Karmiloff-Smith and Nativism

In a series of recent papers Annette Karmiloff-Smith presents a sustained challenge to nativist models of cognition and cognitive development (e.g., Karmiloff-Smith 1997, 1998, 2000; Paterson et al. 1999; Laing et al. 2002; Thomas and Karmiloff-Smith 2002). Karmiloff-Smith bases her challenge primarily on data from a series of experiments on the cognitive abilities of infants, children and young adults with Williams syndrome. She claims that results from these experiments undermine (1) the specific nativist proposal that neonate cognition has a genetically prespecified, highly domain-specific, modular structure, and (2) general methodological aspects of the nativist program as a whole. Instead, she claims, it is “the process of development (that is ontogeny itself)” (20001, p. 145) that progressively creates such modular cognition, and that ‘neuroconstructivism’ is best placed to explain how this creation occurs, particularly in atypical development. In this paper I examine Karmiloff-Smith’s claims, and consider whether they do indeed present a significant challenge to nativist models. What I show is that the arguments Karmiloff-Smith provides do not present the kind of challenge to nativism which she believes. In particular, I show that Karmiloff-Smith’s challenge fails because her interpretation of nativism is both uncharitable and unnecessarily burdensome to the nativist: it is not entailed either by individual nativist’s claims or by typical nativist practice, and there are other interpretations of nativism which can address the challenge she presents. I conclude therefore nativists need not and should not be newly, unduly or unexpectedly worried by Karmiloff-Smith’s claims.

1. Karmiloff-Smith’s Claims

1.1 Staunch Nativism

Karmiloff-Smith’s primary target is what she frequently terms staunch nativism, a position she explicitly contrasts with both empiricism and the

---

1 All references in this paper without a name are to Karmiloff-Smith.
neuroconstructivism which she herself wishes to defend (1998). According to Karmiloff-Smith: “For the staunch nativist, a set of genes specifically targets domain-specific modules as the end product of their epigenesis” (1998, p. 389). Staunch nativists “argue for mosaic development. It is under tight genetic control, fast, involves the independent development of different parts of the system and is fine under optimal conditions. However, more or less everything must be specified in advance and there are upper bounds on complexity” (2000, p. 153). Moreover, staunch nativism is a “non-developmental view” (1998, p. 389) in which “the notion of the ‘environment’ is a static one” (1998, p. 390) wherein the environment “simply acts as a trigger” (1998, p. 390) to set genetically pre-specified parameters. For the staunch nativist, “domain specificity is the starting point of ontogenesis, and development relegated to a relatively secondary role” (1998, p. 390). Correspondingly, cognitive development consists in the development of “domain-specific mechanisms within innately specified modules” (1998, p. 390), mechanisms which are themselves “dedicated to the exclusive processing of one and only one kind of input” (1998, p. 390). In other words, staunch nativists claim that neonate cognition consists in genetically pre-specified, domain-specific modules which develop along predetermined, mutually independent pathways, and for which the environment acts simply to trigger the operation of mechanisms in such modules.

Karmiloff-Smith claims that staunch nativists defend their view in various ways, including by reference to atypical cognitive development. In particular, staunch nativists (she claims) argue that cognitive dissociations observed in children with developmental disorders such as Williams Syndrome, Autism or Specific Language Impairment show that “atypically developing children start out with a fractionated pattern of impaired and intact modules” (Paterson et al. 1999, p. 2355) similar to patterns observed in certain brain-damaged adults. Such apparent similarity results in “the notion of direct damage to innately-specified cognitive modules [being] invoked by strict (sic) nativists to explain developmental disorders” (1998, p. 391), and thus staunch nativists use such explanations “to bolster theoretical arguments in favour of the prespecified modular structure of the human mind/brain” (Paterson et al. 1999, p.

2 Despite the explicit contrasts in (1998), some work is required to determine exactly what ‘staunch nativism’ is, not least because Karmiloff-Smith also uses the terms ‘strict nativism’ and simply ‘nativism’ in her writing. However, it seems from her overall position that all critical references to some form of nativism are to ‘staunch nativism’, so I shall read her this way throughout.
In other words, staunch nativists claim that the similarities between disordered cognitive performance in cases of atypical development (on the one hand) and brain-damage after typical development (on the other) strongly support the staunch nativists’ model of neonate cognitive structure.

This provides us with an outline of the ‘staunch nativism’ Karmiloff-Smith wishes to attack. Detailed discussion of this notion, and of the relation this notion bears to nativism as endorsed by practicing nativists, will be the subject of the section 2.

1.2 The Problems

The evidence that Karmiloff-Smith marshals against staunch nativism comes largely from several co-authored studies into the cognitive abilities of infants, children and young adults with Williams syndrome. Williams syndrome (WS) is a rare genetic disorder occurring in 1 in 20,000 live births, and is caused by a hemizygous microdeletion of 17 contiguous genes on the long arm of chromosome 7. Characteristics of the WS phenotype include facial dysmorphia, congenital heart and renal disorders, moderate to severe mental retardation, and, most importantly for our purposes, an uneven and distinctive cognitive profile in which aspects of language performance and social interaction appear relatively good, but many other cognitive functions such as spatial cognition, number and problem solving appear impaired (1998, 2002, citing various sources).

Karmiloff-Smith et al.’s studies of WS are detailed and numerous, and it would be impossible to present all of their empirical results and conclusions here. However, Karmiloff-Smith argues that her data generate four significant Problems for staunch nativism, Problems which concern what I shall call Starting Points, Whole Modules, Comparisons, and Explanatory Levels:

1. The Starting Points Problem is that, according to Karmiloff-Smith, the cognitive modules found in normal adult humans do not develop from modular ontogenetic origins. In other words, Karmiloff-Smith agrees with staunch nativists that adult cognition is (at least) partially
module, but claims her results show that, contrary to staunch nativism, neonate cognition is not modular: “Where modules do exist in the adult end state, they are likely to be the product of a developmental trajectory (in both the normal and atypical cases), and not its starting point” (Paterson et al. 1999, p. 2357).

2. The **Whole Modules** Problem is that, according to Karmiloff-Smith, staunch nativists mistakenly claim that cognition in those with developmental disorders such as WS consists in cognitive modules which have been preserved or damaged whole. Karmiloff-Smith argues that her data show that, contrary to staunch nativism, “[i]t is unlikely that atypical development will be explicable in terms of preserved or damaged whole modules” (2000, p. 151), even if such explanation is appropriate for the cognitive profiles of brain-damaged adults.

3. The **Comparisons** Problem is that, according to Karmiloff-Smith, staunch nativists cannot validly draw their conclusions concerning the modular pre-specification of *normal* infant cognition and cognitive development from comparative work involving children and adults with *developmental disorders*. Karmiloff-Smith claims that “where normal behavioural levels are found in a developmental disorder in a given domain, they might be achieved by different cognitive processes” (1998, p. 391) and that for certain language and face-processing tasks “children and adults with WS [do indeed] reach behavioural mastery via different processes from normal controls” (2000, p. 149). Thus, she claims, “cognitive scientists, neuroscientists, and philosophers of mind cannot use the purported sparing or impairment of a cognitive function in middle childhood or adulthood to support the claim that cognitive modules are innately specified in infancy” (Paterson et al. 1999, p. 2357).

4. The **Explanatory Levels** Problem is that, according to Karmiloff-Smith, staunch nativists investigate cognitive development with too
narrow a research focus. Staunch nativists, she claims, approach cognitive development almost exclusively at the cognitive level, and such an approach is a mistake. Instead, she argues, the successes of ‘neuroconstructivism’ show that developmental disorders must be approached “simultaneously at multiple levels: the genetic, the brain in its spatial and temporal dynamics, the cognitive, the environmental and the behavioural…because the dynamics of development itself are the key to understanding developmental disorders” (1998, pp. 397-8).

Karmiloff-Smith believes each of these Problems presents a serious challenge to either the staunch nativist model of infant cognition, or to certain central aspects of staunch nativists’ research program, or both. And we can see that this certainly appears to be the case. The **Starting Points and Whole Modules** Problems challenge staunch nativists’ claims that domain-specific modules are specified at birth and that atypical development should be explained by the presence or absence of such modules. The **Comparisons** Problem challenges the use of atypical development to defend both of these specific claims, and also undermines staunch nativist methodology regarding more general use of results from atypical cognitive development in explanations of normal development. Finally, the **Explanatory Levels** Problem challenges the overall investigative approach of the staunch nativist program. Karmiloff-Smith’s Problems therefore do indeed present serious *prima facie* difficulty for staunch nativists. But, of course, this is only significant *for nativism in cognitive science* if either staunch nativism is the kind of nativism to which any practising nativists subscribe, or (if it is not, then) if Karmiloff-Smith’s Problems also cause difficulties for the kinds of nativism to which practising nativists do subscribe. I claim, however, that neither of these conditions hold.

The rest of this paper will show why this is so. In sections 2 and 3 I show that Karmiloff-Smith’s ‘staunch’ interpretation of nativism is not entailed either by claims made by particular nativists – including those nativists which Karmiloff-Smith herself cites as exemplars of staunch nativism – or by typical nativist practice. Then, in sections 4 and 5, I show that other interpretations of nativism can successfully avoid, address or dissolve the Problems Karmiloff-Smith presents. I then conclude, in
section 6, with a brief discussion of how the nativist program should proceed in the light of the previous sections.

There is much that one might question concerning Karmiloff-Smith’s claims. Helen Tager-Flusberg, for example, has in recent work listed a number of methodological shortcomings of Karmiloff-Smith’s research which, Tager-Flusberg argues, have a significant impact on the extent to which Karmiloff-Smith’s results should be accepted as accurate (Tager-Flusberg and Sullivan 2000; Tager-Flusberg in prep.). One might also question the extent to which Karmiloff-Smith’s experimental results support the theoretical claims upon which some of her Problems are based. However, for the purposes of my paper I am willing to grant Karmiloff-Smith all this. What I will show, then, is that even if Karmiloff-Smith’s studies are sound and her data accurate, nativists have no reason to be newly, unduly or unexpectedly worried by them.

2. Staunch Nativism?

Having grown used to (and no doubt tired of) complaints to the effect that “no nativist ever makes such fundamental claims and that [nativists’] critics are first constructing and then demolishing a myth” (2000, p. 145), Karmiloff-Smith provides various quotes and references in support of her ‘staunch’ interpretation of the nativist position. Now, I will accept that some nativists may have defended staunch nativism with regard to certain cognitive properties in some domains at certain times. However, I will now argue that the references which Karmiloff-Smith provides should not lead us to accept either that staunch nativism is defended by the particular nativists to whom Karmiloff-Smith refers, or that staunch nativism is representative of nativism as it is typically conceived of by most practising nativists. In other words, I will show that despite the references Karmiloff-Smith provides, staunch nativism is a straw man. My reasons are threefold: first, most of Karmiloff-Smith’s references come from the domain of language acquisition; second, Karmiloff-Smith’s use of the word ‘module’ exhibits a fundamental equivocation; and third, many of these references need not and should not be read as ‘staunchly’ as Karmiloff-Smith chooses to do.
2.1 Language and other domains

That Karmiloff-Smith’s references come predominantly from the domain of language acquisition is important because there is no *a priori* reason for the kind of nativism appropriate to linguistic development to be the kind of nativism appropriate to all other domains. For example, even if it were true that in the language domain “syntactic knowledge is in large part innately specified” (2000, p. 145, citing Crain 1991), innate specifications in other cognitive domains could be of, say, much smaller cognitive structures, or of either more general or more specific properties than those which constitute ‘syntactic knowledge’\(^3\). My claim, then, is that these potential cross-domain differences between nativists’ proposals serve both to undermine Karmiloff-Smith’s presentation of staunch nativism as representative of nativism in general, and to illuminate a more general methodological problem with her anti-nativist arguments.

Karmiloff-Smith’s focus on nativists’ claims in the domain of language acquisition is not unmotivated, of course. Nativists consider this domain to be the source of many of their most powerful arguments, so strikes at linguistic nativism are strikes at the historical and empirical heart of the nativist program (e.g., Chomsky 1965, 1980; Pinker 1994). In addition, linguistic development is quite probably the research domain in which both nativists and their opponents have undertaken the greatest amount of detailed study. It is, therefore, the domain in which nativists have made their clearest, strongest and most detailed claims. Moreover, if Karmiloff-Smith’s target were nativism only in the linguistic case then choosing nativist references predominantly from the linguistic domain would be fine. Similarly, were the empirical data which drive her Problems taken predominantly from work on language acquisition, her choice of references would be similarly unproblematic.

However, many of Karmiloff-Smith’s empirical investigations concern cognitive domains other than language, e.g., face processing (2000), and her rhetoric frequently addresses nativism in general (1998). But nativists’ claims can and do differ significantly from domain to domain, and anti-nativist arguments derived from

\(^3\) In fact, it is no easy matter to see how we should (or could) compare the size or granularity of potentially innate properties from different cognitive domains. However, as this difficulty merely strengthens the case *against* Karmiloff-Smith generalising from language-specific (or other domain-specific) conclusions I will suppose, in her favour, that such comparisons can somehow be made.
empirical studies in one domain, e.g., face-processing, need not carry over to the linguistic domain or to nativism in general. Similarly, nativists’ claims in the domains of, e.g., face processing or naïve physics may well be correct even if those in the domain of language turn out not to be. Moreover, nativists such as Jerry Fodor might well embrace anti-nativist data concerning cognitive domains other than language because these data might offer support to his claim that the only cognitive modules, innate or otherwise, are those input/output modules dedicated to our primary senses and to language (e.g., Fodor 1983, 2000). In short, nativists’ claims in any cognitive domain will ultimately stand or fall of their own accord, and it is therefore important to observe and respect the differences between claims made in each domain. Nativist references taken from the linguistic domain are simply not generalisable to other domains or to nativism in general to the extent that Karmiloff-Smith suggests. Thus whilst Karmiloff-Smith presents both linguistic nativism and the problems she claims such nativism faces as properly representative of the nativist program as a whole, such a presentation is in fact somewhat misleading. So even if the references Karmiloff-Smith provides were to support her staunch interpretation of linguistic nativism, we should not accept this staunch interpretation as representative of nativism as a whole. Nor, more generally, need we accept that the data she provides speak directly to nativists’ claims in domains other than those from which the data were derived.

2.2 The word ‘module’

More significantly, Karmiloff-Smith’s use of the term ‘module’ exhibits deeply problematic equivocation. As we saw in 1.1, Karmiloff-Smith claims that staunch nativists believe that “a set of genes specifically targets domain-specific modules as the end product of their epigenesis” (1998, p. 389). To support this claim Karmiloff-Smith refers to particular nativists who argue that ‘specific genes target’ such structures as

These references clearly support Karmiloff-Smith’s claim. Equally clearly, however, the term ‘module’ is used in this context to refer to quite specific cognitive structures, structures which themselves (perhaps) form part of a larger ‘language module’ acquired during normal development. In other words, these references do not claim that cognitive structures such as, for example, the ‘language module’ or the ‘face-processing module’ are the specific targets of particular sets of genes.

However, Karmiloff-Smith also claims that staunch nativists believe that structures such as the ‘language module’ and the ‘face-processing module’ are equally pre-specified:

Nativists…assert…that the human brain is innately pre-specified not only for low-level perceptual processes such as vision, but also for such higher-level cognitive functions as the capacity to acquire and use language and number, and to recognise faces. Furthermore, they argue that each mental domain functions independently of the others. This domain specificity is often referred to as ‘the modular view of the mind’.

(2000, p. 144)

In other words, Karmiloff-Smith claims that staunch nativists believe that in normal development:

(a) ‘a set of genes specifically targets’ structures such as the ‘morphological module’, and
(b) structures such as the ‘language module’ are innately pre-specified.

Now, staunch nativists may indeed believe both (a) and (b). However, (a) and (b) are clearly quite different claims. Even if we accept ‘innately pre-specified’ as equivalent to ‘genetically targeted’ (and I will argue against accepting this equivalence in section 3), the cognitive structures involved in each claim are clearly distinct. Structures such as the ‘morphological module’ or the ‘module for canonical linkage rules in grammar’ are constituent parts of a larger ‘language module’. Thus whilst these structures are clearly closely related, they are also distinct from the
perspective of explaining the architecture and development of cognition. To refer to all of these structures as ‘modules’ is therefore to invite equivocation and confusion⁴.

The importance of distinguishing between these two kinds of structure becomes clear when we turn to Karmiloff-Smith’s claims about staunch nativists’ explanations and exploitations of atypical development. Karmiloff-Smith claims repeatedly that staunch nativists use apparent damage to cognitive modules to develop and defend their explanations of both typical and atypical cognitive development:

the notion of direct damage to innately-specified cognitive modules [is] invoked by strict (sic) nativists to explain developmental disorders

(1998, p. 391)

Many [nativist] theorists have used [the] uneven pattern of abilities and impairments in WS to support claims about the existence of innately specified cognitive modules, some of which are spared (language and face-processing) and others impaired (number and visuospatial processing).

(Paterson et al. 1999, p. 2355)

Again, Karmiloff-Smith may be correct to claim that staunch nativists argue in this way. However, the architectural distinction between the ‘language module’ and the ‘morphological module’ now becomes crucial. Staunch nativists claim (at most) that specific instances of genetic preservation or damage result in preservation of or damage to the particular cognitive structures which are the targets of such genes in normal development. In other words, staunch nativists claim that certain genetic damage (say) results in damage to the ‘morphological module’ or the ‘module for canonical linkage rules in grammar’. Such claims are equivalent to the claim that genetic damage or preservation results in partial damage to or preservation of structures such as the ‘language module’. Thus whilst staunch nativists do claim that genetic damage and preservation results in damage to and preservation of structures such as the ‘language module’, such damage or preservation is of particular parts of this kind of structure. Keeping in mind the architectural distinctions between

⁴ Note that my concern here is about the use of the term ‘module’, rather than what modules really are. That is, it is about which structures are being called ‘modules’ in the debate I am discussing, and not what the necessary and sufficient conditions for modules actually are (and/or whether the structures concerned satisfy them). These latter questions are important in the overall study of cognitive development but as they are not germane to the discussion in this paper I have set them aside.
‘morphological’ and ‘language’ modules is therefore essential to understanding properly the staunch nativist position (as presented by Karmiloff-Smith).

That such equivocation may cause conceptual confusion is problematic enough. But my point here concerns more than just Karmiloff-Smith’s terminology. Recall the Whole Modules Problem: the claim that “it is unlikely that atypical development will be explicable in terms of preserved or damaged whole modules” (2000, p. 151, my emphasis). Karmiloff-Smith derives the Whole Modules Problem from data showing that, for example, children with WS perform similarly to normal controls on many face-processing tasks but employ a “feature-by-feature strategy” rather than “configural or holistic processes” (2000, pp. 149-50) in order to do so. In the light of such results Karmiloff-Smith concludes that successful face-processing behaviour by those with WS “cannot be invoked to argue in favour of a preserved, innately specified face-processing module, even if such a module might normally exist” (2000, p. 150). Similar kinds of results concerning the linguistic performance of those with WS show that “people with WS do not simply call on an intact language module fashioned by evolution and innately specified” (2000, p. 151). As I made clear at the end of section 1, I grant all this.

However, these results and conclusions clearly concern the sorts of modules which are not the sorts of modules about which staunch nativists make genetically specific claims. Staunch nativists, to repeat, are concerned with the parts of such modules (as clearly shown by the references which Karmiloff-Smith herself provides) and what staunch nativists claim is that those with developmental disorders such as WS exhibit systematic, disorder-specific patterns of preservation or impairment for which damage to or preservation of innate, highly-specified cognitive structures such as the ‘morphological module’ provides the best explanation. Results from studies of atypical development which show that structures such as the ‘language module’ are not ‘preserved or damaged whole’ therefore pose no problem for staunch nativists. Such results simply do not aim at the target staunch nativism represents. That is, such results involve the wrong sort of module to present a challenge to staunch nativism.

---

5 Empirical data in support of this claim include results showing that those with WS perform below normal controls on face processing tasks which require configural or holistic processing, but perform above normal controls on tasks, such as identifying upside-down faces, where a feature-by-feature strategy is in fact superior (1997).
Karmiloff-Smith’s **Whole Modules** Problem therefore either aims at a target distinct from that provided by the very nativists she cites, or must in fact refer to cognitive structures much more specific than the ‘language module’. But in the latter case Karmiloff-Smith’s empirical data are largely silent, and the **Whole Modules** Problem therefore lacks sufficient empirical support. Either way, the **Whole Modules** Problem essentially dissolves.

To summarise: Karmiloff-Smith’s equivocation over the term ‘module’ leads her to consider two architecturally distinct staunch nativist claims as one, and thus to misrepresent the claims of the very staunch nativists she cites. Moreover, this equivocation undermines Karmiloff-Smith’s belief that the **Whole Modules** Problem presents a significant challenge to staunch nativists’ claims concerning the relation between genetic and cognitive structure. We thus have good reason not to accept Karmiloff-Smith’s notion of staunch nativism despite the references she provides, and we also have strong reason to think the **Whole Modules** Problem does not present a challenge to staunch nativism when both the Problem and staunch nativism are properly understood.

### 2.3 Too ‘staunchly’ read?

What then of my final claim: that the references Karmiloff-Smith provides need not be read as staunchly as she chooses to read them?\(^6\) Consider first two of the quotes Karmiloff-Smith takes from Steven Pinker (1994):

The mind is likely to contain blueprints for grammatical rules…and a special set of genes that help wire it in place.

If language, the quintessential higher cognitive process, is an instinct, maybe the rest of cognition is a bunch of instincts too – complex circuits designed by natural selection, each dedicated to solving a particular family of problems.

(2000, p. 145)

---

\(^6\) Establishing this claim is also more complicated than might first be thought, this time because the series of quotes Karmiloff-Smith (2000) provides do not have page numbers marked. It is therefore extremely difficult to check either the context of the quotes or the omitted words and phrases. Again I will presume, in Karmiloff-Smith’s favour, that nothing crucial has been obscured.
Clearly Pinker claims there are genes whose primary role is fixing grammatical properties during language acquisition, and that if this claim is correct then there may be genes which play a similar role in other domains. However, note that what Pinker does not claim here is that such genes do all – or even most – of the work. They only help ‘wire it in place’. Nor does he claim that the dedicated, complex circuits in any or all domains are present at birth. Of course, these further claims are consistent with what Pinker says, but there is no requirement that we interpret him in this way in the passages quoted. That is, we need not interpret him as staunchly as Karmiloff-Smith chooses to do.

The same is true of many of the other ‘staunch nativist’ quotes Karmiloff-Smith provides. For example:

We argue that human reasoning is guided by a collection of innate domain-specific systems of knowledge [Carey and Spelke (1994)]

syntactic knowledge is in large part innately specified [Crain 1991]

(2000, p. 145)

Susan Carey and Elizabeth Spelke have clearly and purposely here used the words ‘is guided by’ and not, for example, ‘stauncher’ terms such as ‘is determined by’ or ‘consists in’. Similarly, Stephen Crain leaves open the possibility that a good deal of syntactic knowledge is not innately specified, or even that no syntactic knowledge is fully specified. Moreover, there is no reason to read ‘innate’ and ‘innately specified’ as synonymous with ‘present in detail at birth’ in either case. In other words, neither of these quotes makes nativist claims as staunch as Karmiloff-Smith’s interpretation. Thus whilst Karmiloff-Smith’s staunch nativism is consistent with these quotes, it is once again not entailed by them. Despite the evidence Karmiloff-Smith provides, therefore, Pinker et al. need not be taken as the staunch nativists Karmiloff-Smith claims them to be.

Karmiloff-Smith might now object that my claims here are mere linguistic nit-picking, and that I am exploiting ambiguities in the terms used in order to deflect attention from these authors’ overall positions. After all, these authors must have something specific in mind when using these terms given that terms such as ‘help’ or
‘is guided by’ are ambiguous to the point of vacuity without some more precise interpretation underwriting them. I would argue, however, that whilst these authors clearly do have *something* in mind, it is not at all clear that what they have in mind is the staunch interpretation on which Karmiloff-Smith insists. I could argue for this in a number of ways, including supplying my own selective quotes from these authors which either support my own interpretation or count against Karmiloff-Smith’s. However, this ‘he said, she said’ approach does not seem the most useful here. More profitable, I feel, is to focus on the term ‘innate’ as these and other authors use it. This term appears in many of the references Karmiloff-Smith provides, and clearly plays a central role in both Karmiloff-Smith staunch interpretation of nativism and in nativist claims in general. Understanding what various authors may mean when using the term ‘innate’ will therefore clarify considerably the extent to which Karmiloff-Smith’s staunch interpretation of nativists’ claims is justified. This understanding will also provide a link to, and a sound basis for, the arguments developed in the second half of this paper.

3. The Meanings of ‘Innate’

The term ‘innate’ has a long and torturous history in the biological and cognitive sciences (see, e.g., Lehrman 1953, Stich 1975, Ariew 1999). Recently, Paul Griffiths (2002) has provided a summary of the most prominent or powerful meanings, building on earlier work by Patrick Bateson (1991), Fiona Cowie (1999), Richard Samuels (2002) and others. In combination, these authors argue that that ‘innate’ is or has been used to mean:

1. Present at birth
2. A behavioural difference caused by a genetic difference
3. Adapted over the course of evolution
4. Unchanging throughout development
5. Shared by all members of the species
6. Not learned
7. A distinctly organised system of behaviour driven from within
8. Something that can be taken as given with respect to the set of causal factors currently under investigation
9. Develops in a wide range of environments
10. Not acquired
11. Represented in the genome.

The initial point, of course, is that these meanings are not co-extensive. Traits can be shared by all species members but not present at birth (e.g., human teeth), or unchanging throughout development but not shared by all members of the species (e.g., particular human skin colour), and so on. Failure to separate these meanings has proved to be the source of much confusion and disagreement within and across scientific programs. So too has the mistaken belief that a trait which is innate under one description should (or must) therefore possess most (or all) of the other properties. Moreover, cashing out each of these meanings often increases rather than decreases this confusion. As technological and medical advances decrease the time between conception and viable births it becomes difficult to see exactly what ‘present at birth’ should really mean. Similarly, work on the nature of genetic expression has further complicated what it means to say that a behavioural difference is ‘caused by’ a genetic difference, that a trait is ‘represented in’ the genome, or that a given phenotypic property is genuinely shared by all and only members of a given species. Furthermore, many of the meanings given above implicitly appeal to some kind of environmental or phenotypic norm against which exceptions are to be considered as genuine exceptions and not as evidence that a trait should actually not be considered innate. In fact, these compounded confusions have led Bateson, Griffiths and others to call for the term ‘innate’ to be abandoned in favour of “[s]ubstituting what you actually mean whenever you feel tempted to use the word ‘innate’” (Griffiths 2002, p. 82).

Whether this is a conclusion we should endorse will be discussed below. However, what this briefest of sketches shows us is that Karmiloff-Smith’s ‘staunch nativism’ represents one quite particular version of nativism – a version which combines certain interpretations of ‘innate’ and excludes certain others. Recall that according to Karmiloff-Smith, staunch nativists argue that neonate cognition consists in mutually independent, environmentally triggered, genetically pre-specified,
domain-specific cognitive modules (see 1.1). Thus staunch nativism is a version of nativism which combines meanings 1, 2, 7, and 11 from the list above, together with an understanding of 6 in which triggering is considered distinct from all kinds of learning processes⁷. Having made this combination explicit we can now see that Karmiloff-Smith’s interpretation of nativism is both extremely specific and, more importantly, that it occupies a conceptually extreme location within the space of possible nativist positions.

What I mean by this is that we can now see that staunch nativism represents an extremely strict version of nativism which combines several independent interpretations which are themselves particularly strict. Claims of direct causal links from the genome to certain phenotypic traits (meaning 2), or claims that particular traits develop endogenously (meaning 7), are very strong claims in themselves. As such these claims individually represent quite restrictive interpretations of ‘innate’, interpretations which many nativists are wary of. Though, as Karmiloff-Smith’s references show, sometimes nativists do indeed make such restrictive claims. Combining these claims, however, and then adding the increasingly irrelevant claim that such traits be present at birth, places the resultant interpretation in a position in logical space which few, if any, nativists would wish to defend. Moreover, it moves us to a position which is certainly not one which most nativists actually do defend (see, e.g., Samuels 2002, Griffiths 2002). Thus whilst staunch nativism is indeed one possible interpretation of the nativist program, it need not and should not be considered representative of nativism as a whole. Rather, it should be seen as one of the more extreme interpretations. As such it is also an interpretation which does not represent nativism as typically practised by nativists. Karmiloff-Smith cannot therefore appeal to typical nativist practise to defend ‘staunch nativism’ as an appropriate interpretation of nativism.

Moreover, we can now see that the particular ‘staunch nativists’ to whom Karmiloff-Smith refers need not be interpreted as staunchly as she chooses to do when they use the term ‘innate’. There are very many positions consistent with these

⁷ In fact, Karmiloff-Smith (2000) claims that staunch nativism includes meaning 3 as well, and is thus even stricter than I have presented it. However, as the focus of her criticism in the papers under discussion is the ontogenetic rather than the phylogenetic development of cognitive modules, this meaning can be omitted from the present discussion.
authors’ claim, and most are far less extreme than that which Karmiloff-Smith imposes on them. In addition, these authors may themselves be unclear as to exactly which interpretation(s) they intend when using the term ‘innate’. I do not mean here to defend these authors by making the rather peculiar move of claiming that they make confused or incoherent reference, and thus should not be held to what they claimed. Rather, I mean to observe that theoretical arguments and empirical data have resulted in certain interpretations becoming more (or less) prominent, powerful or applicable subsequent to the references provided – some of which are more than a decade old. We thus have yet more reason not to accept Karmiloff-Smith’s claim that these authors actually intend ‘innate’ to be interpreted as genetically pre-specified, domain-specific, mutually independent and present at birth.

Finally, note also that the interpretive possibilities surrounding the term ‘innate’ further compound the problems discussed in 2.1 concerning carrying over results from one cognitive domain to another, and of moving from domain-specific issues to nativism in general. Properties may indeed be claimed to be ‘innate, but in a different sense’ in different cognitive domains. Debate over the meaning of ‘innate’ therefore provides several reasons to reject Karmiloff-Smith’s staunch interpretation of both individual and more general nativist claims.

3.2 Conclusions on ‘staunch nativism’

In this and the preceding section I have argued that Karmiloff-Smith saddles nativists with one quite particular interpretation of nativism, but that this ‘staunch’ interpretation is inappropriate given both the references which she herself provides from nativist authors and more general nativist use of the term ‘innate’. I conclude therefore that whilst ‘staunch nativism’ may not be entirely ‘a myth’, it should not be considered as an accurate interpretation either of individual nativists’ positions or of the nativist program in general. The staunch nativism which Karmiloff-Smith explicitly challenges is not one with which practising nativists are concerned. The first condition in which Karmiloff-Smith’s Problems would cause new or undue worry for nativist cognitive scientists therefore does not hold. We thus have as yet no reason to believe Karmiloff-Smith’s Problems present any significant difficulty for nativism in cognitive science. Let us therefore now turn to the second possible
condition: that Karmiloff-Smith’s Problems nonetheless cause difficulty for nativism as defended by practising nativists.

4. Innateness as Psychologically Primitive

The previous section showed us that nativists have long been aware of the difficulties which surround the use and meaning of the term ‘innate’. Consequently, ‘innateness’ has been the subject of much analysis within the nativist community, and I shall now focus on one such analysis by Richard Samuels. I will first present an outline of Samuels’ account of ‘innateness’ and nativism and then, in the following section, show how this account can successfully address the Problems Karmiloff-Smith has raised.

Samuels (2002) argues that for certain branches of cognitive science ‘innate’ structures are what he terms psychological primitives. Here’s what he says:

for a cognitive structure to be primitive is for there to be no theory of a certain kind that explains its acquisition. Specifically, let us say that a psychological structure S – e.g., a concept, belief, learning mechanism or module – is a psychological primitive just in case:

1. S is a structure posited by some correct scientific psychological theory
2. There is no correct scientific psychological theory that explains the acquisition of S (in the baseline sense of acquisition)

According to this definition, to say that a cognitive structure is primitive is to claim that, from the perspective of scientific psychology, S needs to be treated as one whose acquisition has no explanation. For although primitive cognitive structures are presumably acquired in the (baseline) sense that they are not possessed by an organism at one time but are possessed at some later time, psychology fails to provide an explanation of how they come to be possessed. Of course, that is not to say that there is no theory whatsoever that explains the acquisition of S. It may be the case and, indeed, presumably is the case that some other branch of science – e.g., neurobiology or molecular chemistry – can provide an explanation. It’s just that psychology cannot furnish us with such a theory.

(Samuels 2002, pp. 246-7)
To a first approximation, then, the account I want to defend is that a psychological structure is innate just in case it is a *psychological primitive*.

(Samuels 2002, p. 247)

In other words, innate cognitive structures are structures which are psychologically primitive in the sense that research in psychology is not intended – and, moreover, *will never be able* – to explain them. Explanations of such structures will instead come from other scientific domains such as, for example, neurobiology or molecular chemistry.

Samuels defends *primitivism* (as he calls it) in several ways. He shows that it satisfies various desiderata which an account of innateness should satisfy; he explains how primitivism relates positively to many other interpretations of innateness; and he discusses the ways in which this interpretation can counter certain problems which it may initially be thought to have. A detailed discussion of all of these strategies is beyond the scope of this paper. However, I will now briefly discuss the aspects of Samuels’ proposals which I feel count most strongly in favour of his interpretation, and which are also the most significant aspects given the aim of addressing Karmiloff-Smith’s Problems with which this paper in concerned.

First, primitivism satisfies two fundamental and widely held constraints on notions of innateness within cognitive science: (a) that if a cognitive structure is learned then it is not innate, and (b) that a cognitive structure’s being innate does not imply that no environmental factors contribute to its acquisition. That primitivism satisfies the first constraint is clear because whilst we may not understand the processes by which many instances of learning occur, one thing of which we are certain is that these processes will be *psychological* processes. Learned cognitive structures will therefore be the (partial) product of psychological processes, and as such cannot be psychological primitives. Learned structure are therefore not innate under primitivism. Satisfaction of the second constraint occurs because primitivism is in fact *neutral about* (Samuels 2002, p. 254) the role played by the environment in the acquisition of psychological *primitives*. That is, primitivism makes no claims one way or the other about the contribution made by environmental factors in the acquisition of structures which are psychologically primitive. That a given
psychological structure is innate is thus no bar to environmental factors being a part of the explanation of the acquisition of such a structure. All that is the case under primitivism is that there is no environment-involving psychological explanation of this acquisition, and this is clearly the case because there is, ex hypothesi, no psychological explanation of any kind. The fundamental constraints on notions of innateness are therefore both satisfied.

Primitivism also accommodates accounts of innateness which make use of the notion of acquisition via some kind of ‘brute-causal’ or triggering process (e.g., Fodor 1981). Whilst here again we may lack adequate specification of the details of such processes, it is clear that however such processes are to be understood, they are certainly to be understood as non-psychological processes. Consequently, psychological structures acquired via a triggering process will be psychologically primitive, and therefore innate under primitivism. Primitivism is therefore consistent with one further significant notion of innateness present in cognitive science.

Furthermore, Samuels claims, primitivism provides an explanation of how and why the notion of innateness is deployed by cognitive scientists and, in part, of why this notion matters to cognitive science. According to Samuels, when cognitive scientists refer to psychological structures as innate they do so because this ‘delimits the explanatory scope of psychological explanation’ (Samuels 2002, p. 256). In other words, cognitive scientists intend reference to ‘innate’ psychological structures to place a methodologically relevant block on research questions – a block which acts to limit the scope of enquiry by marking out what is and is not part of the explananda of scientific psychology. This then means that it is both acceptable and informative to use the notion of innateness when engaged in psychological cognitive science because in so doing one can ‘black box’ certain cognitive structures as the fundamental “building blocks” (Samuels 2002, p. 256) of one’s psychological explanation. The contents of the black boxes are then considered the subject of some other scientific research domain, e.g., neurobiology or molecular chemistry. This ‘black-boxing’ then also serves to illuminate why the notion of innateness matters to cognitive scientists, even though it seems a much less significant notion in many other scientific domains. ‘Innateness’ matters because it provides cognitive science with the building blocks of psychological explanation, and such building blocks are
“of vital importance to anyone who wishes to develop a comprehensive account of human cognition. And since this is the goal of cognitive science, it is clear why cognitive scientists should care about nativism” (Samuels 2002, p. 256). Thus, Samuels concludes, one further virtue of primitivism is that it successfully illuminates both the practice and the underlying motivation of the use of the term ‘innate’ in cognitive science.

Finally, in order to address certain possible objections to his account, Samuels supplements his initial definition of primitivism with what he terms a normalcy condition:

\[ \text{Normalcy Condition: A (token) cognitive structure } S \text{ possessed by organism } O \text{ is innate only if } O \text{ would acquire } S \text{ (in the baseline sense) in the normal course of events.} \]

(Samuels 2002, p. 259)

This condition, Samuels admits, would benefit from some elaboration and clarification. However, the overall idea is clear. Cases of psychological structures gained as a result of, for example, brain lesions, disease or the experimental actions of neuroscientists will not count as innate under primitivism even though the acquisition of such structures has an explanation which lies outside the domain of psychology. This is because the aetiology of such structures in O is not part of the normal development of organisms of the same type as O. In other words, abnormally acquired psychological primitives do not count as innate even though they are psychological primitives precisely because they are abnormally acquired. Exactly how one should define the (ab)normal course of development needs to be spelt out, of course, and I will return to this in the next section. However, the general idea behind the normalcy condition is clear. As, I hope, is the overall shape of Samuels analysis of innateness as psychologically primitive.

---

8 Samuels here explicitly addresses criticism of nativism based on certain results from experimental neuroscience, e.g., Elman et al. (1996), Quartz and Sejnowski (1994). For more detailed discussion see also Samuels (1998).
5. Samuels’ Primitivism and Karmiloff-Smith’s Problems

Samuels’ primitivism may or may not provide an ultimately satisfying account of nativism. It is, however, one of most plausible current candidates, and we should therefore examine how this account fares with regard to Karmiloff-Smith’s Problems. And what I will now show is that primitivism can in fact address all four of these Problems successfully.

5.1 Explanatory Levels

Primitivism enables nativists to defuse the Explanatory Levels Problem almost immediately. Recall that the Explanatory Levels Problem claims that nativist investigation focuses almost exclusively on the cognitive level, and that such an approach is a mistake. Instead, the Problem claims, we should adopt the multi-level approach of ‘neuroconstructivism’, particularly when it comes to investigating atypical development. The primitivist can now reply to the Explanatory Levels Problem by observing that in posing this Problem, Karmiloff-Smith has misunderstood the intended practice of the nativist program. This is because nativists, under primitivism, employ the notion of innateness precisely in order to bracket off Karmiloff-Smith’s ‘multiple levels’ so that they (the nativists) can focus on particular cognitive phenomena associated with the developmental disorder in question. And once this move is made we can see that neuroconstructivism is engaged in a project distinct from that of the nativist and, importantly, one which can equally well be complementary to nativism as in competition with it. Let us see why.

Neuroconstructivists claim that providing an adequate explanation of cognitive development requires the detailed investigation of not only behavioural and cognitive properties, but also of neurobiological properties such as “gene dosage, neuronal formation, neuronal migration, neuronal density, biochemical efficiency affecting firing thresholds, variations in transmitter types, dendritic arborisation, synaptogenesis,….brain chemistry [and] hemispheric asymmetry” (1998, pp. 390-1). However, whilst investigation of these neurobiological properties is clearly relevant to the understanding of development per se, such investigation lies outside of the domain of nativist investigation. More specifically, such investigation is investigation
into the possible contents of the black boxes which instantiate nativists’ psychological primitives. In other words, neuroconstructivism engages in investigation into, and provides subsequent explanations of, the processes by which nativists’ psychological primitives arise. Neuroconstructivism and nativism are therefore engaged in related but clearly distinct explanatory projects. Of course, nativists may be wrong about the dimensions of the boxes which they propose, and neuroconstructivists’ empirical results may show where and why this is so. But this presents no problem for nativism as methodology. Revising explanatory primitives in the light of empirical data has been part of the nativist program all along. Under primitivism therefore, psychological nativists can continue to make claims about ‘what is innate’ in cases of developmental disorder based on the cognitive developmental profiles instantiated by those with such disorders because the ‘other levels’ of explanation are not the nativists’ concern. ‘What is innate’ will be whatever is psychologically primitive when providing a psychological explanation of the developmental disorder being investigated.

This move, however, is open to (at least) the following response: Let us suppose that Samuels’ analysis of nativist practice is correct. Nonetheless, it might still be the case that nativist practice is bad practice, and as such cannot offer adequate explanations of cognitive development. Moreover, one might think that nativist practice is particularly bad practice when it comes to atypical development, not least because primitivism explicitly involves the normalcy condition which atypical development surely violates. In short: whilst primitivism may capture what practising nativists do in the normal case, what they do is in fact inappropriate or unexplanatory, particularly when it comes to understanding atypical development.

---

9 This move can also, I think, address another pervasive feature of Karmiloff-Smith’s writing. Namely, her repeated switching between talk of cognitive states, profiles and structures and talk of brain states, profiles and structures, which gives the impression that what is true of the latter must also be true of the former. However, whilst cognitive properties are no doubt instantiated in (or by) the brain, there is no reason to think that all changes in the latter will result in comparable changes in the former, nor that (ab)normality in the latter entails similar (ab)normality in the former. Thus whilst both these ‘levels’ have important explanatory roles to play, it is also important to observe and maintain the conceptual distinctions between them when providing such explanations. Karmiloff-Smith is not alone in this kind of switching, of course, and many of her nativist opponents do it too. A plague, then, on all their houses.
However, I think this response is itself mistaken, and I also think that understanding why it is mistaken enables us to see how primitivism can successfully address the remaining Problems. Let us therefore first consider the normalcy condition in greater detail.

Samuels introduces the normalcy condition to block the claim that psychological structures acquired as a result of, for example, brain lesions, disease or the experimental actions of neuroscientists must be considered innate under primitivism. And the condition itself refers to the psychological structures which an organism O would acquire ‘in the normal course of events’. Now, it is perhaps unclear exactly how we should cash out the phrase ‘in the normal course of events’. But what is clear, I claim, is that this phrase does precisely the same work in cases of atypical development such as WS as it does in cases of typical development.

To see that this is so, let us compare cases of disordered development in two organisms – O and O* – of type T, where O is subject to, say, brain lesions and where O* has a disorder such as WS. In O’s case, the course of development is clearly not the normal one for organisms of type T. Specifically, O has been subject to an abnormal developmental event such as disease or other trauma which has resulted in lesions in the brain of O. Such events do not happen in the normal course of events for organisms of type T. The normalcy condition has thus been violated. The structures O acquires as a result of the lesions are therefore not innate.

Now contrast this with the second case: Here O* is an atypical variant of type T. Specifically, O* is an organism of type T which has the genetic microdeletion which entails that O* instantiates WS.10 However, whilst O* maybe an atypical variant, the course of O*’s development is the normal one for organisms of type T which have that variation. The normalcy condition has therefore not been violated in this case. The structures O* acquires in the normal course of development for organisms of type T which have O*’s variation are therefore innate.

---

10 Recall that having such a deletion is what it is to have WS, and vice versa. At least, it is as far as the debate which is the focus of this paper is concerned (see s. 1.2).
Thus the normalcy condition applies equally to cases of atypical and typical development, provided that what makes the development atypical is that the organism is a genetic variant of T and not that the organism has been subject to abnormal non-genetic influence. In other words, the normalcy condition claims that the innate structures in particular genetics variant of T are whatever structures those with that particular genetic variation would acquire in the normal course of events for those which are that particular genetic variant of T. Thus for WS, the innate structures in those with WS are whatever structures those with WS would acquire in the normal course of events for those with WS. Primitivism is thus as applicable in cases of developmental disorders such as WS as it is in cases of typical development, normalcy condition included. The question which nativists are answering in cases of atypical development of the kind exemplified by WS is, therefore: ‘what is it that is psychologically primitive in organisms which are exemplars of this particular genetically atypical instance of T?’. And from a methodological perspective this is exactly the same question as is asked in the typical case. It can, therefore, be answered in exactly the same way. The normalcy condition does not therefore preclude primitivism as a way of investigating developmental disorders such as WS.

But what of the primitivist perspective itself? That is, what of the thought that nativism under Samuels’ interpretation fails to offer adequate explanations of cognitive phenomena, perhaps because it has now become a largely descriptive practice for which neuroconstructivism (say) provides the associated explanations. Well, my first response would be that it would be good if this were a real problem. For it would imply that explanation in the domain of psychology is now (almost) complete. Indeed, the reality of such a problem would represent nothing less than the successful end of the psychological science program and this is, of course, the ultimate goal toward which nativists strive (together with many others, of course). However, and unfortunately, I find it unlikely that we really are in this position yet, particularly when it comes to our understanding of atypical development. There is no general agreement over the building blocks of human psychology, nor over how the rest of human psychology is built upon them, nor even over the best tools with which to approach these issues. And this is multiply so for atypical development of the kind exemplified by WS.
Less negatively, the claim that nativists are mistaken to approach development from a predominantly cognitive perspective seems wrong in general. Research at the cognitive level – by many other research programs as much as by nativism – has provided vast quantities of useful results for cognitive science, and even Karmiloff-Smith accepts that the nativist model of development “is fine under optimal conditions” (2000, p. 153; s. 2 above). It therefore seems both that the nativist approach has been a useful one, and that it has not yet outlived its usefulness. And as nativism, under primitivism, is just as applicable to certain kinds of atypical development as it is to typical development, nativists can successfully defuse the Explanatory Levels Problem Karmiloff-Smith has posed. That is, nativists can profitably approach developmental disorders such as WS at the cognitive level whatever the results and, indeed, successes of neuroconstructivism. The Explanatory Levels Problem therefore turns out not to be a problem for nativists at all.

5.2 Whole Modules and Starting Points

We saw in 2.2 that the apparent force of the Whole Modules Problem derives in large part from equivocation and confusion over the term ‘module’. Karmiloff-Smith’s data show that structures such as the ‘language module’ are not ‘preserved or damaged whole’ in atypical development, but it turns out that even staunch nativists do not argue for the ‘wholeness’ of this sort of structure anyway. Indeed, we saw that if nativists (staunch or otherwise) make any claims about ‘wholeness’ at all, then such claims will be made about structures such as the ‘morphological module’. However, Karmiloff-Smith’s data are largely silent on the extent to which these more specific sorts of structures are preserved or damaged in atypical development. It is therefore an open question whether the Whole Modules Problem is sufficiently well motivated to be considered a Problem at all.

Furthermore, let us make explicit what has to be true for the Whole Modules Problem to present a real challenge to nativism as primitivism. It must be the case that:

1) Nativists explain atypical development in terms of wholly preserved or damaged modular psychological primitives, and
2) Karmiloff-Smith *et al.* (or others) have shown that in fact the explanations offered in (1) do not or cannot explain certain aspects of atypical development, and

3) The aspects in (2) are best (or only) explained by positing
   
   i. *partial* damage to or preservation of the modular psychological primitives in (1), and/or

   ii. damage to or preservation of *non-modular* psychological primitives.

But Karmiloff-Smith gives us little reason to believe that any one of (1) to (3) are true – let alone that *all* of them are. So not only is the **Whole Modules** Problem quite plausibly empirically under-motivated, but the requirements for the Problem to pose a real challenge to nativism as primitivism are also unsatisfied. The **Whole Modules** Problem does not therefore present the challenge to nativism that Karmiloff-Smith believes.

A significant issue here, of course, is what it is for a cognitive structure to be a ‘module’ – and thus what any given ‘module’ being preserved or damaged ‘whole’ really consists in. I set this issue aside when discussing the **Whole Modules** Problem in 2.2 (see fn. 6), and will do the same again here. This issue is extremely complex, and proper discussion cannot be provided within the scope of this paper.11 Moreover, this issue is in one sense moot in our discussion of whether primitivism can successfully address Karmiloff-Smith’s Problems. Primitivism is an account of what is required for a cognitive structure to be *innate*. As such, primitivism applies to *any* cognitive structure, modular or otherwise. So in principle one can be a nativist under primitivism without any commitment to ‘modules’ at all. In such a case one would simply be committed to the existence of various innate, non-modular (though perhaps domain-specific) psychological structures. The ‘modular wholeness’ of such structures would therefore no longer be an issue. Alternatively, one might believe that such non-modular structures provide the building blocks of later cognitive modules – a view Karmiloff-Smith seems sometimes to defend (1998, p. 392). Thus under primitivism one can remain a nativist *and* believe in modules, but need not claim that

---

11 Detailed discussion of this issue can be found in, e.g., Fodor (2000) and Samuels (2000).
such modules are innate. Whilst this is a possible position, however, what it amounts to for nativists is a decision to address the Starting Points Problem by simply embracing the conclusion which this Problem proposes.

Recall that the Starting Points Problem is the claim that although normal adult cognition is modular, cognitive modules are unlikely to be the starting point of either typical or atypical developmental trajectories. We have just seen that primitivism allows nativists to accept this claim in principle, entailing that the Starting Points Problem no longer presents nativists with any difficulties at all. However, this acceptance was bought at the cost of denying the existence of innate modules – something which most nativists would be unwilling to do. However, primitivism also enables nativists to address successfully the Starting Points Problem whilst retaining the claim that there are indeed innate modules. This is how:

Under primitivism, nativists agree that modules are unlikely to be the starting point of cognitive development per se. What nativists claim is that such modules are the starting point – the ‘building blocks’ – of psychological explanations of cognitive development. So for any given module the real question is whether that module is itself psychologically primitive, or whether it has developed from other psychological primitives (and therefore how). Indeed, this latter situation is surely the case for modules such as the ‘chess-playing module’ (should one exist), so the fact that some modules are almost certainly not psychological primitives poses no problem for primitivism. The issue is thus which, if any, of the building blocks required for the psychological explanation of ultimately modular cognitive development are themselves modular.

However, there is clearly no requirement that these building blocks be present at the starting point of development. All that need be present at that time are the properties of neurobiology, or molecular chemistry, or genetics, or the environment (or whatever) which are required for explanations of how the modular psychological primitives arise. Cognitive modules need not therefore be present at the ‘starting point of development’ even if they are innate – they need only be present at the starting point of psychological explanations of cognitive development. The absence of such modules at the ‘starting point of development’ therefore presents no significant
difficulties for nativism. What would be a problem for nativism under primitivism is if we have reason to believe that all the cognitive structures which provide the building blocks of psychological explanation turn out to be non-modular. This, however, is not something which Karmiloff-Smith claims to have shown. Nativists can therefore both address the Starting Points Problem and retain their claim that innate cognitive modules exist.

Primitivism thus enable nativists to successfully address both the Whole Modules and Starting Points Problems in several different ways. Each of these ways involves varying commitments concerning the nature of cognitive ‘modules’ and the relation between these ‘modules’ and other non-modular (but perhaps domain-specific) cognitive structures. These commitments need to be cashed out, and much work is still required to complete this. Moreover, nativists must then integrate these results successfully into their model of cognitive development. What I have shown, however, is that this integration is possible in principle, and that Karmiloff-Smith has given us no reason to believe it cannot be done in practice. The Whole Modules and Starting Points Problems therefore present little challenge to nativism under the primitivism account.

5.3 Comparisons

This leaves the Comparisons Problem: the claim that the nature of the differences in cognitive performance between those with developmental disorders and normal controls means that ‘cognitive scientists, neuroscientists, and philosophers of mind cannot use the purported sparing or impairment of a cognitive function in middle childhood or adulthood to support the claim that cognitive modules are innately specified in infancy’.

Now, Karmiloff-Smith is clearly correct when she observes that “where normal behavioural levels are found in a developmental disorder in a given domain, they might be achieved by different cognitive processes” (1998, p. 391). Acknowledging and respecting the distinction between behavioural and cognitive performance is a fundamental principle of all cognitive research. Indeed, this distinction has been the bane of Artificial Intelligence research for the past fifty years.
More significantly, Karmiloff-Smith et al. have shown that for certain tasks the cognitive processes of those with WS do indeed differ from normal controls despite their ‘surface level’ behaviour appearing similar in many respects. For example, children with WS perform similarly to normal controls on many face-processing tasks, but employ a “feature-by-feature strategy” rather than “configural or holistic processes” (2000, pp. 149-50) in order to do so (recall 2.2). Similarly, Karmiloff-Smith et al. have demonstrated that “[f]or numerosity judgment, WS patients do well in infancy but poorly in adulthood, whereas for language, WS patients do poorly in infancy but well in adulthood” (Paterson et al., p. 2357). The cognitive profile of infants with WS thus differs quite significantly – and perhaps therefore surprisingly – from both normal subjects and adults with WS. Finally, Karmiloff-Smith et al.’s results concerning linguistic development show that “people with WS appear to follow a deviant pathway in their language acquisition” (2000, p. 151). That is, language acquisition in those with WS appears to differ significantly from language acquisition in normal controls. These are all significant results, and their value with regard to our understanding cognitive development should not be underemphasised. However, the differences which these results suggest are simply not as problematic for nativism as Karmiloff-Smith believes.

Karmiloff-Smith et al.’s results show that both the developmental profile and the cognitive end-state of those with WS differs more from the normal profile and end-state than was previously known. There are significant differences in both the ontogenetic timings of certain cognitive abilities and the processes by which these abilities are realised. These results tell us, first, that those with WS differ from the norm in more complex ways than was previously thought and, second, that cognitive development is not a simple progression for which an apparently ‘normal’ starting point in infancy is sufficient for subsequent ‘normal’ performance later in life. Karmiloff-Smith et al.’s data fill in some of the details of this complex progression, and she is right to claim that both theorists and clinicians must take account of these details in future work. However, it nonetheless remains the case that those with WS exhibit a characteristic pattern of cognitive development, and one in which occurs

12 Note that a ‘normal’ starting point might still be necessary for ‘normal’ cognitive performance later in life, given that one of the things Karmiloff-Smith et al. have shown is that the cognitive performance of those with WS differs from normal controls even though they exhibit ‘behaviourally’ comparable linguistic skills.
the differential development of domain-specific cognitive structures. And as questions concerning which domain-specific cognitive structures should be considered ‘modules’ are currently unresolved (both in this debate and in cognitive science more generally (recall s. 2.2)), Karmiloff-Smith et al.’s data are consistent with nativist claims that cognitive development exhibits certain forms of modularity. Any challenge that such data might pose to nativist ‘cognitive scientists, neuroscientists, and philosophers of mind’ must therefore concern the ‘innate specification in infancy’ of the structures concerned.

However, nothing in the data which Karmiloff-Smith provides counts against such structures being innately specified under primitivism. Psychological explanations of cognitive development in those with WS may still require modular structures as building blocks, even if Karmiloff-Smith et al. have shown that these building blocks are different from those required to explain typical development. But the fact that this difference exists poses no problem for nativists. We saw in section 5.1 that those with WS are atypical variants of the normal genome. And there is no problem in general for nativists if it turns out that certain (modular) structures are innate in typical instantiations of a genome G and that certain other atypical (modular) structures are innate in atypical variants of G. Indeed, such atypicality is what one might expect to be the case. Thus the fact that what is innate in those with WS is atypical compared to normal development causes nativists no difficulty. Moreover, comparison of Karmiloff-Smith et al.’s data with data from studies of normal development will serve to illuminate just what these atypicalities are, and thus to inform nativists as to what is innate in these atypical cases.

Furthermore, recall that under primitivism the (modular) structures required for explanations of both typical and atypical cognitive development can be ‘innately specified in infancy’ even if such modules are not realised in infancy (s. 5.2). A psychological structure is innate under primitivism if there is no psychological explanation of how that structure is acquired. A given psychological structure can therefore appear earlier or later in WS ontogeny than it does in typical development and yet still be innate for both those with WS and normal controls. All that is required for the structure to be innate in such cases is that there is no psychological explanation of how this structure is acquired by those with WS during typical WS
development and that there is similarly no psychological explanation of how this structure is acquired by normal controls during typical development. In both cases the psychological structures are innate, and comparison of the developmental differences between the normal controls and the WS variants will inform us which structures are innate in each case.

Finally, that fact that innate (modular) structures can appear late in ontogeny means that data on the cognitive performance of children and adults will remain one source of information about innate (modular) structures. Post-infancy evidence from those with developmental disorders can therefore continue to be used by nativists as evidence in support of innate specification in infancy. Such evidence should not be used as the only source, of course, but primitivism makes no claim that it should. What Karmiloff-Smith’s infant data do show is that what is innately specified in WS may well turn out to differ from the norm considerably more than nativists have previously thought. Nativists will therefore have to develop more complex explanations of atypical development than they have thus far. However, such explanations can (and no doubt will) continue to include innately specified (modular) cognitive structures. In sum, primitivism enables nativists to continue to compare typical and atypical development and infant and post-infant cognition to develop and defend nativist models of cognitive development. Thus even if we accept the empirical data which Karmiloff-Smith et al. provide, the Comparisons Problem does not challenge nativist practice to the extent that Karmiloff-Smith claims. Primitivism can therefore successfully address the Comparisons Problem also.

5.4 A Better Explanation?

One response to the preceding sections might be to claim that I offer too highly abstract a defence of nativism. That is, one might think that whilst primitivism enables nativists to explain cognitive development in theory, Karmiloff-Smith et al. have a more successful non-nativist explanation in actuality. However, if they do have one, it is not present in the writings under discussion. What are present are claims such as:
This leads to an important speculation: domain-specific outcomes might not even be possible without the process of development itself.

(1998, p. 392, my emphasis)

With respect to number development, for instance, [Down Syndrome] infants may lack the initial domain-specific prerequisites, whereas for WS infants it is the subsequent process of learning that explains phenotypic outcomes in the end state.

(Paterson et al. 1999, p. 2357, my emphasis)

One could claim that the face-processing module was only ‘turned on’ at twelve months, i.e., that it is under maturational control. But surely a more parsimonious and more likely explanation is that by twelve months the infant has had sufficient experience of faces to cause the microcircuits in the neocortex to become progressively specialised and localised.

(2000, p. 152, my emphasis)

But these claims do not refer to – let alone provide – actual explanations which are superior to nativist proposals. The phrases ‘process of development’ or ‘process of learning’ are largely place-holding descriptions which require substantial filling in if they are to be explanatorily adequate. Karmiloff-Smith accepts this, I believe, as her language here is often speculative and seems intended to motivate further research aimed at supplying the required details. However, some of nativism’s strongest arguments – those from the ‘Poverty of the Stimulus’ – are direct demonstrations that in certain domains such filling in simply cannot be done without the existence of much innate ‘modular’ cognitive structure (Pinker 1997; Crain and Pietroski 2001; Laurence and Margolis 2001).

Similarly, the developmental profile of the ‘microcircuits of the neocortex’ can provide no psychological explanation of cognitive development. In fact, Karmiloff-Smith’s claim that neocortical development does provide such an explanation gives explicit illustration of how the conflation of ‘multiple levels’ of investigation can cause explanatory confusion (see fn. 9). Karmiloff-Smith’s claims about the neocortex may be true, but this fact simply cannot serve to rebut the (nativist) psychological proposals in the sentence that precedes these claims. No-one denies that some neo-cortical development precedes the occurrence of all cognitive
‘modules’. The question is whether this neo-cortical development underwrites the development of ‘non-modular’ cognitive structures which conflict with the structures required for nativists’ modular psychological explanations of development. However, Karmiloff-Smith equivocation on the term ‘module’ means we have no reason to believe that this conflict actually exists. We are not, therefore, provided here with any actual developmental explanations superior to those which primitivism enables nativists to provide.

In sum, primitivism can successfully address all of the Problems which Karmiloff-Smith presents, even if the data which motivate these Problems are accepted as entirely correct. Karmiloff-Smith’s data do not therefore present a problem for nativism as subscribed to by practicing nativists. Thus the second condition at the end of section 1 does not hold, and Karmiloff-Smith’s challenge to nativism in cognitive science therefore fails.

6. Conclusions and Implications

I have argued that Karmiloff-Smith’s Problems fail to challenge nativism in the way that she believes. This is because, first, Karmiloff-Smith’s ‘stauch’ nativism is an inappropriate interpretation of both individual nativists’ positions and the nativist program in general, and, second, because a more appropriate interpretation – primitivism – can accommodate her empirical results and the conclusions which she draws from them. Nativists need not therefore be newly, unduly or unexpectedly worried either by the claims Karmiloff-Smith makes or by the empirical data from which these claims have been drawn. Rather, nativists can and should make use of this data to improve their explanations of both typical and atypical cognitive development. The importance of the data should not be underemphasised; it is only Karmiloff-Smith’s use of this data which I have shown to be in error.

My demonstration, however, comes with caveats attached, and I should make these explicit. This will ensure that we have a clear sense of what I have and have not shown, and of what needs to be done in the future in the light of this.
I have shown that staunch nativism is an inappropriate interpretation of nativism, that Samuels’ primitivism is a much more accurate and profitable interpretation, and that primitivism can successfully address Karmiloff-Smith’s Problems. However, these interpretations of nativism are only two of many possible interpretations, and the list in section 3 shows us how many others there could be. Not all of these interpretations are ones I think should be defended, and not all of them can address all four of Karmiloff-Smith Problems in the same way that primitivism did. Nativists who prefer these other interpretations will have to defend their view and address Karmiloff-Smith’s Problems however they see fit. Nonetheless, it seems to me that many other interpretations can address Karmiloff-Smith’s Problems, particularly those which focus on ‘robustness in the face of environmental variation’ (meaning 9) or ‘the evolutionary specification of end states’ (meaning 3). All I have shown, however, is that Samuels’ primitivism can do the work required.

Also, whilst I believe primitivism to be a more profitable interpretation of nativism than ‘staunch’ nativism (and, indeed, than many other interpretations of nativism), I also believe that primitivism is a much less immediate or intuitive interpretation. In other words, I think that it is relatively easy to grasp a notion of nativism which advocates a ‘straight line’ between particular genetic sequences and particular, if complex, cognitive structures. It is much harder to grasp a notion defined in terms of explanatory psychological primitives and, correspondingly, one in which it is often unknown what relations these structures bear to genes and other non-psychological properties. This does not – and should not – count against primitivism. However, it does entail that nativists must be as explicit as possible about when they are making the claim that certain psychological structures are innate, and when they are suggesting which non-psychological properties underwrite these innate structures. Otherwise, nativists run the risk of appearing to make these ‘straight line’ claims even though they are not actually making them, and thus leaving themselves open to accusations of supporting a ‘genetic determinism’ which they do not actually wish to defend. Perhaps this issue concerns only how nativism is perceived, rather than being a more serious worry about actual practice, but Karmiloff-Smith’s work shows that such perceptions may be widely shared. Moreover, it is only by being explicit about such claims that the nativist program will have full explanatory force. If nativists intentionally delimit the explanatory scope of their program in its defence, then it
behoves them to respect these limits at all times. Otherwise, confusion and misunderstanding will follow.

Finally, we saw that the issue of what it is to be a ‘module’ underwrites much of this debate, and it is clear that resolution of this issue is sorely needed. Claims and counter-claims built on unintentional equivocation serve neither nativists nor their opponents, and result in miscommunication by both sides. Clarification of this issue will bring great reward to all.

Significant as these caveats are, however, they should not distract us from what has been achieved in this paper. Nativists can successfully address Karmiloff-Smith’s challenge, and therefore have little to fear from her empirical work. In fact, nativists have much to gain from further analysis of Karmiloff-Smith et al.’s data, as do cognitive scientists in general. Thus whilst there is still much to be done, nativism’s success in this instance is one of the many steps that must be taken toward an understanding of cognition and cognitive development.
References


Tager-Flusberg, H. (in prep.). What neurodevelopmental disorders can reveal about cognitive architecture.

