version of this test employs the idea is that a human zygote might be genetically engineered with a larger brain. There does not seem to be any principled reason, for example, why we could not genetically engineer the aforementioned creature with a 2200 cc brain. If the correlation between brain size and intelligence cited above holds, then it would seem that this creature ought to be more intelligent than humans. In other words, it seems a perfectly valid piece of naturalistic thinking to investigate the
following scientific hypotheses:

Hypothesis 1: A primate with a brain volume of 2200 cc will exceed humans in intelligence by the same margin as humans exceed that of chimpanzees.

As a corollary to hypothesis 1 the following hypothesis might be entertained.

Hypothesis 2: A primate as described in hypothesis 1 will be capable of gleaning information and thinking about aspects of the universe that will exceed human ability in this regard by the same order of magnitude that human ability exceeds that of chimpanzees.

To put this in some perspective consider that if they had the same body weight as humans then apes would have a brain about 400 cc in size and *Australopithecines* a brain of approximately 600 cc.\(^{41}\) *Homo sapiens* of course enjoy a brain of approximately 1300 cc. If we engineer a creature, let us call it ‘*Homo bigheadus*’, with a brain of 2200 cc how intelligent might we expect it to be, given that the same relationship between intelligence and brain size versus the log of body weight? It is difficult to say in part because we have no interval measure for interspecies comparisons of intelligence. That is, we do not have some recognized scale which would allow us to state that humans are say 15 times as intelligent as an Orang but only 5 times as smart as *Australopithecus robustus*. At best we have some rough and ready ordinal rankings of intelligence. As noted, we may say that *Orangs* are more intelligent than a Great Dane, and *Homo sapiens* more intelligent than *Orangs*, with *Australopithecus robustus* falling somewhere in between. Nevertheless, even with mere ordinal rankings of intelligence we might guess that *Homo bigheadus* might eclipse us in intelligence in a very dramatic fashion, e.g., we might properly expect that the difference between our intelligence and theirs would be more like the difference between human and *Australopithecine* intelligence, than say human and intelligence with that of *Homo erectus*. We might even suppose that this is some sort of iterative process, *Homo Bigheadus* creates the *Homo Biggerheadus*, creatures with brains 4000 cc in size, and *Homo Biggerheadus* creates *Homo Evenbiggerheadus*, etc.

\(^{41}\) These projections are based on data from Jerison, *op. cit.*
No doubt many will find the thought of such an experiment "fantastic" (to put it mildly). Yet incredible as it may seem, it is not a question of whether we will have the technological ability to perform an experiment along the lines suggested by these hypotheses; the only question is when will we have the ability. Consider that the basic information and techniques necessary for such an experiment are already available; it is really a matter of working through the myriad of details. There are, for instance, several methods for genetic engineering; so the real trick is finding the appropriate genes that control the growth of the brain. This may not be that difficult. The crude map of the human genome we now possess certainly could be of some assistance. There is also evidence from our phylogenetic cousin the common chimpanzee, since, as is well known, there is an incredible genetic similarity between our species, e.g., King and Wilson have found that "...the average [human] polypeptide is more than 99 percent identical to its chimpanzee counterpart." The idea would be to discover the genes that have altered the allometric curve of the brain in humans as compared with chimps. From there it should be a relatively simple matter to manipulate them in the genome of a human zygote, and the recipe should be complete. The ease in which we might create a larger brain through genetic engineering is underscored by the fairly recent discovery in developmental genetics of homeobox genes: genes that control the development of the body plans of a larger number of organisms. For our purposes, what is of interest is that there are a number of homeobox genes that control the growth of various brain regions. For example, if you want to make a larger brain in a frog embryo simply insert some RNA from the gene X-Otx2 into the zygote and voila – you have a frog embryo with a larger brain, specifically, the mid and forebrain mass is increased. Homeobox genes also come in various forms of generality. Otx2 is obviously very general in its scope; in contrast,

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43 In fact I have argued in *Becoming Gods*, op. cit., that it might be best to look at the genetic differences between the common chimpanzee and the “pygmy chimpanzee” since the latter has a smaller (probably neotenuous) brain compared with the former.


for example, Emx1 controls the growth of the neocortex. Thus, if we believe that intelligence and scientific wisdom might be aided by tweaking one area of the brain or another there may be just the right homeobox gene for this task. How long until the technology is available for such an experiment? The answer, somewhat surprising perhaps, is today. Mammals have analogues of these homeobox genes. So if nothing else, it seems, that we could in fairly short order have some idea of the efficacy of such procedures by studying other mammalian species such as rats or mice. We might, for instance, today attempt to genetically engineer rats with a brain twice the normal size (or perhaps some particular part of the brain) and observe how this affects their level of intelligence. Such experiments would provide at least some evidence as to what might be feasible in our own case.

Of course this simplifies many, many problems; let me just mention a couple in passing. First, there are general considerations of physiology e.g., a larger brain might require increase blood flow, which might mean increasing the size or strength of the heart. Would we have to adjust the allometric curve of the heart and other vital organs? Perhaps the skeletal structure would have to be altered in order to support the additional cranial weight. We might have to look at extending the life span of these creatures in order to allow them enough time to develop to their full potential. Second, one may wonder about the sufficiency (or perhaps even necessity) of creating greater intelligence by dramatically increasing the gross brain size. It has been speculated, for example, that it is the greater development of our neocortex, as compared with other primates, that is primarily responsible for our greater intelligence, or that due consideration ought to be given to the fact that we exhibit much more hemispheric specialization of cognitive tasks. It may be that the task of


47 It has been argued, for example, that the neocortex ought to be used as the relevant brain structure in studying the evolution of primate intelligence since primate encephalization is principally a result of an increase in neocortical size, and "higher" cognitive functions are primarily attributed to the neocortex. In addition to the classic discussion in Jerison, *op. cit.*, see R. I. M. Dunbar, "Coevolution of neocortical size, group size and language in humans," (with commentary), *Behavioral and Brain Sciences*, 16, (1993), 681–735 and Sawaguchi, T. "The size of the neocortex in relation to ecology and social structure in monkeys and apes," *Folia Primatologica*, (1992), 58, 131–45 and numerous references therein.
attempting to create more intelligent beings ought to focus on the quality as opposed to the quantity of the brain. Thus, it should be clear from what has just been said that there is really nothing so simple as “the crucial genetic engineering test”. There are a number of tests that we might perform depending on the relative weight we assign to these variables. For instance, one group of researchers might suppose that doubling the mass of the neocortex ought to be sufficient for testing whether we can make more intelligent creatures, while another might focus on increasing the total mass of the brain by 50%. What could reasonably be expected from such tests would probably require input from a number of diverse academic fields. Whether increasing the gross size of the brain to 2200 cc would be necessary or sufficient for a significant increase in intelligence is thus an open question. The general principle – that we might be capable of experimentally manipulating the intelligence of various creatures including humans – does seem scientifically respectable. Certainly it seems scientifically respectable to suggest that we might be able to experimentally increase the intelligence of any non-human animal. It is difficult to see why humans might be exempt from this inductive thinking.

Another possibility for putting noetic skepticism to the test is based on extrapolations from computer science. The possibility that computers might be able to out-think us has been put forward by a number of researchers, one of the most prominent of whom is Professor Hans Moravec at Carnegie Mellon University. Moravec’s conjecture has two essential components: (1) an estimate of how long it will take to develop (affordable) computers with the requisite amount of computing power, and (2), an estimate of how much computing power will be necessary to simulate human intelligence. The key unit of measurement here is MIPS,

48 By “significant” I mean simply that we can imagine that there might be some observed increase in intelligence in terms of efficiency rather than an increase in understanding. We might imagine, for example, such creatures are able to calculate atomic energy levels using quantum mechanics almost instantaneously in their heads. If such creatures could not offer up a better theory than quantum mechanics it would seem that their increase in intelligence efficiency is not a significant increase. We could plod along and do the same job.

a million machine instructions per second. Moravec predicts that robots capable of executing 100 million MIPS will be commercially available around 2040 and these should equal or surpass human intelligence. He claims that "...mass-produced, fully educated robot scientists working diligently, cheaply, rapidly and increasingly effectively will ensure that most of what science knows in 2050 will have been discovered by our artificial progeny!"^{50}

It perhaps goes without saying that Moravec's claims are contentious.\textsuperscript{51} I do not propose to defend his estimates here, rather, I think the important point to observe is that his inductive reasoning is grounded in empirical data and as such is naturalistically respectable. Moravec may be wrong that robots will usurp humans as the scientists and (presumably) the naturalized epistemologists of the future, but it is not because he has begged the methodological issue against the naturalized epistemologist.\textsuperscript{52}

8. Evaluating the Experimental Results of the Crucial Tests

To predict that we will soon possess this expertise is obviously not to say that we can create such higher intelligences. It is, after all, an experiment. Let us concentrate on the case of genetic engineering of larger brained creatures while allowing that similar remarks would apply to some of the other procedures mentioned. If the genetic engineering experiment is conducted, there are two potential results. One possibility is that the experiments fail to produce a significant increase in intelligence. As noted above, for all we know there is a maximum level of intelligence, and humans have already reached this ceiling. It is even possible that these creatures might be less intelligent – perhaps the larger brain is achieved at

\textsuperscript{50} "Rise of the Robots," \textit{op. cit.}, p. 135.

\textsuperscript{51} Some thoughtful criticisms can be found in the replies to Moravec's \textit{Journal of Evolution and Technology} article, \textit{op. cit.}

\textsuperscript{52} There are a number of other means that we might use to reach the goal of manipulating human intelligence. There is the suggestion of eugenicists, which may be traced back as far as Plato \textit{The Republic} 459–461, that we could breed for intelligence. An \textit{in vivo} solution is suggested by recent attempts to repair damage to the brains of Alzheimer patients by implanting fetal neurons. Stem cell research, for example, might allow us to engineer larger brains (and skulls) for consenting adults.
the price of a loss of neuron integration.\textsuperscript{53} The anti-skeptical forces within naturalism – Hawking et al. – would have to favor the null hypothesis from such an experiment, i.e., that no significant increase in intelligence and conceptual abilities results from such an experiment. Such a result ought to boost our confidence in our own theoretical abilities. Under these circumstances it would seem we are in a better position to reject skepticism. The inability to create a higher intelligence (at least in this universe) might be understood as indicating that we have hit some sort of "nomological" ceiling in terms of intelligence, or perhaps simply a technological or practical impossibility. In any event, if it is not possible for us to create a higher intelligence then this would seem to rule-out a naturalized version of noetic skepticism; for naturalists like Quine and Devitt are in a good position to reject any further skepticism as based on mere logical possibility as incongruent with naturalism.

But would it not be open to the noetic skeptic to reply that it may be simply that we have not yet succeeded in constructing the correct sort of experiment? Certainly such an objection might seem plausible if we abandon the project prematurely. However, suppose we make numerous attempts and each one ends either in creating a creature less intelligent than humans, or equal to humans. Never is there the slightest indication, even with a hundred thousand generations of experimenters devoting their lives to this task, that we have succeeded in creating a creature more intelligent than ourselves. This ought to close the case on a naturalized version of noetic skepticism. True, it would still seem open to the noetic skeptic who rejects the tenants of naturalism to reply that it might be the case that there could be more intelligent creatures than ourselves, it is simply that we are too stupid to create them. Nevertheless, I think that eventually such a line of objection would ring hollow, at least given naturalism. After all, one could defend almost any theory on a similar basis, e.g., one could defend the idea that ether exists by simply saying that we

\textsuperscript{53} There is of course the possibility of a creature having a comparatively larger brain and with a fewer number of neurons as well. For instance, we know that triploid salamanders and diploid salamanders are about the same size yet differing in the fact that the former has fewer but larger cells. In an interesting experiment it was discovered that the triploid was less able to learn than the diploid. See, Fankhauser, G., et al. "Effect of size and number of brain cells on learning in larvae of the salamander, \textit{Triturus viridiscens}," \textit{Science}, (1955), 122, 692–3. This experiment suggests the idea that total brain mass may not be as important as simply the number of neurons available.
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are too stupid to discover it. We do not need to appeal to any naïve view of falsificationism to maintain the claim that eventually such objections would seem unscientific and unnaturalizable. After a hundred thousand-life times of failure (and probably long before) this form of noetic skepticism would be asserting the mere logical possibility of higher intelligences, not a testable scientific hypothesis.

The other potential outcome is that we succeed in creating "transcendent" beings. In broad terms, we can image two quite different outcomes; one that supports local noetic skepticism and one that supports global noetic skepticism. With respect to local skepticism, it is possible that the enhanced beings are able to entertain some beliefs that we cannot, but only over a reasonably restricted domain of application. Suppose, for example, they are able to conceive certain types of advanced mathematics and physics beyond the cognitive reach of humans, but otherwise their beliefs are more or less like ours. In this case, although this limitation might mean we are incapable of formulating a final theory of everything, nevertheless, this might reasonably be considered a case of local rather global skepticism. If we add a few further domains to the list of areas beyond our cognitive reach, perhaps cosmology and chemistry, it seems that we are still left with a local version of noetic skepticism. Eventually if we add enough domains, however, our local skepticism is going to mutate into a full-blown global skepticism.

On the other hand, we might imagine that the gulf between our understanding and the transcendent beings is indeed enormous, as supporting a global type of noetic skepticism. Obviously this result might have profound implications not only in our quest for knowledge, but for human civilization in its entirety. Indeed, such an event would have no analogue in human history. The closest parallel might be something like the aforementioned increase in intelligence seen in the development of the Hominid line from Australopithecine. The situations are clearly disanalogous in two major respects. The development of the Hominid line took hundreds of thousands of years, and was an evolutionary change. The proposed experiment could result in the development of a transcendent creature virtually "overnight", and would not be a (Darwinian) evolutionary change. In a very real sense such creatures would defy our imagination, just as our activities often transcend the understanding of chimps or human infants. Might such creatures travel to distant stars and back as easily as we catch the cross-town bus in non-peak times? Who is to say?
Of course, our best physics says this is impossible, but this begs the question. Our best physics may be human, all too human, in its grasp of the truth. To support the claim of global skepticism we might imagine that the experiment reveals that our form of representing the world is limited in the way that the Kantian position canvassed above indicates, i.e., that our representation of the universe (and ourselves) is too "coarse grain" in just the way that the map analogy above suggests.

However, there seems to be a potential problem in positively verifying the results of this experiment. For it might be objected that even if the experiment succeeded in successfully bioengineering creatures of greater intelligence, we could never verify that they had a better theory of the universe that was beyond our understanding. By hypothesis we cannot understand the theory, so how could we verify that it was a better theory? If the theory is not verifiable then in what sense is it naturalizable? If we allowed this objection it would seem that at best we are left again with the mere assertion of the logical possibility of a higher intelligence, a view, which we have had occasion to note, is inconsistent with naturalism.

As a small point of logic it should be noted that it does not follow that if "we" cannot verify the results of such an experiment, then the results cannot be verified. After all, the bio-engineered beings might verify the result. If these bio-engineered beings are the scientists of the future then perhaps the experiment is naturalizable, at least from their perspective. We need to ask: to whom does naturalism belong? There does not seem to be any particularly compelling reason to believe that other species might not engage in the scientific enterprise, and in fact, be better scientists.\footnote{I explore this point further in "Prolegomena to Any Future Science", in preparation. This objection also touches on the question of the relation between verifiability and meaning. Verificationists often suggest (to put it roughly) that a statement is meaningful iff it is verifiable. (See C. Misak's interesting study of the history of this idea: \textit{Verificationism}, (New York: Routledge, 1995)). Verificationists have typically concentrated on the problem of going from "left to right" with respect to this biconditional. However, one may wonder whether we must assume that going from right to left is unproblematic. It might be thought that many lay people have "verification" of the claim that $E=mc^2$. This verification of course relies on their trust of what physicists say. (See "Social Epistemology" by Frederick Schmitt, in \textit{The Blackwell Guide to Epistemology}, edited by John Greco and Ernest Sosa, (Massachusetts: Blackwell Publishing, 1999), pp. 354–82, and references therein for discussion of the role of "epistemological trust"). It is difficult to see in what sense a layperson might be said to understand what $E=mc^2$ means. If this is so then it might be the case that we can verify statements even though we do not understand what they mean. There are non-naturalistic reasons as well for why one}
Indeed, it seems a natural growth of science. If we think of science as the interplay between experiment, observation, and theorizing, then the creation of better theorizers seems as apposite as the creation of better scientific experiments, or the creation of better equipment for observing.

Even if we insist that, if the experiment is naturalizable then the outcome of the experiment must be appreciable by humans, it certainly does not follow that we could not confirm, in principle at least, the results of the experiment. It might be reasonable to attribute a better theory to the bio-engineered beings because they are better able to control and predict nature. Suppose that the newly created beings claim (in our language) that while their most impressive achievements are not fully appreciable by us — any more than a chimpanzee might be expect to understand the exquisite subtlety of the Critique of Pure Reason, or the complexity of the Hubble telescope — nevertheless, they are willing to put on display their scientific and cognitive talents. Suppose they begin by traveling faster than the speed of light, by simultaneously beating the top one hundred human and computer chess players, reveal an inconsistency in Gödel’s incompleteness proof, etc. Imagine that they satisfy our every material need, they provide us with a safe, unlimited, and self-renewing energy source, and grant us with devices that convert this energy into food, clothing and shelter. In short, they create for humans a (material) utopia. Perhaps they even agree to arrange the stars in the night sky to form the outline of the young Elvis. Under such circumstances it might seem reasonable to believe that these beings had superior cognitive capacities to our own, and, to trust them when they say that their language and sci-

might think that such an experiment could not succeed. Davidson has a priori and transcendental arguments that purport to refute noetic skepticism. (The transcendental and a priori aspects of Davidson’s argument are discussed by many of the contributors to Transcendental Arguments, ed. Robert Stern, Oxford: Oxford University Press, 1999). Thus a Davidsonian would be in a position to dismiss the experiment a priori: we could never create a creature with an understanding that transcends ours since the postulation of such a being is a contradiction in terms. (Cf. Rorty’s use of Davidson’s argument to reject of the possibility of an advanced race – the “Galactians” – in “The World Well Lost,” reprinted in Consequences of Pragmatism, (Minneapolis: University of Minnesota Press, 1982), pp. 3–18). A Davidsonian would ultimately have to disagree with the strong form of naturalism presupposed here which rejects the idea that there are interesting epistemological conclusions which might be established a priori. Can we really take seriously the suggestion that it is not even possible that a creature with a brain the size of a football stadium might not have a conceptual scheme that transcends our own? I criticize Davidson and Rorty’s a priori arguments in Becoming Gods, op. cit.
ence far exceeds ours. We might imagine further that they endorse the
map/globe analogy discussed above as an appropriate description of the
limits or our understanding. Would it be that unreasonable to attribute
a "higher understanding" and a better theory to creatures who are able
to move stars thousands of light years away to form the outline of the
young Elvis? Under such circumstances I think it would be reasonable to
suppose that the bio-engineered beings had a better theory than our own,
even though we could not understand the theory.\textsuperscript{55} This is of course not to
say that we are \textit{guaranteed} to be capable of verifying \textit{every} possible posi-
tive result from the aforementioned experiment. The objection we were
considering was that we could \textit{never} verify that they had a better theory
of the universe that was beyond our understanding. I think it ought to
be conceded that under certain circumstances it might not be possible to
verify whether such creatures are capable of formulating a better theory
of the universe, nevertheless, there are at least some circumstances where
it would seem a reasonable hypothesis to attribute a greater understand-
ing and theoretical insight to the bio-engineered beings. Clearly, the type
of noetic skepticism that is confirmed – local or global – will depend on
a number of factors. If the bio-engineered beings are better chemists, but
otherwise do not mentally outpace us, then this will probably count as a
confirmation of local noetic skepticism. If it turns out that we have good
reason to believe that many of our most "basic" concepts used to repre-
sent the world – e.g., concepts like space and time – distort the true nature
of things in themselves then we may have reason to suppose that global
noetic skepticism is confirmed.

It is perhaps interesting to note that this experiment might put natu-
ralism as well as skepticism to the test. For we have no guarantee that
the bio-engineered beings will themselves be naturalists. Perhaps they
explain to us that their better control and prediction of nature is due to
greater a priori insights into the ultimate structure of Being – that Plato
and Hegel were closer to the correct methodology as opposed to Newton
or Darwin. As naturalists we must acknowledge (however reluctantly)
that this possibility is not one that we are entitled to dismiss a priori.

\textsuperscript{55} But see N. Rescher's, \textit{The Limits of Science, op. cit.}, chapter 13, for an interesting defense
of the idea that other species might simply have a "different" scientific view rather than a
"better" view than our own. Rescher discusses this possibility with respect to the idea of extra-
terrestrial science but the point would perhaps apply to other species of a terrestrial origin.
9. Must We Experiment?

It might be wise at this point to consider the following type of objection. Even if it is granted that our current evidence is not sufficient to adjudicate between the skepticism/anti-skepticism hypotheses, and that we ought to seek for further experimental and observational evidence to confirm or infirm them, this in itself does not demonstrate that we need perform *this* experiment, i.e., it does not show that we need carry out anything as drastic as attempting to create higher intelligences. Perhaps more prosaic lines of inquiry might provide sufficient evidence for accepting one hypothesis and rejecting the other. Imagine, for example, that next week a young physicist named ‘Newteinstein’ publishes a grand unified field theory in *Nature*. Newteinstein completes and unifies particle physics and cosmology. On the basis of this theory the special sciences are completed in the next six months. A hundred thousand generations of human physicists and other scientists are unable to improve on Newteinsteinism, and epistemic optimism gradually becomes the entrenched belief. This would seem to be excellent evidence that noetic skepticism is false. Conversely, it seems quite possible to imagine that we could obtain evidence in favor of noetic skepticism. Suppose, for example, that a theory that unifies quantum theory and general relativity eludes a hundred thousand generations of human physicists. Imagine further that every science eventually reveals itself to be plagued by similar aporia even after a hundred thousand generations of human diligence. In these circumstances noetic skepticism would certainly seem like a plausible conjecture. That is, we might imagine that in this distant future it is hypothesized that our inability to solve these scientific conundrums is because of limits to our understanding. The objection, then, is this: even if we accept that creating higher intelligences is *sufficient* for investigating skeptical hypotheses, why should we believe that this route is *necessary*?

In response let me say, by way of clarification, that my position is not that there is not other possible lines of evidence, indeed, as I argued in section 6 we already have some evidence for both noetic skepticism and anti-skepticism. Furthermore, it seems quite possible, as the objection above indicates, that these lines of evidence might be extended and eventually tend to favor either the skeptical or anti-skeptical hypothesis. However, the experiment to create higher intelligences offers a couple of advantages over other lines of evidence.
One advantage is simply efficiency. The sorts of genetic experiments outlined above could be done in the near-term and relatively inexpensively – as compared at least with mega-science projects like the international space station or building supercolliders, neutrino detectors, etc. In contrast, it seems that other lines of evidence we might hope to obtain will require a “wait and see” response. For example, if we interpret Fodor’s skepticism about the possibility of formulating a successful science of belief systems as more than our current inability to frame such a science, but as a (congenital) noetic skepticism, then it appears that only a “wait and see” attitude could support this view. For it is difficult to see how our current inability to formulate a science of belief systems could demonstrate that with 300 years or 3000 or 30,000 years of scientific advance we might not be able to construct such a science, certainly Fodor does not provide any argument as to why we should believe this could not eventually happen.\textsuperscript{56} Similarly, even if there is a Newteinstein on the horizon it looks as if we will have to take a “wait and see” attitude. After all, Einstein’s revolution came nearly three hundred years after Newton’s; presumably we would need to wait a similar interval (at least) to confirm that the universe is completely comprehensible to us. In terms of efficacy, the higher intelligence experiment seems to win hands down: it is faster and much cheaper. For as was argued above, it is possible that we could create more intelligent beings in the short run and confirm that they had a better view of the universe.

The principled reason for endorsing the experiment to attempt to bioengineer more intelligent beings is that it appears to be the only way to get around the “transcendental problem”. By this I mean the problem familiar from traditional epistemology: how can we stand outside of our perspective of the world to compare it with the world in itself? It seems that no matter how ideal the confirmation of a theory of the universe is “by our own lights” this does not in itself answer the question of whether it is true of the world in itself. Consider again the two hypothetical future scenarios described above. On the one hand, in the case against noetic skepticism, we imagined Newteinstein’s theory is repeatedly confirmed to the applause of a hundred thousand generations of human scientists who, try as they might, are not able to improve on Newteinsteinianism. Even in

\textsuperscript{56} See \textit{ibid.}, part 5.
this instance, it seems that we can raise the question of Newteinsteinianism's fit to reality. The problem is not simply that we think humans might be subject to endogenous constraints, but rather, we do not have any means to independently discover how such endogenous constraints relate to reality in itself. The fact that Newteinsteinianism looks complete and consistent by our lights does not show that it might not look radically incomplete or false from the perspective of a higher intelligence. There is no guarantee that our scientific practices will necessarily reveal surds—phenomena inexplicable to human science—that point to the incompleteness of our scientific endeavors or our perspective. Our problem, in other words, is that we have no assurance that we have asked all the relevant questions: if reality is too complex for humans to conceive, other than in a distorted fashion as suggested by the map/globe analogy, then it may well be that there are questions that science should ask, and explanations that science should seek, that are too complex for humans to appreciate.\footnote{A slightly different way to make this point can be seen from Weinberg's reflections on this matter when he writes: "...it may be that humans are simply not intelligent enough to discover or understand the final theory. It is possible to train dogs to do all sorts of clever things, but I doubt that anyone will ever train a dog to use quantum mechanics to calculate the atomic energy levels." (\textit{Dreams of a Final Theory}, op. cit., pp. 233–4.) The problem is not so much that we cannot get dogs to answer questions about atomic energy questions, but that we cannot get them to ask the questions in the first place. Even if a Newteinstein answers all our questions (other than the transcendental question) it still seems that we ought to worry that we have not asked all the relevant questions. Perhaps, like dogs, we are too easily satisfied.}

Purely human attempts to provide ideal justification, it seems, can never answer the conjecture that a theory like Newteinstein's only appears ideal because of the limitations of our understanding. On the other hand, we considered the hypothetical situation where evidence mounts for the noetic skepticism conjecture: we find that the concerted efforts of (unaltered) humans to scientifically investigate the universe appear thwarted because of numerous aporia. Undeniably this would be good evidence for noetic skepticism, but there are other hypotheses that could explain these results, e.g., that it is simply a brute feature of the universe that it is not fully comprehensible by any intelligence, or that there are some limitations of the scientific methodology itself such that aspects of the universe are inscrutable to science. So in this situation we would have two hypotheses to consider: (1) that the universe is partly or largely incomprehensible by us because noetic skepticism is true, or (2) that even more
intelligent scientists would find these aporia insolvable. Only running the enhanced intelligence experiment would allow us to decide between (1) and (2). So, if the argument here is correct then even the best attempts by (unaltered) humans to gather evidence for either skepticism or anti-skepticism do not answer the transcendental problem. In other words, the experiment to create bio-engineered beings seems to be the only way to attempt to overcome the transcendental problem. This is why I term this the 'principled reason' for attempting the bioengineering experiment. A few comments about this argument are in order.

First, attempting the experiment does not guarantee that the transcendental problem is solved. As we have said, this experiment might be not lead to greater intelligence. And even if we succeed in demonstrating the limitations of our perspective, it does not mean that the transcendental problem will itself be solved, e.g., *Homo bigheadus* may find themselves faced with this problem and be motivated to attempt to create *Homo biggerheadus*. But does not this suggest that every creature will face a similar transcendental problem? The answer here has to be no: clearly, it would seem incongruous with naturalism to say that we know a priori that every other epistemic agent can or cannot solve the transcendental problem. What may be impossible for us might be quite easily accomplished by better intellectually equipped scientists and epistemologists.

Relatedly, the commitment to naturalism also means that there is a limit to how “principled” this claim – that the attempt to create higher intelligences is necessary for attempting to overcome the transcendental problem – can be. Manifestly, I cannot offer arguments that seek to prove *a priori* that this line of experiment is the only way to overcome the transcendental problem; it may be that there are less drastic ways to confirm or infirm (global or local) noetic skepticism that we simply have not thought of yet. The appropriate conclusion then might be that this line of experimentation seems to be the best way thus far to proceed against global noetic skepticism. However, a rebuttal to the claim that the higher intelligence experiment is necessary would have to show how it is possible to obtain, by less drastic means, experimental and observational evidence that bears on the transcendental problem. Short of a serious proposal about how this is to be done, the claim that the higher intelligence experiment is necessary for making progress on noetic skepticism stands.
10. An Engineering End Run at Global Skepticism

It might be thought that the argument runs afoul upon an objection that, in the mouth of an interlocutor, might be elaborated as follows: "While there may not be an outright contradiction in claiming that we have the scientific expertise to attempt to create more intelligent creatures, and that the creation of such creatures may reveal that many of our beliefs may not be true, surely there is a pragmatic contradiction or at least non-trivial tension here. It may be conceded that there is no outright contradiction because Kantian global noetic skepticism is not the thesis that all our beliefs are false; so it is at least formally consistent to say that it is true that we can attempt to build a higher intelligence while admitting that it is possible (or probable) that all or most of our beliefs are false. Yet, if we believe that it is likely that many of our beliefs are not true – as the Kantian version of global noetic skepticism advises – then this seems to undermine the optimism that it is true that we can (attempt to) create more intelligent beings. After all, the sort of experiment described involves a number of theoretical commitments other than just the belief that we can increase intelligence, e.g., that brains are related to intelligence, genes control the developmental path of the brain, etc. So, if we believe that it is true that we can attempt to create more intelligent beings, then it seems that we must believe all sorts of things are true, which means that we must believe that global noetic skepticism is false."

The major mistake of this objection is that it presupposes that we must believe that our theories are true in the main rather than effective. The attempt to create higher intelligences is in some sense an engineering project. It seems that we have good evidence from other engineering projects that we can be effective even where we know the project utilizes theory that is false. For example, it is possible to perform all sorts of engineering feats employing Newtonianism even though we know that Newtonianism is false. Sending people into space can be done using Newtonian calculations because the differences between it and relativistic calculations are too small in these circumstances to be of any consequence. Indeed, the map analogy discussed in section 5 makes essentially the same point, that there is no contradiction in assuming that maps can be effective tools even though one could derive any number of falsehoods from some of them, e.g., that the land mass of Greenland is greater than Australia. Perhaps it might be objected that the reason that we think that
employing Newtonianism is effective is that it is close to the truth, it has a high degree of verisimilitude; similarly, we must assume that our own theories used to attempt to construct higher intelligences must (at minimum) be close to the truth. However, if we grant that it is possible to make sense of the notion of verisimilitude, nothing prevents the global noetic skeptic from accepting this point. So long as it is acknowledged that our conceptual limitations prevent us from reaching the truth, it is consistent with global noetic skepticism that our conceptual understanding of the universe is in fact extremely close to the truth. Imagine, for instance, a species that can grasp Newtonianism, but because of certain congenital limitations, cannot understand Einsteinianism. If we assume, for the sake of the illustration, that Newtonianism is close to the truth and Einsteinianism is true, then it is quite consistent to maintain a noetic skepticism about their understanding of physics, even though their theory is quite close to the truth. In short, global noetic skepticism is the thesis that we lack the conceptual apparatus to formulate a true understanding of much of reality; it is neutral on the issue of verisimilitude, about how close we are to formulating a true understanding of reality.

11. Conclusion

One way to summarize the discussion is to note that noetic skepticism falls on a continuum. The weakest form, which we met in section 6, maintains simply that there are possible universes that are too complex for any human to conceive or understand them in any detail. Given that we believe there are endogenous constraints on the sorts of concepts that are available to humans, this form of noetic skepticism might be platitudeous. Further along the continuum are various forms of local noetic skepticism that might be directed against certain specific domains of knowledge, e.g., we mentioned the possibility that a few concepts necessary to fully understand the physics of our universe may elude us but otherwise the universe is comprehensible to humans. Towards the other end of the continuum lies global noetic skepticism, the idea that the universe may, for the most part, elude our conceptual understanding. As noted above, the weakest form of noetic skepticism is probably of little concern for naturalism: naturalism is (plausibly) seen as directed to knowledge about this world. However, local noetic skepticism does seem of interest to natural-
ism. It would be an interesting result if it could be demonstrated that the universe exceeds our ability to fully comprehend. Admittedly, this result would probably be of more interest to science as opposed to the skeptical tradition in epistemology. Finally, if global noetic skepticism is confirmed this result would be of interest to both science and the skeptical tradition. Surely we would need to re-evaluate human scientific efforts if we could confirm that the universe is mostly incomprehensible to us. The confirmation of a global noetic skepticism would also be of relevance to an epistemological tradition that naturalists like Quine and Devitt hoped to dispense with.

My aim here has been twofold: I have attempted to show that philosophical skepticism is, and ought to be, a live issue for naturalized epistemologists, and that the way to make progress on this issue is through experimentation rather than via theorizing — the method employed hitherto by naturalistic skeptics and anti-skeptics. At minimum, I think there is reason to believe that the issues are far more multifaceted than many naturalized epistemologists — for and against skepticism — would lead us to believe. Skepticism may yet have something interesting to say to naturalized epistemology and science.

58 Clearly these experiments raise ethical questions that are beyond the domain of this paper so the conclusion about the direction of progress that I reach here is conditional on the ethics discussion.