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Nativism

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Introduction

Nativism has a long intellectual heritage going back at least as far as Plato and the claim that we possess innate knowledge. More recently, it has played a pivotal role in the development of cognitive science, where largely under Chomky's influence, innateness hypotheses have been invoked to explain a broad array of psychological phenomena, including concept acquisition, theory of mind, arithmetic and language. Though there are many interesting issues about the history of nativist thought and its connections to more recent concerns (Scott 1995; Stich 1975; Cowie 1999), in what follows I focus primarily on recent incarnations of nativism and the debates in which they figure.

What is nativism?

Though one could be a nativist about many things, contemporary debates are primarily concerned with a range of issues about the nature and extent of our innate psychological endowment: roughly put, with those mental traits that are acquired in the normal course of development, though not as a result of any kind of learning process. By addressing such issues in sufficient detail, researchers seek to illuminate the nature of our psychological capacities – for language, perception, reasoning, and the like – and to help explain how we come to possess such capacities.

To a first approximation, those positions labeled “nativist” maintain that our innate psychological endowment is relatively rich, whilst those labeled “empiricist” – though “non-nativist” would perhaps be more accurate – advocate a relatively austere conception

of our innate endowment. But “nativism” – and “empiricism” for that matter – is not a label for some single well-defined position, but instead characterizes a broad array of claims. Most obviously, some of these claims are quite *local* in the sense that they concern relatively specific psychological traits, whilst others are *global* in the sense that they are very general claims about the overall composition of the mind.

When used to express a local hypothesis, the term “nativism” is typically used in an explicitly relational fashion: one endorses nativism *about* some trait or class of psychological traits. Typically, what this amounts to is the claim that the trait in question is largely or perhaps entirely innately specified. In contrast, those who advocate empiricism (or non-nativism) about a given trait, claim that it is not innately specified. Clearly, there are many possible nativisms of this local variety. But what is most commonly at issue is the innateness of *concepts* (ONE, OBJECT, IDENTICAL, etc.), *mentally represented bodies of information* (e.g. about physical objects, number and biological kinds), and *psychological mechanisms* (e.g. for language acquisition, reasoning and perception). Some local innateness hypotheses are concerned exclusively with one of the above sorts of structure. But it is equally common for hypotheses to incorporate claims about some combination of psychological structures.

In contrast to local forms of nativism, global nativism involves a claim about the overall nature and extent of our innate psychological endowment. Precisely how such a view should be formulated remains a point of some dispute (Cowie 1999). Some have even suggested that no such view has ever been coherently formulated, let alone defended (Chomsky 2003). But within cognitive science there currently appears to be a widely endorsed – though to be sure, vague and underspecified – general nativist perspective that subsumes a confederation of more specific proposals (Simpson et al. 2005). What such proposals share is a relatively *rich* conception of our innate psychological endowment, where this characteristically involves the following pair of commitments:

- Our minds contain *lots* of innate psychological structure – concepts, bodies of information, psychological mechanisms, biases, and so on.
- Much of this innate structure is *domain specific* – as opposed to domain general – in roughly the sense that it is dedicated to addressing problems with quite specific subject matters – e.g. arithmetic, folk biology, naïve physics, language, and so on.

The two commitments are connected. In particular, contemporary nativists posit lots of innate structure in large measure because they are pessimistic about the prospects explaining our psychological development in terms of domain-general structures and processes. As a consequence, advocates of global nativism contend that a satisfactory account of the human mind is likely to require a large inventory of innate, domain-specific structures.

In contrast to nativism of this global variety, global empiricism advocates a far more austere conception of our innate psychological endowment. Though empiricists seldom reject all innate mental structure – among other things, it is hard to see how learning could occur at all without at least some innate learning mechanisms – they do insist that our minds contain relatively little innate structure (Block 1981). Moreover, they do so in large measure because they think that the acquisition of our mature psychological capacities – for language, reasoning, face recognition, and so on – can be explained without positing much in the way of innate, domain-specific structure. On this view, then, most specialized mental structure is acquired in the course of development, typically by general-purpose or domain-general learning processes. For example, according to one rather extreme version of empiricism, our minds come equipped with little more than a set of innate perceptual systems and a few domain-general learning mechanisms, such as those for induction and associative learning. As a consequence, global empiricists posit far less innate domain-specific structure than their nativist counterparts.

Some arguments for global nativism

Why be a global nativist? Though the case typically rests on the accumulation of evidence for more local innateness hypotheses – some of which we will consider in the third section (“Local nativism: two examples”) – there are also various general arguments that have been influential in motivating nativism about psychological structure. Here are two examples.

Methodological continuity with other sciences

Empiricists suppose that our minds contain relatively little innate structure; and that what specialized structure they have is largely a product of general learning processes. Though deeply entrenched in many regions of social science, nativists often maintain that this assumption is highly implausible. One reason is that research in many adjacent fields of enquiry – e.g. anatomy, physiology, and comparative psychology – would appear to suggest that an organism’s capacities very often depend on innate, specialized systems and structures. Hearts and kidneys, for example, though influenced by environmental factors, are not acquired by some kind of general-purpose learning process but instead result from biological processes of growth. According to Chomsky and others, parity of reason should lead us to the default assumption that mental capacities are similarly dependent on specialized, unlearned systems or “organs” (Chomsky 1980). To assume otherwise, they maintain, is to adopt a view that treats minds as somehow separate from the rest of the biological world.

The above argument, though suggestive, is inconclusive. Empiricists need not reject the demand for mental specialization. Rather, their disagreement with nativists concerns the *extent* of this specialization. For example, they typically acknowledge the need for innate perceptual mechanisms and for systems specialized for learning. What they deny is the need for lots of innate, domain-specific structure. The present objection would thus seem to involve an uncharitable construal of the empiricist position. To put the point bluntly, the present objection is akin to complaining that physiologists of the circulatory system reject innate specialization because they fail to posit *multiple* hearts – say, one for pumping red blood cells and another for pumping white cells. Such a complaint would clearly be misplaced. Likewise, the empiricist will object that the analogous criticism is similarly misplaced. It is not that they reject the existence of mental specialization. It is merely that they deny that it is as extensive as nativists would have us believe.

General computational considerations

Contemporary nativists tend to think of cognitive tasks in general and learning tasks in particular as *computational* problems. But from a computational viewpoint, so the argument continues, cognitive tasks require computational processes that are tailored both to the inputs they receive and the function they are supposed to compute. From this vantage, then, the idea of general-purpose cognitive processes – e.g. for learning – “makes no more sense than the notion of a general-purpose sensing organ” (Gallistel 2007). Compare the following: There is no such thing as a general-purpose sense organ because picking up information from different stimuli – light, sound, chemical etc. – requires organs with structures shaped by the specific properties of the input that they process. According to the present argument, the same is true of learning and cognition.

Again, the argument is inconclusive. For one thing, many empiricists are not computationalists in the relevant sense, but instead endorse some form of associationism about learning and cognition (Gallistel 2007). As a consequence, the relevance of computational considerations is less clear; and debates over the existence of innate structure frequently devolve into disputes over whether or not to be a computationalist about cognition (Samuels 2002). But even if one accepts computationalism, the general argument is hard to sustain without a plethora of specific cases in which learning and cognition plausibly require innate, specialized structure. To assess the case for global nativism, then, we need to turn from theoretical arguments concerned with cognition in general to more specific hypotheses about the existence of innate, domain-specific mental structure.

Local nativism: two examples

Disputes over innateness have emerged in connection with a broad array of psychological phenomena, including our intuitive understanding of the physical world, arithmetic and theory of mind. But it is in relation to language that the issues have been most extensively explored.

Linguistic nativism

To appreciate the character of the debate over linguistic nativism, it is worth first noting some widely shared assumptions about the acquisition of language. Researchers working on language tend to suppose that when acquiring a language one comes to possess an internal grammar – or an internal representation of a grammar – for that language.

(Amongst other things, this helps explain the systematicity and productivity of language.)

Clearly, it is implausible that the grammar possessed by a competent speaker – e.g. a grammar for English as opposed to French or Hindi – is innately specified, since what grammar one acquires depends on which linguistic environment one inhabits.

Nonetheless, in contrast to other organisms, all humans everywhere – save those suffering extreme pathology or environmental deprivation – reliably acquire competence in some natural language within the first few years of life. This suggests, with only a hint of idealization, that humans share some set of innate resources – some *initial state* – that permits the acquisition of a grammar for the language they speak. A central problem for any account of language acquisition is thus to characterize the initial state: those innate resources that reliably enable a grammar to be acquired on the basis of the available environmental information.

What are the options? One broad distinction is between linguistic empiricism, on the one hand, and linguistic nativism, on the other. To a first approximation, linguistic empiricists claim that language acquisition depends on the same innate mechanisms that are responsible for cognitive development in other domains. In contrast, linguistic nativists claim that at least some of the innate resources on which language acquisition depends are specific to the domain of language. Within these broad categories, however, there are many more finely articulated positions that one might occupy. For instance, even if one endorses some version of linguistic nativism, there is still plenty of room for disagreement over the precise nature and extent of our innate language-specific resources. For instance, one claim widely associated with the work of Chomsky and his followers is that humans possess an innate, domain-specific *language faculty* which incorporates a universal grammar: a rich body of innate knowledge that specifies the properties shared by all natural languages (Chomsky 1980). But one might be a linguistic nativist without endorsing the existence of universal grammar. For example, one might think there is an

innate, language-specific learning mechanism or module, whilst also denying that we possess an informationally rich body of innate, language-specific knowledge of the sort associated with universal grammar. Indeed, there are various strands in Chomsky's more recent work – within the so-called “minimalist program” – that would suggest just such a rejection of rich innate knowledge of language (see, for example, Fitch et al. 2005).

Poverty-of-the-stimulus arguments

The debate over linguistic nativism is a largely empirical one; and like other empirical debates, different proposals are assessed in terms of their overall ability to accommodate evidence in a simple, powerful and conservative manner. Here, there are many sorts of evidence that are relevant (Pinker 1994; Cowie 2008). But perhaps the most influential argument for linguistic nativism – and the one that has received most attention from philosophers – is what has come to be known as the *poverty-of-the-stimulus argument* (PoSA).

The PoSA has been formulated in a number of different ways. But the rough idea is that some version of linguistic nativism must be right because the information that children receive from the environment is too impoverished to permit an *empiricist learner* – one lacking any innate, language-specific knowledge, mechanisms or biases – to reliably acquire the grammar for their language (for further details see Cowie [1999, 2008] and Laurence and Margolis [2001]).

Though the PoSA is widely accepted by linguists, it has also been subjected to sustained criticism. One major challenge concerns the issue of what environmentally derived information is available in the course of language acquisition. For example, nativists have tended to suppose that children are seldom provided with negative data – roughly, information about when an utterance is *not* grammatical. But recently this assumption has come under scrutiny; and researchers have argued that such data is both available to and used by children in the course of language development (Chouinard and Clark 2003).

Another major challenge concerns the nature of empiricist learners. Almost everyone agrees that traditional empiricist accounts of language learning, such as those

that have emerged from the behaviorist tradition, are inadequate. But in recent years there has been an explosion of research on statistical learning (Pereira 2000); and some have suggested that this research may form the basis for a satisfactory non-nativist account of language acquisition (Scholz and Pullum 2005).

Though a systematic assessment of these methods is beyond the scope of the present chapter, it's far from clear they undermine the PoSA for linguistic nativism. Recall the following: What the PoSA purports to show is merely that language acquisition requires some set of innate, language-specific structures or biases. But the current state of research on statistical learning seems wholly compatible with this claim. Specifically, our most successful computational models of language learning invariably assume language-specific constraints. For example, they assume some model (or representational scheme) relevant to the domain of language; and they presuppose constraints on the inputs that the learning system receives (e.g. sentences in the target language as opposed to the myriad other kinds of inputs that a learning device might receive). Though there is much more to say on the matter, it is far from clear that without an account of how such constraints are acquired by empiricist learning these models vindicate empiricism as opposed to suggesting a variant on linguistic nativism: one which posits an innate, language-specific statistical learning mechanism or module.

Other arguments

Whether or not PoSAs succeed in establishing linguistic nativism, it is important to stress that such arguments are located within a rich network of other considerations intended to support a nativist view of language. The general idea is that nativist views do better at accommodating this range of data, and for this reason are to be preferred to alternative accounts. Here are few examples of such phenomena.

Linguistic universals

According to many linguists, the existence of linguistic universals – roughly, properties possessed by all possible natural languages – militates in favor of linguistic nativism, since the existence of such universals is readily explained on the assumption that we possess an innate language faculty or universal grammar (Crain et al. 2005). In response, some non-nativists have questioned the assumption that there are any substantive

linguistic universals, noting both that there is considerable variation in what different nativists take the universals to be and, moreover, that many proposed universals turn out on further scrutiny not to be possessed by all natural languages (Tomasello 2004; Newmeyer 2005). Others argue that even if there are universal features of language, it does not follow that such features are innate and specific to language. So, for example, it may be that they reflect facts about the historical development of natural languages –for example, that current world languages share certain features because they evolved from a common ancestral language (Putnam 1971). Alternatively, it may be that linguistic universals do not reflect language-specific features of our minds but instead result from constraints imposed by general facts about cognition. So, for example, it has been variously suggested that they reflect facts about the structure of thought, the character of human memory, or our possession of some general capacity for symbolic communication (Tomasello 2003).

Sensitive periods

Another familiar kind of argument for linguistic nativism turns on the existence of sensitive/critical periods. In brief, though we are capable of learning many things throughout the entire course of our lives, our facility for language acquisition appears to diminish dramatically after the age of about twelve; and in those unfortunate cases where a child is denied any significant access to normal linguistic inputs prior to puberty – as in the case of so-called “wild children” – they appear never to attain a mastery of natural language (Skuse 1993). Nativists maintain that this kind of phenomenon is readily explained on the assumption that we have an innate language faculty with its own specific developmental timetable. Non-nativists have responded in a variety of ways. So, for example, it has been argued that there are methodological problems with the evidence for sensitive periods. Among other things, the case rests largely on evidence from the study of wild children. But according to critics, such evidence is problematic both because there are relatively few well-studied instances of such children, and because in those cases that have been studied, the absence of normal linguistic input is confounded with many other, often more egregious, forms of deprivation.

Developmental disorders

A final consideration in support of linguistic nativism that I consider here concerns the putative existence of various heritable, developmental disorders involving either the selective impairment or sparing of linguistic abilities. For example, it has been claimed that the linguistic abilities of children with Williams syndrome are relatively spared, despite profound deficits in general cognitive capacity ($IQ < 60$) (Pinker 1994, 1999). Conversely, it has been argued that people with a syndrome known as Specific Language Impairment (SLI) exhibit selectively impaired linguistic abilities, despite otherwise normal cognitive capacities (van der Lely, 2005). Nativists argue that the existence of such disorders suggests that some version of linguistic nativism is correct. Specifically, it is argued that the (putative) fact that these genetic disorders involve the selective sparing or impairment of linguistic abilities is most readily explained on the assumption that language depends on innate, domain-specific cognitive structures.

Once more, non-nativists have challenged this line of argument in a variety of ways. Most importantly, it has been argued that, contrary to what some nativists maintain, Williams syndrome, specific language impairment (SLI), and other developmental disorders, do not clearly involve the selective sparing or impairment of linguistic abilities. For example, opponents of the argument maintain that subjects with Williams syndrome not only exhibit a range of syntactic and morphological deficits but also have islands of relatively spared nonlinguistic abilities as well (Karmiloff-Smith, Brown et al. 2003). Similarly, it has been argued that people with SLI not only exhibit language-specific impairments, but also a range of nonlinguistic deficits (Karmiloff-Smith, Scerif et al. 2003).

Nativism about folk psychology

In addition to the case of language, debates over innateness have arisen in connection with a broad array of other cognitive capacities. One that has been of considerable interest to philosophers is our capacity for “mindreading” or folk psychology – i.e. the capacity to attribute beliefs, desires and other mental states to agents (Nichols and Stich 2003). Nativists about mindreading are all committed to the thesis that we possess innate domain-specific psychological structures for folk psychology. But as with linguistic

nativism, nativism about folk psychology can take a variety of forms (Segal 2007). According to some views, for example, we possess both innate domain-specific mechanisms dedicated to folk psychological inference and various explicit representations expressing core folk psychological concepts, such as BELIEF, PRETENCE and DESIRE (Leslie 1994; Scholl and Leslie 1999). Other views assume merely that we possess some limited set of innate, domain-specific conceptual resources for folk psychology that are deployed by domain-general systems for learning and reasoning (Wellman 1990). Finally, some views are largely empiricist in character and posit no innate cognitive structures that are specialized for folk psychology as such. Instead they maintain that the acquisition of our mature mindreading capacities depends largely on general-purpose learning systems, perhaps aided by various low-level perceptual and action-guiding mechanisms – such as devices for detecting eye-direction and for engaging in imitation (Karmiloff-Smith, 1997; Sterelny 2003).

Arguments

As with the case of language, there are many considerations that have been invoked in support of nativism about folk psychology. First, nativists about folk psychology have attempted to provide PoSAs in support of their views (see Segal [2007] for an excellent discussion of such arguments). Second, it has been argued that evidence from autism supports nativism about folk psychology, since the disorder is a genetic one in which even high functioning subjects have a significantly impaired ability to attribute beliefs and other mental states. Third, though the details of folk psychology vary from culture to culture, the “core” capacity to attribute beliefs and desires appears to be a universal human trait (Scholl and Leslie 1999). Finally, recent evidence would appear to suggest that the capacity for mental state attribution emerges very early in development (Onishi and Baillargeon 2005; Surian et al. 2007). Nativists claim that such facts are best explained on the assumption that we possess innate resources specialized for folk psychology.

Unsurprisingly, the above kinds of considerations remain a subject of heated debate. For example, in response to PoSAs, some non-nativists about folk psychology

maintain that we are embedded in environments that provide a rich source of data concerning the nature of mental states (Sterelny 2003). Similarly, in response to the data concerning autism and universality, non-nativists maintain that alternative hypotheses better explain the data (Prinz 2005). The extent to which our folk psychological capacities depend on innate domain-specific structure thus remains a topic of active and ongoing debate.

Some arguments for global empiricism

As we have already seen, most contemporary research into our innate psychological endowment is concerned with quite specific empirical hypotheses. Even so, just as nativists have sought to make their views plausible on the basis of quite general considerations, empiricists have developed similarly general arguments against nativism.

Perhaps the most well known of these arguments is the *argument from cultural variability*. This argument was commonplace in the work of mid-twentieth-century anthropologists, such as Margaret Mead and Franz Boas; and it continues to command widespread acceptance in many areas of the social sciences. According to the argument, when we survey the anthropological record, we see enormous variation in human psychology and behavior: in technology, languages, social conventions, emotional responses, gender relations, religious practices, and so on. But this kind of malleability would not occur, it is claimed, if our minds possessed a rich innate structure. Instead, we should expect substantial uniformity across cultures. Thus advocates of the argument conclude that biology imposes few constraints on our mental development and that our minds are (almost) entirely the products of our environments. As Mead famously claimed, “we are forced to conclude that human nature is almost unbelievably malleable, responding accurately and consistently to contrasting cultural conditions” (Mead 1935 : 280).

Nativists have responded to the argument from cultural variability in a number of ways. One common response is that the argument overstates the extent of cultural differences. Though there is, of course, considerable cross-cultural variation, there are also literally hundreds of pan-cultural “human universals” – characteristics of behavior and cognition that appear stable across all cultures (Brown 1991, 2000). So far as we

know, for example, all cultures communicate in a natural language, engage in religious/spiritual practices, categorize flora and fauna, have beliefs about the minds of others, and so on. Second, nativists argue that the observed cultural variability is wholly compatible with the existence of a rich innate psychology. What the anthropological record suggests is that there is considerable variability in *overt* responses. But for all the argument shows, these different outputs could be produced by richly structured innate mechanisms that produce different responses under different environmental circumstances (Tooby and Cosmides 1992). Indeed, it is widely assumed by nativists that many innate structures –those for vision and language, for example – exhibit precisely this sort of sensitivity to environmental inputs.

Another, though rather different, objection to nativism is sometimes called the “*gene shortage*” argument (Marcus 2004). According to this argument, the human genome is too small to allow for much innate psychological structure (Bates et al. 1998; Ehrlich and Feldman 2003). For while we have only about 30,000 genes, our brains contain literally billions of neurons. In which case, it is unlikely that the fine-grained structure of the brain is strongly influenced by genetic factors; and since cognition depends on this fine-grained organization, it is thereby unlikely that it is under genetic control. In which case, though genes may be responsible for the general morphology of the human brain, it is very unlikely that much cognitive structure is innate specified.

What are we to make of this argument? One initial observation is that the argument clearly shows too much. For if it were sound, then exactly analogous considerations would also show that kidneys, lungs, legs and the like are not innate. Such physiological structures also contain many more cells than there are human genes. But this alone surely doesn’t show that such structures are not innate. On the contrary, they are prototypical examples of what nativists have in mind when speaking of innate structures. Now what the argument may well show is that brains are not solely a product of genetic factors and that the structure/function of each neuron is not coded in the genome. But this should be no cause of concern for nativism, since no (sane) nativist would endorse such a view. On the contrary, nativists routinely accept the banal interactionist thesis that cognitive development – as with every other aspect of human

development – depends on both innate and environmental factors. In short: the present argument only succeeds in refuting a view that no one actually endorses.

What is Innateness?

Most debates over nativism in psychology and cognitive science proceed under the assumption that the notion of innateness is clear enough to permit the framing of substantive empirical issues. But there are, in fact, considerable difficulties with trying to understand what innateness is; and some prominent theorists have suggested that the very concept is “fundamentally confused” (Bateson 2000; Griffiths 2002). If such a claim could be sustained, it would appear to have important implications for psychological research. For not only would it undermine nativism in its various forms, it would also threaten the main empiricist alternatives, since they too presuppose the coherence of the innateness concept (Samuels 2007).

One standard reason for claiming that innateness is a confused concept is that it is said to confound several properties under a single term: properties that are neither co-extensive nor, by themselves, adequate to characterize what we mean by “innate.” So, for instance, it is sometimes claimed that innate traits are ones that are *present at birth*, even though presence at birth is neither necessary nor sufficient for innateness. It is not sufficient because prenatal learning is possible (Gottlieb 1997); and it is not necessary because, as Descartes observed long ago, innate characteristics can be acquired quite late in development. (Illustration: Secondary sexual characteristics are plausibly innate but clearly not present at birth.) Similarly, it is sometimes said that innate traits are solely the products of internal (including genetic) causes, even though this is clearly not necessary for innateness, since, like all contemporary theorists, nativists wholeheartedly accept the banal thesis that cognitive traits are caused jointly by internal *and* environmental factors.

In view of the problems with standard claims about innateness, theorists have responded in a variety of ways. One response is to conclude that innateness is a confused concept, and map out the implications of this for future psychological research (Mameli and Bateson 2006). Another response is to try and make systematic sense of the notion of innateness that figures in psychology and allied sciences. Though there is not the space

here to discuss the issue at great length, a number of proposals seem worthy of further consideration.

Innateness as canalization

One such view invokes the notion of environmental *canalization* (Waddington 1940). According to this proposal, a trait of an organism (with a given genotype G) is innate to the extent that it is environmentally canalized in organisms with G; and the trait is highly canalized to the extent that its development is insensitive to the range of environmental conditions under which it emerges (Ariew 1999). So, for example, my possession of legs is (highly) innate on this view because, for organisms with the same genotype as me, the development of legs is highly insensitive to variation in environmental conditions.

The canalization account of innateness has been criticized on several grounds. One standard concern, for example, is that it threatens to trivialize debate over innateness (Cowie 1999). The worry is, in brief, that assessments of canalization depend on what sorts of environmental variability one takes to be relevant to the process at hand; and this, in turn, appears to depend on the explanatory interests of those who use the concept of canalization in the first place. (Example: The development of normal facial features is likely to seem more highly canalized where we are interested only in those environments capable of sustaining human life than it will to, say, an obstetrician interested in a wide a range of *in utero* environments, many of which may interfere with normal facial development.) The concern is thus that disputes over innateness end up merely reflecting differences of explanatory emphasis.

For the present objection to pose a genuine obstacle to understanding nativist/empiricist debates in terms of canalization, however, it would need to be the case that these debates do, in fact, turn on such differences in explanatory emphasis (Segal 2007). Fortunately for the canalization account, it is unclear that this is so. On the contrary, it would seem that whilst nativists and empiricists disagree about the processes responsible for psychological development, they nevertheless share much the same assumptions about which range of environments is relevant to understanding such processes (Segal 2007). Thus it is far from clear that the canalization account does trivialize the debate between nativists and empiricists.

Innateness as psychological primitiveness

A second approach to understanding the notion of innateness as it figures in contemporary nativist/empiricist debates is one that invokes the notion of *psychological primitiveness* (Cowie 1999; Samuels 2002). According to this view, innate psychological traits are primitive in roughly the sense that they are (a) acquired in the normal course of development, whilst (b) not being acquired by any kind of psychological process, such as perception or inference. Or to put the point slightly differently, according to the present view, the innate mind consists of those reliably developing psychological traits whose acquisition psychology cannot explain.

One virtue of the psychological primitiveness account is that it explains the peculiar significance of innateness hypotheses to psychology and cognitive science. Though many areas of biology have dispensed with the notion of innateness altogether – in large measure because it plays no useful theoretical role – it continues to have widespread application in psychology and cognitive science (Johnson 1997). Why is this? One possibility is that it results from an unfortunate oversight that should be remedied immediately (Griffiths 2002). But if the present proposal is correct, then the notion of innateness in fact functions to frame two issues of genuine importance to psychology and cognitive science. First, it delimits the scope of psychological explanation: once we know that a given structure is innate, we also know that our scientific psychology should not – indeed cannot – explain how it was acquired, and that we must instead look to biology or some other science for an explanation. Second, discovering which structures are innate also furnishes us with the resources – the “building blocks” – from which to construct developmental psychological theories. Such theories must – on pain of regress – presuppose the existence of structures whose acquisition is not explained by psychology. So, if we know that a given structure is innate, then it can be invoked by psychological theories to explain the development of other psychological traits.

As with the canalization view of innateness, the primitiveness account has also been subject to a variety of criticisms. One common complaint, for example, is that it invokes an unduly vague notion of normal development (Mameli and Bateson 2006). There is something to this. Clearly, there are many possible notions of normalcy that might be invoked here. But one should be careful not to overplay the point. Though it

would no doubt be desirable to provide a more precise account of normalcy, it is unclear that the task is any more pressing here than it is in understanding the claims made in many other areas of science. All sciences – with the possible exception of physics – typically assume some largely unarticulated set of normal conditions in formulating their laws and generalizations. In the jargon of philosophy, they are *ceteris paribus* generalizations that apply only when all else is equal (Carroll 2003). According to the present view, much the same is true of innateness hypotheses in developmental psychology and other areas of cognitive science. In effect, they are generalizations that, like virtually all other scientific generalizations, tacitly assume some set of background normal conditions. So, for example, the claim that humans possess an innate object concept is tantamount to the claim that, *ceteris paribus* – i.e. given standard background conditions – humans acquire the object concept via some non-psychological process. On this view, then, notions of normalcy are no more important to understanding innateness hypotheses in cognitive science than they are to understanding hypotheses in geology, economics, or, for that matter, aerodynamics.

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