INCOMMENSURABILITY, RELATIVISM, SCEPTICISM:
REFLECTIONS ON ACQUIRING A CONCEPT

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Abstract

Some opponents of the incommensurability thesis, such as Davidson and Rorty, have argued that the very idea of incommensurability is incoherent and that the existence of alternative and incommensurable conceptual schemes is a conceptual impossibility. If true, this refutes Kuhnian relativism and Kantian scepticism in one fell swoop. For Kuhnian relativism depends on the possibility of alternative, humanly accessible conceptual schemes that are incommensurable with one another, and the Kantian notion of a realm of unknowable things-in-themselves gives rise to the possibility of humanly inaccessible schemes that are incommensurable with even our best current or future science. In what follows we argue that the possibility of incommensurability of either the Kuhnian or the Kantian variety is inescapable and that this conclusion is forced upon us by a simple consideration of what is involved in acquiring a concept. It turns out that the threats from relativism and scepticism are real, and that anyone, including Davidson himself, who has ever defended an account of concept acquisition is committed to one or the other of these two possibilities.¹

¹ This paper benefited from comments made by Wayne Davis, Chauncey Maher, Jose Martin, and an anonymous reviewer at this journal.
of a realm of unknowable things-in-themselves entails the possibility of humanly inaccessible schemes that are incommensurable with even our best current or future science.\(^2\) In what follows we argue that the possibility of incommensurability of either the Kuhnian or the Kantian variety is inescapable and that this conclusion is forced upon us by a simple consideration of what is involved in acquiring a concept. It turns out that the threats from relativism and scepticism are real, and that anyone, including Davidson himself, who has ever defended an account of concept acquisition is committed to one or the other of these two possibilities.

### 1. Incommensurability and Conceptual Endowment

Let us follow Davidson (2001, p. 185) by taking incommensurability to be a relation between conceptual schemes, expressible as sets of intertranslatable languages, that obtains whenever there is failure of translatability.\(^3\) For ease of explication, let us understand a concept as what two intertranslatable words or phrases, and a thought as what two intertranslatable sentences, express. We can then understand concepts and thoughts either as mental or extralinguistic entities, or as translations of words and thoughts into one’s home language. Thus John’s ‘bachelor’ and ‘unmarried man’ would express the same concept, BACHELOR, and Jean’s ‘Il pleut’ and Johann’s ‘Es regnet’ would express the same thought, IT’S RAINING. On this view, two linguistic items fail to be intertranslatable in virtue of expressing different concepts or thoughts, and two concepts or thoughts fail to be intertranslatable in virtue of being different concepts or thoughts. If languages have intranslatable words and sentences—and therefore speakers of the language have different concepts and thoughts—then these languages and the conceptual schemes they express are incommensurable.

Conceptual schemes are related to what we call an individual’s ‘conceptual endowment’ (CE). One’s CE at time t consists of all and only those concepts one has actually tokened prior to t. Thus if an individual has had thoughts that contain the

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\(^2\) The Kantian scepticism we’ll argue for is stronger than Kant’s. Kant held that things-in-themselves, as noumena, are thinkable but not knowable. We shall argue in §4 that the sort of theorists whom we call ‘constructivists’ are committed to the view that things-in-themselves are neither thinkable nor knowable.

\(^3\) See Goldberg (2004).
concepts THREE-LEGGED, RED, and DOG prior to t, each of these concepts is part of her CE at t. However, without having actually entertained the complex concept THREE-LEGGED RED DOG prior to t, this concept is not part of her CE, but part of her potential conceptual endowment (PCE) instead. Let an individual’s PCE at time t be the closure of her CE at t under whatever rules of complex concept formation she has access to at t. Thus if an individual possesses THREE-LEGGED, RED and DOG as part of her CE, as well as the ability to form intersective concepts, she ipso facto possesses the concept THREE-LEGGED RED DOG as part of her PCE—even if she has never actually entertained this concept.

An individual’s PCE includes the complete space of concepts to which she has access absent further experience. It therefore captures everything essential to the idea of a conceptual scheme. For a conceptual scheme is meant to be the horizon of intelligibility for an individual, so that everything in an individual’s conceptual scheme at time t is, if not actually conceived by her at or prior to t, at least conceivable. Everything outside an individual’s scheme at t would be inconceivable for her at t. Someone with the concepts GOLDEN and MOUNTAIN as part of her CE (and so with the concept GOLDEN MOUNTAIN as part of her PCE) could conceive of golden mountains, while someone without the concept MOUNTAIN (or without the ability to form intersective concepts) could not. An individual’s PCE therefore defines her space of thinkable thoughts, just as a conceptual scheme is supposed to do.

With the notion of a PCE in mind, we can rephrase Davidson’s (2001, p. 185) suggestion that incommensurability might come in degrees. PCE_1 would be completely incommensurable with PCE_2 if and only if they have no common members. Or, in terms closer to Davidson’s, for any language expressing PCE_1, no sentences of it would be translatable into a language expressing PCE_2. Conversely, PCE_1 would be partially incommensurable with PCE_2 if and only if they have only some common members. For

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4 See Rellihan (2005). See also Fodor (1981, pp. 277, 314), where a notion similar to that of a PCE is introduced.

5 For purposes of illustration, we appeal throughout this paper to intersection as a paradigmatic rule for constructing complex concepts. Everything we say is intended to apply to more complicated rules of construction as well, and nothing in our argument depends upon the specific rules of construction involved. We say more about this in §4.
any language expressing PCE₁, only some sentences of it would be translatable into a language expressing PCE₂.

While complete incommensurability is a symmetrical relation, partial incommensurability is not. To see what we have in mind, consider two artificial examples. Let Observation English consist of all and only the expressions of English referring to observable phenomena. Since the expressions of Observation English constitute a proper subset of the expressions of English, the former can be translated into the latter. However, with the failure of reductive empiricists to provide any uncontroversial examples of translations in the opposite direction, it is generally acknowledged that the converse does not hold. Consider also how Tarski’s object- and meta-languages relate. Everything expressible in the former is expressible in the latter, but, again, the converse does not hold. In such cases the PCEs that these languages express are both partially and asymmetrically incommensurable.

The possibility of real cases of partial asymmetrical incommensurability provides a response to the objection that explanations of incommensurability display an illicit understanding of supposedly incommensurable conceptual schemes. Putnam (1981) and Kitcher (2001) raise this objection; Davidson frames it succinctly: ‘Kuhn is brilliant at saying what things were like before the revolution using—what else?—our post-revolutionary idiom’ (2001, p. 184). According to Davidson, Kuhn’s putative examples of incommensurability undermine the thesis because in offering these examples Kuhn translates them into his own language. There is, however, nothing inconsistent about describing pre-revolutionary schemes in our post-revolutionary language, just as there is nothing inconsistent about describing Observation English in English or object- in meta-languages. In each case the incommensurability described is partial and asymmetrical.

The notion of partial asymmetrical incommensurability also allows us to refine our thesis that the possibility of incommensurable conceptual schemes, of either the Kuhnian or Kantian variety, is inescapable. Acquisition of a novel concept—in the context of a scientific revolution, say—either does or does not augment an individual’s PCE. In the former case, the novel concept is not constructible from concepts already possessed, or, as we shall say, it is ‘non-constructively acquired’. In the latter case, the novel concept is constructible—in something like the way that BLACK HAT is
constructible from BLACK and HAT, given the rule of intersective concept formation—and we shall therefore say that it is ‘constructively acquired’. We shall argue that any instance of non-constructive acquisition results in the schemes before and after acquisition being partially asymmetrically incommensurable, and so Kuhnian relativism ensues. We shall then argue that disallowing non-constructive acquisition leaves us with the worry that our scheme is at least partially asymmetrically incommensurable with a complete description of the world, and so Kantian scepticism follows. Incommensurability results either way; relativism or scepticism can be avoided but not both.

2. Non-Constructivism

Suppose that in acquiring the concept DAX an individual acquires a concept not constructible from concepts that she already has and thus acquires a concept not already in her PCE. Her PCE would therefore be augmented, and her PCE at time $t_0$ (prior to acquisition) would be a proper subset of her PCE at time $t_1$ (after acquisition). While daxes would be inconceivable for her at $t_0$, they would be conceivable at $t_1$, and her horizon of intelligibility would have expanded in the interim. Moreover, if we continue to take concepts to be expressible in words and thought in sentences, the individual’s language at $t_0$ would be translatable into her language at $t_1$ but not vice versa. Partial asymmetrical incommensurability would obtain. Should differences resulting from acquiring concepts individually seem too insignificant to count as genuine incommensurability, note that this process could be iterated indefinitely. Each time a new concept is acquired non-constructively, conceptual schemes move farther apart.

One might object that even iterating non-constructive acquisition results in a weaker form of incommensurability than the sort that Kuhn made famous. Kuhn (1996) sometimes claims that schemes are changed not concept by concept but all at once, and even speaks of incommensurability as resulting in completely incompatible worldviews. Kuhn eventually came to find this implausible, however, focusing instead on partial incommensurability: ‘Only for a small subgroup of (usually interdefined) terms and for sentences containing them do problems of translation arise’ (2002, p. 36). Such translation problems could arise by acquiring concepts individually in precisely the manner that we describe. Further, even small changes in conceptual schemes become
much weightier if some variety of semantic holism is correct. On that view, since the meaning of a concept depends both upon the complete set of inferential relations that the concept has to other concepts and the meaning of these other concepts themselves, the meaning of a concept changes whenever any of its inferential relations change or any of the concepts to which it is related change their meaning. Thus two concepts will have the same meaning only if they are possessed by individuals with identical conceptual schemes; any difference, however trivial, results in complete incommensurability.\(^6\)

Non-constructivism seems to have been the preferred account of concept acquisition for Aristotle and for the Aristotelian empiricists of the Middle Ages. They regarded perception as a species of efficient causation in which an object’s sensible form is transmitted to the perceiver. They then regarded concept acquisition itself as the process of abstracting an object’s intellectual from its sensible form. Thus Aristotle and the Aristotelian empiricists viewed learning as the acquisition of something genuinely new—the transfer of intelligible structures from the world to the mind.\(^7\) The image of the tabula rasa is popular here, and, of course, if the mind is a blank slate, concept acquisition cannot help but augment an individual’s PCE. Varying the image, Adams explains that the Aristotelian empiricists took learning to be akin to a process of contagion by which the mind is infected with the world’s intellectual structure (1975, pp. 72–3). Either way, this model is non-constructivist. New concepts are not constructions of old concepts, and because concept acquisition would therefore result in one’s PCE at \(t_0\) being a proper subset of one’s PCE at \(t_1\), Aristotle and the Aristotelians would be committed to the possibility of (at least) partial asymmetrical incommensurability. As our blank slates are written upon by the world, we pass through successive stages of incommensurable PCEs.

Contemporary externalisms such as Putnam’s (1998) and Kripke’s (2005) share important features with the Aristotelian model. Putnam and Kripke both reject the view that concepts are reducible to—and therefore constructible from—descriptions used to fix their reference in context. Should it turn out that Aristotle was neither a student of Plato

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\(^7\) See Adams (1975) on the medieval Aristotelians. See also Piatelli-Palmarini (1989, p. 2) on what he calls the ‘instructivist’ method of concept acquisition, which is similar to our non-constructivist method.
nor a tutor of Alexander, this would not render ARISTOTLE non-referring. The concept ARISTOTLE (and our word ‘Aristotle’) would continue to refer to the individual at the end of the long causal/historical chain extending from Aristotle’s ‘baptism’ to our current use of his name. Similarly, describing water as the transparent, potable liquid that fills lakes and falls from the sky is insufficient to fix the reference of WATER because this description is satisfied by different substances here and on Twin Earth. WATER refers to H₂O here and XYZ there because use of the corresponding word is causally related to H₂O here and XYZ there. For Putnam and Kripke, because reference is not fixed by descriptions, newly acquired concepts cannot be constructible from any associated descriptions. Something else must be added, some causal connection between us and the object or objects to which our concepts refer. Absent our travelling to Twin Earth or their travelling here, we and our doppelgangers have incommensurable conceptual schemes. For there is no way of constructing the concept twater from concepts in our scheme or WATER from concepts in theirs. In general, if concepts are not reducible to, and so not translatable into, the descriptions that fix their reference in context, then concept acquisition must result in partial asymmetrical incommensurability. Thus Putnam and Kripke, along with the legions of externalists following in their footsteps, are committed to the possibility of incommensurable conceptual schemes.

Of course we could acquire twater were we to travel to Twin Earth and come into appropriate causal contact with XYZ. Nonetheless recall that we are concerned with conceptual schemes, and so PCEs, indexed to particular times. Were we to visit Twin Earth, our PCE prior to our visit would be intranslatable with our PCE during or after. This temporal indexing makes sense of Kuhn’s own focus on incommensurability between conceptual schemes entertained at different historical times. Kuhn never denied that Newton could learn relativity theory. He merely claimed that Newton’s adoption of relativity would amount to a conversion experience or ‘paradigm shift’ rather than a rational transition from classical mechanics. Like Kuhn, we insist that Newton’s PCE in the seventeenth century would be intranslatable with his PCE in the twentieth, were he to visit.

To be fair, the historical and contemporary non-constructivists that we have identified can, and must, allow that some concepts are acquired constructively: e.g.
BLACK HAT from BLACK and HAT. Otherwise non-constructivists fail to respect the compositionality condition for language and thought, and familiar considerations suggest that representational systems have to be compositional if they are to be learnable. For how else would finite minds have access to an infinite class of concepts and thoughts?\(^8\) This, however, is irrelevant. As we have shown, any non-constructivist concept acquisition gives rise to partially asymmetrically incommensurable schemes, and Aristotle, the medieval Aristotelians, and contemporary externalists alike all maintain that at least some concepts are acquired non-constructively.

Admittedly, the form of incommensurability that we have demonstrated is semantic rather than methodological, and some have suggested that relativism can be avoided if there exist rational, universally binding standards for deciding between alternative PCEs. Indeed, Kuhn himself (e.g., 1996, pp. 185ff; 1979, pp. 321–2) has made this suggestion and has offered up his own set of standards. However, it is unclear how (semantically) incommensurable PCEs could be compared against his or any other standards in ways that would allow for adjudication, for it is unclear how incommensurable PCEs could be compared at all. Comparing two schemes requires a grasp of each, and this is precisely what semantic incommensurability forbids. Thus the existence of incommensurable PCEs is sufficient to introduce worries of relativism.

Still one virtue of non-constructivist accounts of concept acquisition is that they have the potential to disqualify various forms of scepticism. It cannot be the case that all our concepts fail to describe the world as it really is if concepts are acquired as intellectual structures migrate from the world to the mind or if concepts mean what they do in virtue of their causal relations to the world. Thus Aristotle based his claim that ‘everything is a possible object of thought’ (Aristotle, in McKeon 1941, p. 590) on his account of concept acquisition, and Putnam uses a variety of externalism to a similar effect in his discussion of the brain-in-a-vat hypothesis (1981). Putnam in particular argues that the brain-in-a-vat hypothesis is self-defeating by claiming that one cannot think in vat-English what one thinks in English by ‘I am a brain in a vat’. According to him, the word ‘vat’ when thought by a brain in a vat cannot refer to actual vats because, \textit{ex hypothesi}, brains in a vat don’t have the right causal relations to actual vats. If

\(^8\) See Davidson (2001, essays 1 and 2).
Putnam’s externalism is correct, then we cannot even formulate the Kantian worry that there is a reality beyond the reach of our words and concepts. Unfortunately, Kuhnian relativism follows instead. If meaning is reference, and the reference of ‘vat’ in English and vat-English are distinct, then its meaning becomes language- and ultimately scheme-relative. What we and a brain-in-a-vat mean by ‘vat’ differs. Hence individuals with different causal relations to the world possess different conceptual schemes.

3. A Non-Constructivist Objection

We recognize of course that Putnam and Kripke’s externalism is often offered as a rebuttal to incommensurability and relativism alike. According to their causal theory of reference, a word means what it does in virtue of its referent, where that referent stays essentially fixed through scientific revolutions. Though Newton and Einstein thought that mass had different properties (only the latter held it convertible to energy), each used the word ‘mass’ to refer to, and so ultimately to mean, the same fixed object in the world. If meaning is reference, and reference remains essentially fixed, then meaning too remains fixed. *Ceteris paribus*, sentences uttered by Newton and Einstein in which ‘mass’ appears are intertranslatable and so commensurable after all; with essentialism relativism itself would seem to lack footing. How could we have concluded otherwise?

Putnam and Kripke’s externalism, however, can block incommensurability and relativism only some of the time. Putnam might be able to argue that sentences of Einstein containing ‘mass’ are translatable into sentences of Newton, since Einstein’s ‘mass’ refers to the same thing as Newton’s. But Putnam cannot argue that sentences of Einstein containing ‘space-time’ are translatable into any of Newton’s. Even if Einstein’s ‘space-time’ refers to some fixed object, no expression in Newton’s language refers to that object. Nor are Newton’s ‘space’ and ‘time’ jointly coreferential with Einstein’s ‘space-time’. If Einstein is right, then Newton’s ‘space’ and ‘time’ refer jointly (and individually) to nothing. Of course Newton’s language can be expanded to include ‘space-time’, but then his language after the expansion would be intranslatable into his language before the expansion and so his pre- and post-revolutionary PCEs would differ. Pre- and post-revolutionary conceptual schemes would then be incommensurable.
Kuhn (2000) himself suggests another reason why Putnam and Kripke’s externalism entails the possibility of incommensurability and with it relativism. Putnam and Kripke must maintain that ‘planets’ means what it does in virtue of referring to whatever objects planets happen to be. The process by which it does this involves a causal chain of reference grounded in an initial baptism. Kuhn observes, however, that even if Putnam and Kripke are correct, they fail to realize that while the set of objects initially baptized as ‘planets’ includes the sun and moon and excludes the earth, with Copernicus the set came to exclude the sun and moon and include the earth instead. ‘Planets’ before and after the Copernican revolution refers to different objects and so means different things. Names and essences apparently get reassigned; even if there are essences in the world that names name, they don’t name them essentially. Incommensurability and relativism follow.

Of course the most significant response to the essentialist objection is that scientific revolutions sometimes involve more than the reorganization of reference. Sometimes new objects are discovered. But then externalists have no choice but to say that our PCEs expand along with our ontology.

4. Constructivism
If any non-constructive concept acquisition entails the possibility of incommensurability, the only chance of avoiding that possibility is to disallow non-constructive acquisition altogether. Instead all concepts would be acquired by being constructed from concepts previously possessed. Concept acquisition would not involve the augmentation of our PCEs; PCEs (and so conceptual schemes) would remain unchanged by revolutions.

Just as no one can endorse an unqualified non-constructivism without running afoul of the compositionality condition, however, no one can endorse an unqualified constructivism without invoking an infinite regress. Perhaps BACHELOR is a complex concept, composed of UNMARRIED and MAN, and perhaps each of these concepts is complex in turn, but this process of analysis has to end somewhere. There must be some bedrock of atomic primitives from which the rest of our concepts are constructed, primitives that cannot be acquired constructively. Thus constructivist accounts of concept acquisition are parasitic upon non-constructivist ones, and we have already seen where
that road leads. So long as any concepts are acquired non-constructively, concept acquisition results in incommensurable schemes.

But perhaps the opponents of incommensurability have more resources at their disposal than this objection suggests. They do have to allow the existence of atomic primitives that cannot be acquired constructively, but there needn’t be any interesting instances of Kuhnian incommensurability resulting from this—scientific revolutions needn’t give rise to incommensurable schemes—for the atomic primitives and rules of concept formation that form the basis for constructive acquisition needn’t be acquired at all.

Let constructivism be the view that (a) the primitive concepts acting as the basis for constructive concept acquisition are innate and, therefore, species universal, and (b) all acquired concepts are constructed from these innate primitives via innate rules for complex concept formation. According to some accounts, this was the view of the British empiricists, who held that only our simple sensory concepts (RED, PAIN, etc.) are innate, the remainder being constructed from these primitives via innate principles. Such rules, we take it, are what Hume was getting at by appealing to the ‘faculty of compounding, transposing, augmenting, or diminishing the materials afforded us by the senses and experience’ (Hume, in Selby-Bigge and Nidditch 1975, p. 19). Less austere accounts of constructivism would allow for non-sensory primitives (e.g., CAUSE) as well as logical and set-theoretic rules of construction.

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9 Since the expressive power of a PCE is jointly determined by its primitive concepts and its rules of complex concept formation, both have to be innate if Kuhnian incommensurability is to be avoided. See below.

10 See, e.g., Fodor’s (1981, 2003). As Fodor (1981, p. 276) reads him, Hume allowed that all of our impressions are innate (cf. Hume, in Selby-Bigge and Nidditch 1975, p. 22), and since Hume believed that our simple ideas are copies of our impressions, it follows that the content of our simple ideas must be innate. Add to this Hume’s dictum that the ‘creative power of the mind amounts to no more than the faculty of compounding, transposing, augmenting, or diminishing the materials afforded us by the senses and experience’ (Hume, in Selby-Bigge and Nidditch 1975, p. 19) and we see that the concepts to which a Humean mind has access are innately determined. Similar considerations apply to other reductive empiricists.
Clearly, constructivism solves the problem of relativism. In virtue of being innate, primitives and rules will be shared, and in virtue of being constructed solely from these primitives via these rules, PCEs themselves will be innately determined. It follows that concept acquisition will not lead to Kuhnian incommensurability, for acquisition will not involve the augmentation of an individual’s PCE. Newton’s and Einstein’s ‘mass’, for example, will be intertranslatable because both will be translatable into the same innately determined conceptual scheme. Unfortunately, constructivism leaps from the frying pan of relativism into the fire of scepticism, for it raises the spectre of an unknowable (and, indeed, unthinkable) class of things-in-themselves that must forever remain beyond the grasp of our innately determined PCEs.

Let us follow Fodor (1983) in saying that a mind is ‘epistemically bounded’ if there are truths for which it cannot form corresponding representations. Epistemic boundedness is thus a kind of incommensurability relation, for a mind that is epistemically bounded is (at least) partially asymmetrically incommensurable with the scheme of True Science, the scheme that accurately represents reality in toto. For a putative illustration of epistemic boundedness and the accompanying variety of incommensurability, consider McGinn’s (1989) recent defence of mind-body Mysterianism. According to McGinn, (a) there is some property P in virtue of which brains give rise to phenomenal consciousness, and (b) we are constitutionally incapable of forming representations of P. Since representations of P will form an essential part of True Science, McGinn’s Mysterianism entails that our minds are epistemically bounded.\footnote{McGinn now defends a more robust kind of Mysterianism, evocatively called ‘transcendental naturalism’, according to which the realm of the mysterious includes all of philosophy (cf. 1993, p. 2). Interestingly, McGinn’s arguments for Mysterianism appear to rest upon a constructivist account of our conceptual capacities: ‘A type of mind M is cognitively closed with respect to a property P (or a theory T) if and only if the concept-forming procedures at M’s disposal cannot extend to a grasp of P (or an understanding of T)’ (1989, p. 350).} Incommensurability of the Kantian sort follows.

Any account of concept acquisition wishing to avoid McGinn’s or more robust forms of Mysterianism owes us some explanation of how the representational powers of our minds could limn the structure of reality, some explanation of how our minds could
be epistemically unbounded. Eschewing appeals to idealism, which makes reality mind-dependent, or to pre-established harmony between mind and world, which leaves unboundedness unexplained, only one form of explanation remains: our minds can be epistemically unbounded only if the world itself has some way of influencing the constitution of our PCEs. Thus non-constructivists defuse the boundedness worry by allowing our PCEs to be augmented as a result of experience, thereby making the representational capacities of our minds a function of the world we live in. This strategy is not available to constructivists, however. If our PCEs are innately determined, no amount of intercourse with x’s that are F will suffice for acquisition of the concept FNESS if FNESS is not already constructible from within our own scheme. But if experience cannot augment our PCEs—and according to constructivism it cannot—then how can constructivism account for unbounded minds?

As we have seen, constructivists hold that the world can affect the representational capacities of our minds only by affecting the constitution of our innately determined PCEs. Now consider. Like all innate structures, our PCEs would have to be products of evolution and, therefore, at best the result of natural selection, at worst the result of random processes like genetic drift. Random processes are unlikely mechanisms for producing unbounded minds, but in the former case this is only slightly less obvious. Natural selection can account for the presence of unbounded minds only if there were (a) selection pressure for unbounded minds in the environment of human evolution and (b) unbounded minds in the population of our evolutionary ancestors for selection to operate upon. In fact (b) is parasitic upon (a). If there were constant pressure for unbounded minds, and if each intermediate stage on the path from boundedness to unboundedness were favoured over preceding stages, cumulative selection and random variation could account for the presence of an unbounded mind in the usual fashion. Thus the question of whether constructivism can account for unbounded minds reduces to the question of whether there was selection pressure for unbounded PCEs in the environment of human evolution, and the answer to this question is surely ‘no’.

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12 See, e.g., Dawkins’s discussion of the evolution of the eye via cumulative selection and random variation (1986, p. 45).
First, PCEs are, strictly speaking, invisible to natural selection. Organisms are selected for on the basis of their behaviour (broadly construed), and concepts that are only potentially accessible cannot affect actual behaviour. Thus it is innate CEs rather than innate PCEs that are selected for. Moreover, our CEs were selected for on the basis of their capacity to lead to adaptive behaviour in the environment of the late Pleistocene African savannah, and in this environment there was simply no selection pressure for access to the concepts of True Science. Knowledge of the migratory patterns of large game and the intentional states of conspecifics would have had an effect on fitness, but knowledge of cosmology and particle physics would not. Thus since there was no selection for epistemically unbounded minds in the environment of human evolution, and since, on the constructivist account, selection is the only (non-random) way in which the world can influence the constitution of our PCEs, constructivism gives us no reason to believe that our minds are unbounded. At best, we have reason to believe that our minds are unbounded with respect to the microworld of our evolutionary adaptation, but no reason to believe that they are unbounded tout court.\textsuperscript{13}

Of course selection for a CE entails selection of a PCE, just as selection for a molecule (haemoglobin) that transports oxygen throughout the body entails selection of a molecule with some specific colour (red). It is therefore not inconceivable that selection for CEs capable of supporting adaptive behaviour in the African savannah resulted in selection of PCEs capable of grasping True Science in similar fashion. It is, however, unlikely; for ‘selection of’ is just a bit of technical jargon for referring to coincidences. If our evolutionary microworld had been different, different CEs would have been selected for and thus there would have been selection of different PCEs. But if this microworld had been the same, and only the macroworld of which it is a part had been different, there would be no corresponding changes in our CEs or PCEs. Thus selection of PCEs, like selection for CEs, is sensitive to the constitution of our evolutionary microworld rather than to the constitution of the universe at large, of which this microworld is only a part.

\textsuperscript{13} Block (1986) and Sterelny (1989) each make a similar observation regarding Fodor’s ‘mad dog nativism’. Concept nativism, they argue, raises the spectre of scepticism, for innate concepts are the products of evolutionary processes, and evolution would not have produced conceptual repertoires sufficient for True Science.
The point remains that a process insensitive to the constitution of reality \textit{in toto} is an unlikely mechanism for producing unbounded minds.

Even if this line of reasoning is persuasive, however, one might still object that we have underestimated the resources of constructivism. At various points in this paper we have appealed to intersection as a paradigmatic principle of complex concept construction, but a more complete account would have to allow for at least the full combinatorial resources of first-order logic, set theory, and modal logic. Perhaps, the objection goes, the concepts required for True Science can be constructed from our innate primitives together with these, or other, considerably more powerful rules of concept construction. If so, then evolutionary considerations to the contrary notwithstanding, our minds would be unbounded.\footnote{14 We are grateful to an anonymous reviewer for raising this objection.}

To see why this objection fails, consider, first, that both primitives and rules of concept formation are limiting conditions on the sorts of concepts that can be constructed. The dismal history of analysis in philosophy attests to this. \textit{No} rules of concept formation, no matter how powerful, allow for the logical construction of concepts referring to ‘unobservables’ from a stock of primitive sensory concepts, just as (arguably) no rules allow for the construction of normative from non-normative concepts, mentalistic from behavioural concepts, and, if Davidson is right, mentalistic from physicalistic concepts. Thus if there is reason to doubt the adequacy of our innate primitives, there is reason to doubt the adequacy of the class of concepts that can be constructed from them, \textit{regardless} of the rules involved. Moreover, because the expressive power of a PCE is jointly determined by its primitives \textit{and} rules of formation, both have to be innate if constructivism is to avoid Kuhnian relativism. The alternative, to let concept formation rules \textit{themselves} be acquired, allows for the possibility of augmenting our conceptual schemes by acquiring more powerful rules—a possibility that constructivism was meant to avoid. Thus the considerations we’ve been adducing in favour of scepticism regarding the adequacy of our innate concepts apply equally to our innate rules of concept formation. Constructivists should have no more faith in the latter than they have in the former.
What the constructivist needs, it would seem, is some argument showing that the microworld of our evolutionary adaptation is sufficiently similar to the macroworld of True Science so that a CE capable of representing the former would yield a PCE capable of representing the latter. But it is unclear how any such argument could avoid begging the question against the sceptic. For in order to compare our evolutionary microworld to the world as represented by True Science, the constructivist would have to assume knowledge of (and, therefore, the capacity to represent) reality *in toto*, and this, of course, assumes precisely what is in contention.

We’ve been arguing that constructivism makes it unlikely that our minds are epistemically unbounded, but it should be noted that a considerably weaker claim is sufficient for a response to Davidson. Recall that Davidson’s gambit is to show that incommensurability of either the Kuhnian or the Kantian variety is a conceptual impossibility, that the ‘very idea’ of an incommensurable scheme is incoherent. However, there is nothing incoherent in the suggestion that selection for minds adequate to the demands of the African savannah resulted in selection of minds inadequate to the demands of True Science. A Davidsonian constructivist, in order to disqualify this possibility, would have to defend the shocking thesis that it is not only *possible* but *necessary* that human evolution resulted in unbounded PCEs!

As Davidson himself recognized, the possibility of an unknowable realm of things-in-themselves raises the spectre of Kantian scepticism just as surely as the possibility of a malevolent demon raises the spectre of Cartesian scepticism. The nature of sceptical challenges is not to claim that the sceptical scenario is actual (let alone necessary), merely that it is possible. Descartes never intends for us to be convinced that his demon does (or must) exist. That he might exist, just as that our minds might be epistemically bounded, is sufficient to introduce doubt. And doubt is the coin of the sceptical realm, for if both epistemic boundedness and epistemic unboundedness are possible, the opponent of scepticism owes us some reason to prefer the second possibility to the first. It is here, we have argued, that constructivism is silent.

Constructivism’s problem is thus the opposite of non-constructivism’s. By allowing augmentation of our PCEs in light of novel experiences, non-constructivism avoids scepticism but entails relativism. By disallowing such augmentation,
constructivism imprisons us within the conceptual schemes of our Pleistocene ancestors, and there is every reason to believe that such a scheme would be inadequate for True Science.

5. A Tale of Two Davidsons
Because Davidson famously argued that incommensurability is impossible, we close by demonstrating that even he is committed to its possibility. We also show that Davidson ultimately can argue against relativism or scepticism but not both.

Davidson’s model of triangulation is non-constructivist:
The teacher is responding to two things: the external situation and the responses of the learner. The learner is responding to two things: the external situation and the responses of the teacher. All these relations are causal. Thus the essential triangle is formed which makes communication about shared objects and events possible.

‘But,’ Davidson continues, ‘it is also this triangle that determines the content of the learner’s words and thoughts when these become complex enough to deserve the term’ (2002, p. 203, his emphasis throughout). Thus words, thoughts, and concepts themselves get their content—or meaning—externally. Elsewhere Davidson connects his views to Putnam’s externalism:

It is now commonplace of the empiricist tradition that we learn our first words … through a conditioning of sounds or verbal behaviour to appropriate bits of matter in the public domain…. But here is the point: this is not just a story about how we learn to use words; it must also be an essential part of an adequate account of what words refer to, and what they mean…. [M]eanings cannot be purely subjective or mental. As Hilary Putnam … put it, ‘meanings ain’t in the head’ (2002, pp. 43–4).

Though differences exist between Davidson and Putnam, each uses his non-constructivism against scepticism. ‘If words and thoughts are, in the most basic cases, necessarily about the sorts of objects and events that commonly caused them, there is no room for Cartesian doubts about the independent existence of such objects and events’
(Davidson 2002, p. 45). That is because words and thoughts would be about, and so mean, what they do based on their external causes. Davidson also explains:

But it does seem to me that if you accept perceptual externalism, there is an easy argument against global scepticism…. If anything is systematically causing certain experiences (or verbal responses), that is what the thoughts and utterances are about…. Anyone who accepts perceptual externalism knows he cannot be systematically deceived about whether there are such things as cows, people, water, stars, and chewing gum (2002, pp. 200–1).

Anyone who accepts semantic externalism likewise knows he cannot be systematically wrong about whether his words refer to such things as cows, people, etc. In fact, Davidson urges,

[w]hat stands in the way of global scepticism of the senses is, in my view, the fact that we must, in the plainest and methodologically most basic cases, take the objects of a belief to be the causes of that belief…. Communication begins where causes converge: your utterance means what mine does if belief in its truth is systematically caused by the same events and objects (2002, p. 151).

This rejection of the Cartesian variety of scepticism transitions into a rejection of the Kantian variety. If we take the objects of our beliefs to be whatever systematically causes them, then we will be capable of thinking about Xs just in case we are capable of establishing the right sorts of causal relations to Xs. Since it is unlikely that there are any objects that we cannot become systematically causally related to, it is unlikely that there are any objects about which we cannot think.15 Thus Davidson’s externalism contains the resources for defanging the Cartesian and Kantian sceptic alike.

Regardless of whether Davidson succeeds, however, even he must admit that not everyone has access to the same worldly events and objects. For the externalist, therefore, as for any non-constructivist, not everyone will have the same concepts, either potentially or actually. This is particularly acute in the case of scientific revolutions that involve the discovery of new phenomena and so the expansion of our ontology. Then our pre- and

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15 See Rellihan (2005), where an argument for this claim is made explicit.
post-revolutionary PCEs would differ markedly. Hence Davidson’s non-constructivism commits him to the possibility of alternative, incommensurable schemes and therefore to Kuhnian relativism.

At other times Davidson seems to endorse constructivism to avoid the possibility of relativism. Recall Davidson’s observation: ‘Kuhn is brilliant at saying what things were like before the revolution using—what else?—our post-revolutionary idiom’ (2001, p. 184). Relativism does not become a factor, Davidson suggests, because we can construct claims made in allegedly incommensurable schemes in light of our own concepts. Though it is unclear why Davidson fails to realize that this leaves the possibility of asymmetrical incommensurability untouched, it is clear that in arguing against relativism Davidson makes no appeal to externalism or other forms of non-constructivism. Further, Davidson contends, to deny the existence of incommensurability is not to deny that some people have conceptual resources not available to everyone. Biologists, aeronautical engineers, solid state physicists, musicologists, cartographers, molecular biologists, selenographers and psychoanalysts all command vocabularies and theories many of us do not. In our more restricted way, we common types also have our specialties…. But they are variants or features we can explain to one another…. Not everyone can grasp the concepts of quantum mechanics—I can’t—but the language of relativistic quantum physics doesn’t represent a different [and so, on Davidson’s view, incommensurable] conceptual scheme (2005, pp. 127–8).

Davidson is right that few can grasp the concepts of quantum physics. Nonetheless, Davidson contends, quantum physicists can explain their claims to others. How would they do so? Few are ever in a position to triangulate the objects (or evidence of the objects, such as particle trails) that quantum physicists triangulate, and the same goes for many of the objects triangulated by biologists, aeronautical engineers, and the like. When Davidson insists that everyone can nonetheless understand these specialists’ claims, he must allow such understanding to occur absent triangulation. On Davidson’s view, however, absent triangulation one could acquire new concepts only by constructing them from old ones—only by formulating the specialist’s concepts in a nonspecialist’s
idiom. For how could quantum physicists explain the concept WAVE-PARTICLE DUALISM to lay persons without formulating it in lay terms? Davidson here then is a constructivist. If the physicist and layperson speak the same language, then they must have the same PCE, and this in turn means that experience, even of quantum mechanical phenomena, does not augment our PCEs. Of course if experience does not augment our PCEs, if PCEs are innately determined instead, then we require some explanation of how we can have access to just those concepts needed for True Science. Davidson’s attempt to avoid Kuhnian relativism therefore introduces the threat of Kantian scepticism.

In retrospect, Davidson’s project of dissolving the ‘dualism of scheme and content’ was doomed from the start. Rejecting the very idea of a conceptual scheme requires rejecting the relativistic possibility of different schemes and the sceptical possibility of an unknowable realm of things-in-themselves that our scheme necessarily fails to fathom. Non-constructivism avoids scepticism by proposing that causal contact with x’s that are F is sufficient to acquire the concept FNESS, thus ensuring our access to concepts required for True Science. But this implies that individuals with different causal relations to the world possess different conceptual schemes; conceptual relativism follows. Constructivism avoids relativism by proposing that all our concepts are either innate or constructed from innate primitives via innate rules, thus ensuring that individuals on either side of a scientific revolution will have the same scheme. This, however, raises the worry of epistemic boundedness and so scepticism about whether our scheme is capable of describing True Science. Thus the possibility of incommensurable schemes is unavoidable. The only choice that we have is whether relativism or scepticism follows in its wake.16

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16 See Goldberg (2004) for independent reasons why Davidson’s argument against incommensurability fails.
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