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LINGUISTIC EXPLANATION

AND 'PSYCHOLOGICAL REALITY'

ABSTRACT: Methodological questions concerning Chomsky's generative approach to linguistics have been debated for decades without consensus. The status of linguistics as psychology, the psychological reality of grammars, the character of tacit knowledge and the role of intuitions as data remain heatedly disputed today. I argue that the recalcitrance of these disputes is symptomatic of deep misunderstandings. I focus attention on Michael Devitt's recent extended critique of Chomskyan linguistics along the lines of earlier critiques by Quine, Searle and others. I suggest that Devitt's characteristic complaints are based on a failure to appreciate the special status of Chomsky's computational formalisms found elsewhere in cognitive science. Devitt ascribes an intentional conception of representations that Chomsky repudiates and that is independently implausible. I argue that Devitt's proposed "linguistic reality" as the proper subject matter of linguistics neglects the problems of tokens as opposed to types and he misses the force of Chomsky's arguments against Behaviourism and nominalism. I suggest that Devitt's case against intuitions as data misunderstands their standard role throughout perceptual psychology. Finally, of more general interest, I argue that Devitt's position exemplifies compelling errors concerning mental representation seen throughout cognitive science and philosophy of mind.

LINGUISTIC EXPLANATION AND 'PSYCHOLOGICAL REALITY'*[1]

When a debate persists over decades or even centuries without resolution and without shift in the opposing positions, there is good reason to think that the adversaries are talking past one another rather than disagreeing in a meaningful way. Such a situation is hardly unknown in science or philosophy, and the debate about knowledge of language is *prima facie* a case in point. We see repeated rehearsal of the same objections to Chomsky's generative approach to linguistics despite repeated efforts at clarification of the original position in dispute.

For Fodor[2] the generative approach provided a model for psychological explanation of the sort also articulated in Pylyshyn's[3] seminal work – namely, the computational view of cognition that "presupposes that we take seriously such distinctions as those between competence and performance."[4] A decade earlier, Pylyshyn[5] gave important analyses of 'Competence and Psychological Reality' and 'The Role of Competence Theories in Cognitive

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[2] Fodor, J.A.: 1968, *Psychological Explanation*. New York: Random House.

[3] Pylyshyn, Z.: 1984, *Computation and Cognition*. Cambridge, Mass.: MIT Press.

[4] Ibid, p. 223

[5] Pylyshyn, Z.: 1972, Competence and Psychological Reality. *American Psychologist*, June, 546-552. Pylyshyn, Z. 1973,: The Role of Competence Theories in Cognitive Psychology. *Journal of Psycholinguistic Research*, 2, 1, 21-50.

Psychology' in which he explained above all, "One reason why the notion of competence is particularly important is that it is the first clear instance of the influence of … mathematical imagination on the study of cognition"[6], referring to studies by Turing, Gödel, Church and others in the foundations of mathematics and the theory of computation. Chomsky has referred to this approach as "Galilean," and Pylyshyn explains the allusion as reflecting the fact that, like the great advances in physics, "Chomsky's work is permeated with the belief that the secrets of the universe (both physical and psychological) are, as Galileo said, "written in the language of mathematics."[7] Over thirty years later, it is clear that these ideas have not become less controversial. The extraordinary persistence of the same disputes suggests that their underlying sources are deep ones that deserve to be diagnosed. Further, I will suggest that the misunderstandings involved are not unique to linguistics but pervasive throughout cognitive science and philosophy of mind since the seventeenth century.[8]

1. "RATHER IDLE CONTROVERSY"

Recently, Michael Devitt[9] has mounted an extended critique of the generative enterprise and compares the situation to quantum physics where there are not only successful explanatory theories but also controversy about

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[6] Pylyshyn op. cit. 1972, p. 548.

[7] Pylyshyn op. cit. 1972, p. 547.

[8] Slezak, P.: 2002a, The Tripartite Model of Representation, *Philosophical Psychology*, 13, 3, 239-270. Slezak, P.: 2002b, Thinking About Thinking: Language, Thought & Introspection, *Language & Communication*, 22, 353-373. Slezak, P.: 2006, 'Cartesian 'Ideas' and the First (C17 th) Cognitive Revolution.' Ron Sun (ed.) *Proceedings of the 28th Annual Conference of the Cognitive Science Society*, Vancouver, BC, Canada, July 26-29, Mahwah, New Jersey, 798-803.

[9] Devitt, M.: 2006a, Intuitions in Linguistics. *British Journal for the Philosophy of Science*, 57, 481-513. Devitt, M.: 2006b, *Ignorance of Language*. Oxford: Oxford University Press.

foundations. Devitt says in linguistics, by contrast, "There is not a similar controversy about how to "interpret" these theories but I think that there should be." However, on the contrary, there *has* been just this controversy from the earliest days of generative linguistics, and we will see that Devitt is simply rehearsing the most persistent objection to the "psychological reality" of grammars as internal representations. Quine[10] and Stich[11] had made identical objections, repeated by Searle.[12] J.D. Ringen[13] suggested that generative grammar is more like non-empirical disciplines such as logic or pure mathematics and, in the same vein, R. Botha[14] was concerned with Chomsky's attribution of psychological reality to the constructs of competence theories in linguistics.[15] By 1978, one philosopher remarked that "More has been written, much of it exasperatingly shallow, about the confusions surrounding the concept of competence and knowledge-as-competence than almost any other topic in recent philosophy."[16] In light of this history, any engagement with the issues today should be accompanied by some diagnosis of the peculiar recalcitrance of the debate. In this regard, I will suggest that the interest of Devitt's work goes beyond the issues of

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[10] Quine, W.V.: 1972, Methodological Reflection on Current Linguistic Theory. In D. Davidson and G. Harman (eds), *Semantics of Natural Language*, Dordrecht: D. Reidel.

[11] Stich, S.: 1972, Grammar, Psychology, and Indeterminacy. *The Journal of Philosophy*, 69, 22, December, 799-818.

[12] Searle, J.: 1980b, Rules and Causation: Reply to Chomsky. *Behavioural and Brain Sciences*, 3, 37-38.

[13] Ringen, J.D.: 1975, Linguistic Facts: A Study of the Empirical Scientific Status of Transformational Generative Grammars. In D. Cohen and J.R. Wirth (eds) *Testing Linguistic Hypotheses*. Washington, D.C.: Hemisphere Publishing Corporation.

[14] Botha, R: 1980, Methodological Bases of a Progressive Mentalism. *Synthese* 44, 1-112.

[15] Slezak, P.: 1981, Language and Psychological Reality, *Synthese,* 48, 3, 427-440.

[16] Nelson, R.J.: 1978, The Competence-Performance Distinction in Mental Philosophy, *Synthese*, 39, 337-381 at 339.

linguistics with which it is directly concerned to deep and pervasive problems throughout cognitive science.

Devitt's verdict is a calamitous judgment on Chomsky's conception of his linguistics. He writes:

> I urge that linguistics is not part of psychology; that the thesis that linguistic rules are represented in the mind is implausible and unsupported; that speakers are largely ignorant of their language; that speakers' linguistic intuitions do not reflect information supplied by the language faculty … that there is little or nothing to the language faculty …[17]

In short, on Devitt's view just about everything in Chomsky's conception of the status and character of the generative enterprise is wrong.[18]

Devitt's critique rests on two pillars: his negative critique of Chomsky's psychological realism regarding grammars, and his positive case for an alternative conception of a "linguistic reality" that grammars are about. Thus, in part, Devitt's book depends on attributing a certain doctrine concerning mental representation to Chomsky as the most "natural interpretation" despite Chomsky's explicit rejection of it (see section 3 below). Indeed, Devitt is dismissive of those people who "even go so far as

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[17] Devitt op. cit. 2006b, p. vi

[18] Of course, in view of his tireless repetition of the same responses, it might be the case that Chomsky doesn't understand the criticisms of his theory. It might also conceivably be the case that Chomsky is disingenuous in his replies, as suggested by Botha op. cit. 1980 and Rey, G.: 2003a, Chomsky, Intentionality, and a CRTT, in L.M. Antony and N. Hornstein (eds) *Chomsky and his Critics*. Oxford: Blackwell. Rey, G.: 2003b, Intentional Content and a Chomskian Linguistics, in A. Barber (ed) *Epistemology of Language*. Oxford: Oxford University Press. For discussion of Botha see Slezak op. cit., 1981.

to hold that the view [RT – Representation Thesis] is not to be found in linguistics" at all, despite what Devitt describes as "the massive evidence to the contrary".[19] As an exegetical principle, beyond a certain point, such severe uncharitability is itself a symptom of mistaken attribution that is a clue to deep and pervasive philosophical puzzles. Devitt's work may be seen as a case study in what Rorty[20] has called "the original sin of epistemology" – to model knowing on seeing.[21] In a telling metaphor, Devitt suggests "If we could look into the brain and simply "see" if there

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[19] Devitt, op. cit., 2006b, 7. Devitt also thinks that he is "arguing for something that should be fairly obvious" (2006b, vi), "simple" and deserving to be "accepted as utterly uncontroversial" (2006b, 8; quoted approvingly from Cowie, F.: 1999, *What's Within: Nativism Reconsidered*. New York: Oxford University Press, p. 246). However, Devitt claims overwhelming evidence for the attribution to Chomsky, while at the same time retreating behind a formal disclaimer on the grounds that the question concerning Chomsky's view of the psychological reality of language "is surprisingly hard to answer" (2006b, 62). Devitt says "I would, of course, like to interpret Chomsky correctly but I want to emphasize from the beginning that interpreting Chomsky is not my major concern. My major concern is to evaluate a variety of ways in which language might be psychologically real in the speaker, whether or not they are plausibly attributed to Chomsky (or his followers). So I shall take no firm stand on this matter of interpretation." (2006b, 7). On the question of what Chomsky means by the central term "represent" Devitt refers the reader to the exchange between Rey and Chomsky in L.M. Antony and N. Hornstein (eds) 2003 *Chomsky and his Critics*. Oxford: Blackwell. See also Rey, op. cit. 2003b. Devitt says cryptically only "I do not have the heart to enter into this debate," and declines to comment directly on this "fascinating exchange" (2006a, 485; 2006b, 7). However, Rey not only construes 'representation' in the same way that Devitt does, but defends its attribution to Chomsky on the basis of the most jaundiced personal attributions. Devitt gives no indication that he dissents from either the substance or tone of Rey's *ad hominem* remarks, including the charge that Chomsky holds the intentional view despite his denials. On his own account, Devitt clearly thinks the evidence for this attribution is overwhelming, and, therefore, while I acknowledge his formal agnosticism, I will persist in speaking of Devitt's attribution of the intentional view to Chomsky himself. I would, of course, like to interpret Devitt correctly but I want to emphasize from the beginning that interpreting Devitt is not my major concern. My major concern is to evaluate a variety of ways in which language might be psychologically real in the speaker, whether or not they are plausibly attributed to Devitt (or his followers). So I shall take no firm stand on this matter of interpretation.

[20] Rorty, R.: 1979, *Philosophy and the Mirror of Nature*. Princeton: Princeton University Press, p. 60.

[21] Ibid., p. 146.

were representations of this and that, as we can look in a book and see if there are representations …, then that would of course settle the matter."[22]

Devitt's Representational Thesis (RT) is attributed to Chomsky not only in the face of Chomsky's repudiation but also despite the familiar merits of his quite different computational conception found elsewhere throughout cognitive science. In this way, Devitt's interpretation of Chomsky together with his own alternative program entails nothing less than undoing the mentalism of the "cognitive revolution" in a return to certain *nominalistic* aspects of Skinnerian, Bloomfieldian behaviourism – the second pillar of Devitt's book. Devitt is concerned with what he regards as a "linguistic reality" – the real subject matter of grammars – constituted by the "outputs/products" such as "physical sentence tokens" and "the spoken, written, etc., symbols that speakers produce."[23] This nominalism must be distinguished from the anti-mentalism that is also characteristic of Bloomfield's Structuralism and Skinner's Behaviourism. Devitt protests that he is not a behaviourist, but he rejects only the *anti-mentalism* while explicitly embracing *nominalism*.[24] With regard to precisely such a concern Chomsky had asked:

> … do the data of performance exhaust the domain of interest to the linguist, or is he also concerned with other facts, in particular those pertaining to the deeper systems that underlie behaviour? … The

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[22] Devitt, op. cit. 2006b, p. 51.

[23] Devitt, op. cit. 2006a, p. 483.

[24] Devitt, op. cit. 2006b, p. 27; see below section 15.

behaviorist position is not an arguable matter. It is simply an expression of lack of interest in theory and explanation.[25].

In this regard, we may recall Chomsky's remarks on "this rather idle controversy" being revived by Devitt. In a lengthy footnote to his famous methodological chapter of *Aspects* he wrote:

> In fact, the issue of mentalism versus antimentalism in linguistics has to do only with goals and interests, and not with questions of truth or falsity, sense or nonsense.[26]

Remarkably, it remains apt to characterise Devitt's work in Chomsky's words forty years ago as "a paradigm example of a futile tendency in modern speculation about language and mind."[27] My reason for discussing Devitt's book in detail is that it is the most recent, careful and thoroughgoing presentation of such speculations that have plagued Chomsky's enterprise. Therefore, if the conclusions I attempt to substantiate in the review are correct, then Devitt's work can be regarded as, in effect, a *reductio ad absurdum* of his anti-mentalist and other assumptions. My view is that it is a definite merit, not a defect, of Devitt's work that it can be used for this purpose, and it is for this reason that I try to deal with it fairly exhaustively. I do not see how his proposals can be improved upon, aside from occasional details and oversights, within the framework of the general assumptions that he accepts – the general framework of anti-mentalist or

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[25] Chomsky, N.: 1965, *Aspects of the Theory of Syntax*. Cambridge, Mass.: MIT Press, p. 193.

[26] Ibid. p. 193.

[27] Chomsky, N.: 1967, Preface to Review of Skinner's 'Verbal Behavior'. In Leon A. Jakobovits and Murray S. Miron (eds) *Readings in the Psychology of Language*. Prentice-Hall, 142-143.

neobehaviorist, or, more generally, empiricist ideas that has dominated much of modern linguistics, psychology, and philosophy. The conclusion that I hope to establish by discussing these speculations in their most explicit and detailed form, is that the general point of view is largely mythology, and that its widespread acceptance is not the result of empirical support, persuasive reasoning, or the absence of a plausible alternative.[28]

2. *SAVOIR* AND *CONNAÎTRE*

Devitt dubs a certain view of our intuitions about language "Cartesian" – because of the introspective immediacy and certainty such evidence seems to possess. However, the characterisation is perhaps more apt than Devitt intends. Beyond the notion of privileged access to our mental states, Descartes also held views concerning our inaccessible "tacit knowledge" – views that are remarkable anticipations of contemporary conceptions in cognitive science and linguistics. Specifically, in his *Dioptrics* Descartes proposes that in binocular vision the mind determines the distance of an object by means of an implicit triangulation or parallax calculation based on the separation of the eyes and their orientation. Descartes says "this happens by an action of thought which, although it is only a simple act of imagination, nevertheless implicitly contains a reasoning quite similar to that used by surveyors, when, by means of two different stations, they measure inaccessible places."[29] This is, of course, just Chomsky's conception of a competence theory that captures our tacit knowledge – a

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[28] The discerning reader will notice that the foregoing paragraph is a lightly edited and thinly disguised paraphrase of Chomsky's retrospective comments on his 1959 review of Skinner's (1957) *Verbal Behavior* (Chomsky, N.: 1959, Review of Skinner's Verbal Behavior. *Language*, 35, 1, 26-58; reprinted in L.A. Jakobovits and M. S. Miron op. cit. 1967.)

[29] Descartes, R.: 1637/1965, *Discourse on Method, Optics, Geometry, and Meteorology*. Translated by Paul J. Olscamp. New York: Bobbs-Merrill, p. 106.

formal, mathematical, computational model describing what we know unconsciously and underlying our intuition or "simple act of imagination."

Thus, in order to appreciate the most recent polemics about these matters, *en passant* it is helpful to see them in historical perspective. Devitt's critique of Chomsky is not only rehearsing objections that have been made and answered repeatedly for several decades recently, but he is also echoing Descartes' critics for several centuries. Across the spectrum of his writings Descartes is charged with implausible views and absurd errors that are, in fact, more likely to be those of his critics.[30] Of specific relevance to our topic here is Cecilia Wolf-Devine' complaint about Descartes' theory of these unconscious geometrical calculations proposed to explain binocular stereopsis.[31] Wolf-Devine takes this account of knowing to invoke a homunculus, despite Descartes' explicit disavowal of such question-begging pseudo-explanations and despite the manifest virtues of the proposed computations on their own. Significantly in view of parallel contemporary debates, Wolf-Devine draws attention to Descartes' use of the verbs *savoir* and *connaître* to suggest that Descartes is guilty of "a hopeless over-intellectualization of perception."[32] These complaints are striking to a modern reader familiar with the interminable disputes surrounding Chomsky's use of the words "know" or "cognize" to characterise his generative grammars; and, of course, Devitt's title *Ignorance of Language* is

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[30] See Slezak op. cit., 2006.

[31] Wolf-Devine, C.: 1993, *Descartes on Seeing: Epistemology and Visual Perception*, Carbondale: Southern Illinois University Press. Wolf-Devine, C.: 2000a, Descartes' theory of visual spatial perception, in S. Gaukroger, J. Schuster, J. Sutton, eds., (2000) *Descartes' Natural Philosophy*, London: Routledge, 506-523. Wolf-Devine, C.: 2000b, The role of inner objects in perception, in S. Gaukroger, J. Schuster, J. Sutton, eds., op., cit. (2000), 557-568.

[32] Wolf-Devine op. cit. 2000a, p. 513.

a play on Chomsky's *Knowledge of Language*.[33] Wolf-Devine seeks to distinguish Descartes' claim that we "know" the distance of an object by "natural geometry" from the claim that "we actually use geometry" – since she suggests that the latter notion "would cause all sorts of problems."[34] These worries are a constant refrain in the chorus of criticism that Devitt joins. Wolf-Devine unwittingly echoes Chomsky's critics and their discomfort with the idea that we might *actually use* the rules of a formal grammar – that is, that such rules might be construed as "psychologically real". The persistence of the same objections may also suggest that they are not mere blunders, but rather have a deeper source and are, therefore, worthy of analysis and diagnosis.

3. THE "NATURAL" INTERPRETATION OF CHOMSKY

In seeking to reconstruct Chomsky's views, Devitt chooses to depart from Chomsky's own terminology and to insist upon terms and conceptions that Chomsky has explicitly repudiated, namely the philosophical ideas of intentionality and propositional attitudes. Of course, philosophical talk of "standing in a propositional attitude" is not unproblematic even where it is more appropriate.[35] Devitt makes only a footnote reference to an exchange between Chomsky[36] and Rey[37] on the very question at the heart of Devitt's concern – namely, "the issue of what Chomsky means by 'represent' and

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[33] Chomsky, N.: 1986, *Knowledge of Language: Its Nature, Origin and Use*. New York: Praeger.

[34] Wolf-Devine op. cit. 2000a, p. 513.

[35] Stainton, R. J. and Viger, C.: 2000, Review Essay of Jerry A. Fodor, Concepts. *Synthese*, 123, 131-151.

[36] Chomsky op. cit. 2003.

[37] Rey, op. cit. 2003a, and op. cit. 2003b.

other apparently intentional expressions."[38] Devitt persists in his semantic, intentional sense of 'representation,'[39] indeed, illustrating it with the very example of a picture that Chomsky uses to distinguish it from his own.[40]

Devitt characterises Chomsky's view of linguistic knowledge as "propositional knowledge of syntactic rules,"[41] using the philosophical idiom which entails that *speakers* have access to the *linguists'* theories.[42] Indeed, Devitt[43] suggests that Chomsky has made the elementary confusion of a theory and its object. Thus, Devitt imputes the view that linguistics is the study of "the system of rules that is the object of the speaker's knowledge."[44] However, for Chomsky, the rules are not the intentional *object* of the speaker's knowledge, but rather *constitute* this knowledge. Chomsky's frequent comparisons with insects and bird-song could hardly make sense on any other interpretation. Aside from the intrinsic implausibility of the idea that naïve speakers might "have propositional knowledge of syntactic facts," we will see that Devitt ascribes to Chomsky

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[38] Devitt, op. cit. 2006b, p. 7 fn. 9.

[39] Ibid., p. 5.

[40] Chomsky, op. cit. 2003, p. 276.

[41] Devitt, M.: 2003, Linguistics is not Psychology. In A. Barber (ed) *Epistemology of Language*. Oxford: Oxford University Press, p. 108.

[42] Ibid. p. 4. B.C. Smith makes the same point in Why We Still Need Knowledge of Language, *Croatian Journal of Philosophy* 6, 18, 2006, 431-456. See discussion of Chomsky's systematic ambiguity of notion of 'grammar' below, section 9. Exactly the same misattribution has been made by critics of Pylyshyn's related use of the notion of tacit knowledge in relation to visual imagery. Kosslyn rejects Pylyshyn's account of certain imagery evidence – the McCollough Effect – on the grounds that subjects were ignorant of the *psychological theories and experiments* concerning the phenomena in question. Kosslyn, S.M.: 1983, *Ghosts in the Mind's Machine*. New York: W.W. Norton, p. 81.

[43] Devitt, op. cit. 2006b, p. 69.

[44] Devitt, op. cit. 2003, p. 109.

the very errors he has been careful to warn against (see Section 9 below). Devitt defends this interpretation of Chomsky as the most "natural" one because it "takes his talk of 'knowing that', 'propositional attitudes', and 'representation' at face value.[45] However, we will see that what appears as "face value" to a philosopher steeped in scholastic subtleties may not appear as "face value" to cognitive scientists. Thus, the doctrine that Devitt ascribes to Chomsky is characterised as follows:

> The Representational Thesis (RT): A speaker of a language stands in an unconscious or tacit propositional attitude to the rules or principles of the language, which are represented in her language faculty.[46]

Devitt asserts "Many linguists, including Chomsky, seem to believe RT"[47] and "The natural interpretation attributes RT to Chomsky."[48] It is telling that Rey[49] uses the same curious expression "the natural interpretation" as if we are dealing with hermeneutics of the Dead Sea Scrolls whose author's intentions are obscure or unavailable. By any reasonable measure, the *natural* interpretation is clearly the one that Chomsky has repeatedly articulated and insisted upon in specific response to the very construals offered by Devitt and Rey. The only sense in which Devitt's RT is the "natural" interpretation of Chomsky is one that ignores what he says and appears so to a philosopher enmeshed in irrelevant philosophical notions of intentional representation. This tendency has been noted by others. Stone

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[45] Ibid.

[46] Devitt, op. cit. 2006a, p. 482; op. cit. 2006b, p. 4.

[47] Devitt, op. cit. 2006a, p. 482.

[48] Devitt, op. cit. 2006b, p. 7.

[49] Rey, op. cit. 2003b.

and Davies, writing of 'Chomsky Amongst the Philosophers,' reflect on the fact that "Philosophers object to linguistic theories, not on the grounds that these theories fail to account adequately for the empirical evidence, but because they fail in other 'philosophical' ways."[50] In this context, there is a nice irony in the fact that Chomsky has referred to his abstract idealizations as 'Galilean'.[51] Devitt's fixation upon certain philosophical preconceptions makes it irresistible to note the comparison with Aristotelian philosophers critical of Galileo who were too hidebound in their scholastic notions to appreciate the force of his new scientific arguments.

4. SIMPLY EMBODIED

Devitt finds a deep paradox in the fact that Chomsky allegedly "has no worked out opinion about, or even much interest in, *how* that grammar in the head plays a role in language use."[52] However, on the contrary, Chomsky has repeatedly suggested plausibly that his abstract, idealized approach is the best way to discover underlying neurological, processing correlates of grammars.[53] Far from lacking interest in the question, Chomsky is simply responding to the obvious fact acknowledged in Devitt's own words that "we don't even know enough about what to look for" or, in Fodor's words quoted approvingly by Devitt, "there isn't one, *not one*, instance where it's known what pattern of neural connectivity realizes a

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[50] Stone, T. and Davies, M.: 2002, Chomsky Amongst the Philosophers. *Mind & Language*, 17, 3, 276-289, at p. 278.

[51] Chomsky, N.: 1980a. Biological Basis of Language Capacities, in *Rules and Representations*, New York: Columbia University Press. See Pylyshyn, op. cit. 1972, 1973.

[52] Devitt, op. cit. 2006b, p. 71.

[53] Chomsky, N.: 1980b, Rules and Representations, and Peer Commentary *Behavioral and Brain Sciences*, 3, 1-61, p. 197.

certain cognitive content."[54] Thus, Chomsky expresses exactly Devitt's own sentiment, saying "we might go on to suggest actual mechanisms [underlying abstract rules], but we know that it would be pointless to do so in the present stage of our ignorance concerning the functioning of the brain."[55] Nevertheless, Devitt discovers a supposed anomaly in Chomsky's approach: "What is puzzling about this is that *a strong commitment* to RT seems inappropriate in the absence of a well-supported theory of language use that gives RT a central role."[56] That is, Devitt foists a view onto Chomsky that he doesn't hold and is then mystified by his failure to take it seriously. This exegetical strategy leads Devitt to discover the same mystery repeatedly among other theorists such as Fodor, Bever and Garrett[57] and Berwick and Weinberg.[58] Devitt says again: "This raises the old puzzling question: why be *so convinced* about RT given this ignorance about its place in a theory of processing?"[59] Of course, the puzzle disappears if the theorists are taken at their word and not assumed to hold RT.

R.J. Matthews[60] suggests that Chomsky shifted from his earlier commitment to an intentional conception only when "it became increasingly difficult to think of these [recent] grammars as propositional objects of knowledge"

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[54] Fodor, J.A.: 1998, *In Critical Condition*. Cambridge, Mass.: MIT Press, p. 145, quoted in Devitt op. cit. 2006b, p. 52.

[55] Chomsky, N. op. cit. 1980b, p. 206,7.

[56] Devitt, op. cit. 2006b, p. 71; emphasis added.

[57] Fodor, J.A., Bever T.G. and Garrett, M.F.: 1974, *The Psychology of Language: An Introduction to Psycholinguistics and Generative Grammar*. New York: McGraw Hill.

[58] Berwick, R.C. and Weinberg, A.S.: 1984, *The Grammatical Basis of Linguistic Performance*. Cambridge, Mass.: MIT Press.

[59] Devitt, op. cit. 2006b, p. 79; emphasis added.

[60] Matthews, R.J.: 2006, Knowledge of Language and Linguistic Competence. *Philosophical Issues*, 16, 200-220, p. 204.

because new formalisms became less rule-like and grammars appeared less plausible as propositional objects of knowledge. However, it was no easier to think of the earliest grammars in this way and, moreover, as we will see below, there is not the slightest reason to think that Chomsky ever did so.[61]

5. THE BIRDS AND THE BEES

Evidence of Devitt's misunderstanding is seen in his articulation of what he takes to be a possible *alternative* to the "most natural" reading of Chomsky's words. On this alternative construal, he is taken to hold that language rules are *merely* embodied "without being represented."[62] However, given Devitt's stipulation of how "representation" is to be used, this is simply an arbitrary terminological matter of no theoretical interest. Indeed, as we will see, from another point of view Devitt is merely re-stating Chomsky's own competence/performance distinction. Nevertheless, we will see that this idea that a system might embody rules and behave according to them without actually representing them has had a firm grip on theoretical imagination as the source of persistent scepticism about the "psychological reality" of rules and representations, not just in linguistics.

Rey accuses Chomsky of inconsistency or insincerity because he sees Chomsky's[63] illustrative examples as essentially involving intentional, referring representations. The difficulty arises in part because, undoubtedly the cases cited do have referential properties, but these are entirely irrelevant to Chomsky's specific theoretical interest in them. It is as if one were to insist that billiard balls have a colour that is an intrinsic property,

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[61] See also Collins, J.: 2004, Faculty Disputes. *Mind & Language*, 19, 5, 503-533.

[62] Devitt, op. cit. 2006b, p. 7, op. cit. 2003, p. 109.

[63] Chomsky, op. cit. 1980b, p. 102.

even though a Newtonian explanation of their behaviour will not refer to these aspects of the phenomena of interest.

For example, to illustrate his view of the psychological reality of the rules postulated in a grammar, Chomsky gives the example of a rocket whose trajectory is determined by computations using internal representations of planets and its own position and velocity. However, Rey is misled by the undeniable referential features of the illustration which are irrelevant to Chomsky's point. Rey[64] quotes Chomsky's comparison of his conception with those familiar in other inquiries where computational systems are postulated to explain insect navigation or bird song at a psychological level[65], but Rey avows "I myself am unacquainted with these senses of 'represent'."[66] Rey cites Chomsky's comparison with immunology and physics in order to illustrate his notion of representation that is not conceived as intentional in the philosophers' sense. However, Rey dismisses such illustrations and not surprisingly, like Devitt, finds it implausible that the ant represents "the system of vector algebra itself."[67] Instead, Rey suggests "That system is, at best, merely implemented somehow in the ant's nervous system." However, as we have seen, *terminology aside*, this is not an *alternative* to Chomsky's conception but precisely his view, since to be implemented in the nervous system *is* to be represented in the relevant sense. This is the formal computational sense capturing "abstract underlying

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[64] Rey, op. cit. 2003b, p. 153.

[65] Chomsky op. cit. 2003, p. 276.

[66] Rey, op. cit. 2003b, p. 153.

[67] Rey op. cit 2003b, p. 157,8 responds with sarcasm, accusations of disingenuousness, and the evidence of his colleagues' shared incomprehension (Rey 2003b, 160 fn 19).

structural principles"[68] exemplified in Marr's[69] approach, as we will see below.

6. DEVITT'S *PHILOSOPHIE ALS OB*[70]

Devitt holds that a system might behave "as if" it is following rules but for all that, it might not be governed by represented rules at all. We will see that the entire "debate" might be settled if the term "psychological reality" is ceded to the critics and understood to mean "processing mechanism" since Chomsky's critics on this issue appear to be almost exclusively motivated by this concern. Thus, in light of the possibility of multiple, equivalent grammars, Devitt says "We need psychological evidence to show which grammar's rules are in fact playing the role in linguistic processing, evidence we do not have." Indeed, Devitt qualifies this, adding "We need evidence that the syntactic rules of *any* grammar are processing rules. These rules may simply be the *wrong sort of rules* to be processing rules."[71] There could be no more explicit indication of the source of the traditional worry about the formalisms of a competence theory. Devitt's scepticism about rules is not merely a "sort of instrumentalism" as he had characterized it,[72] but a refusal to accept the abstract idealizations of grammars when their underlying processing realization is unknown. If the term "psychological reality" is granted as referring by stipulation to processing mechanisms,

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[68] See Pylyshyn op. cit. 1973, p. 47.

[69] Marr, D.: 1982, *Vision*. New York: Freeman.

[70] Hans Vaihinger's (1911) book *The Philosophy of 'As If'* argued that we can never know the underlying reality of the world that behaves "as if" it corresponds with our models.

[71] Devitt, op. cit. 2006b, p. 37.

[72] Devitt, M. and Sterelny, K.: 1989, Linguistics: What's Wrong with 'The Right View'? *Philosophical Perspective*s, 3, 497-531, p. 497.

then the debate collapses, Devitt's position being no more than a restatement of the competence-performance distinction.

Nevertheless, Devitt's view derives its broader interest from the very ease with which it can be rebutted and its remarkable tenacity. Together these indicate an obstinate philosophical prejudice or illusion that deserves diagnosis and Wittgensteinian dissolution as a kind of mental cramp that afflicts thinking about representations beyond linguistics (see section 11 below). Thus, for example, Devitt's articulation of his position is striking for its precise recapitulation of Chomsky's own position as if an alternative view is being proposed – a point also noted by Laurence.[73] This charge is easy to substantiate, as we can see from Devitt's statements:

> It is not enough to know that there is something-we-know-not-what within a speaker that respects the rules of her language … We would like to go beyond these minimal claims to discover the ways in which the competence of the speaker … respect these rules.[74]

Chomsky writes:

> … we are keeping to abstract conditions that unknown mechanisms must meet. We might go on to suggest actual mechanisms, but we know that it would be pointless to do so in the present stage of our ignorance concerning the functioning of the brain. … If we were able

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[73] Laurence, S.: 2003, Is Linguistics a Branch of Psychology? In A. Barber (ed) *Epistemology of Language*. Oxford: Oxford University Press, p. 87. On Laurence's specific claims regarding the psychological status of symbols and Devitt's response, see below section 17.

[74] Devitt op. cit. 2006b, p. 38

to investigate humans as we study other, defenceless organisms, we might well proceed to inquire into the operative mechanisms …[75]

Chomsky's phrase "abstract conditions that unknown mechanisms must meet" is precisely Devitt's "Respect Constraint" (see Section 14 below). Terminology aside, Chomsky's point concerning the competence-performance distinction might well be encapsulated in Devitt's own supposed challenge: "A grammar may have nothing more to do with psychological reality than comes from meeting the Respect Constraint."[76]

7. QUINE ON FITTING AND GUIDING.

Chomsky[77] suggests that in its modern guise we can trace the argument about "psychological reality" of grammars back to Quine's distinction between "fitting" and "guiding", the latter term supposedly only appropriate to conscious application of rules. Where rules are not "guiding" and followed consciously in this manner, it is widely held that we may only speak of behaviour "fitting" or conforming with rules in the way that a planet obeys Kepler's Laws. Above all, on such views, we must not attribute "psychological reality" to such rules. In his *Reflections On Language* Chomsky[78] wrote of the "singularly misleading analogy" that is frequently made between mathematical laws of physics and the rules of a grammar. However, Devitt's main criticism of Chomsky's grammars is just

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[75] Chomsky op. cit. 1980b, p. 197.

[76] Devitt, op. cit 2006b, p. 37.

[77] Chomsky, N.: 2000, *New Horizons in the Study of Language and Mind.* Cambridge, Cambridge University Press, p. 94.

[78] Chomsky, N.: 1975b. *Reflections on Language.* New York: Random House, p. 190, 198.

an elaboration of this Quinean distinction between "fitting" and "guiding" rules. Devitt's version of Quine's qualms is expressed as the following principle:

> Distinguish processing rules that govern by being represented and applied from ones that are simply embodied without being represented.[79]

Devitt says that his thesis that linguistics is not part of psychology rests in part on this principle that he asserts is "not controversial."[80] However, apart from the fact that Chomsky has disputed it for forty years, as we will see presently (Section 11 below), the principle is also central to intense disputes surrounding connectionist models, particularly since the provocation by Fodor and Pylyshyn[81] nearly twenty years ago. Nevertheless, Devitt laments the fact that his principle "does not have the prominence it should have in the debate over psychological reality."[82] However, even in the narrower domain of linguistics, Devitt's precept has been *the* pervasive, persistent

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[79] Devitt op. cit. 2006b, p. 45. In the immediately following remarks, Devitt says that these are two ways in which certain processing rules might be psychologically real, but neither of them should be confused with the case in which an object "simply behaves *as if* it is governed by those processing rules. For that situation is compatible with those rules *not* being embodied in the object at all." (2006b, 45). However, it is unclear what kind of system Devitt has in mind that might neither "represent" rules (in his sense), nor "simply embody" them at all, unless perhaps it is a remotely controlled robot and, therefore, of no interest here. Aside from such cases, it is unclear why a system whose rules are "simply embodied without being represented" is not an instance of behaving *as if* it is governed by certain rules according to the first alternative. Accordingly, I will persist in speaking of Devitt's idea that rules might be embodied without being represented as essentially Quine's conception of rules fitting rather than guiding.

[80] Devitt op. cit. 2006b, p. 46.

[81] Fodor, J.A. & Pylyshyn, Z.: 1988, Connectionism and Cognitive Architecture: A Critical Analysis. *Cognition* 28, 3-71; reprinted in Pinker and Mehler (eds) 1988: *Connections and Symbols*. Cambridge, Mass.: MIT Press.

[82] Devitt op. cit. 2006b, p. 46.

objection to the "psychological reality" of grammars, as the long record of Chomsky's responses demonstrates. Thus, Searle[83] made the stereotypical complaint with a long line of critics echoed by Devitt. Searle cites the clichéd example of the behaviour of a falling body that can be described by certain laws but which "play no causal role in producing it."[84] Searle distinguishes this case from one in which an agent is "actually following" rules since, "The claim that the agent is acting on rules involves more than simply the claim that the rules describe his behavior and predict future behavior." In the standard terms now repeated almost verbatim by Devitt, Searle explained further:

> Additional evidence is required to show that they are rules that the agent is actually following, and not mere hypotheses or generalizations that correctly describe his behavior. … there must be some independent reason for supposing that the rules are functioning causally.[85]

8. "Cognize"

It is clear that the "debate" has long ago degenerated into a ritual talking past one another and it is important to attempt a diagnosis. Chomsky and Katz[86] replied to Stich's[87] "projectile" argument saying: "At best, it is an open question whether more than an uninteresting issue of terminology is

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[83] Searle op. cit. 1980b.

[84] Searle op. cit. 1980b, p. 37.

[85] Ibid.

[86] Chomsky, N.: & Katz, J.J. 1974, What the Linguist is Talking About. *The Journal of Philosophy*. 71, 12, June, 347-367, p.363.

[87] Stich op. cit. 1972, p, 817.

involved." Indeed, it is of no interest that theoretically significant forms of embodied rules will be excluded from counting as "knowledge" by stipulating a sense of "representation" that excludes most of cognitive science.

In regard to the terminological issue, Devitt says "The term 'know' is mostly used for the propositional attitude in question but, *when the chips are down*, Chomsky is *prepared to settle for* the technical term 'cognize'."[88] We may note the irony of Devitt's accusation of a certain "looseness of talk of 'knowledge.' " Devitt says "I think that linguistics would do better to avoid the talk" and "I think that we should drop talk of knowledge from serious science."[89] However, it was precisely because of the misleading connotations of the term "know" that Chomsky[90] himself suggested that it might be replaced with the neologism "cognize." It is measure of the tenacity of these philosophical preconceptions that Devitt is unable to appreciate the very effort to dispel them, adopting it as his own, while seeing Chomsky's proposal as a compromise or implicit concession to his critics.

9. "Systematic Ambiguity" – Theory and Object

Devitt attributes implausibly naïve errors to Chomsky such as "a certain use/mention sloppiness" and a neglect of the crucial, elementary distinction between a theory and its object. Devitt writes:

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[88] Devitt, op. cit. 2006b, p. 4; emphasis added.

[89] Devitt, op. cit. 2006b, p. 5.

[90] Chomsky op. cit. 1986, p. 265.

Clearly, the generation of expressions by the I-language would be one thing, the generation of descriptions of expressions by the grammar, another. Yet Chomsky seems uninterested in the difference.[91]

However, Devitt has evidently missed Chomsky's explicit warning about the systematic ambiguity of the term "grammar": In his *Aspects*, the first chapter on Methodological Preliminaries sets out the key ideas of a competence theory including the following warning. Far from seeming uninterested in the difference between theory and its object, Chomsky notes:

Using the term "grammar" with a systematic ambiguity (to refer, first, to the native speaker's internally represented "theory of his language" and, second, to the linguist's account of this), we can say that the child has developed and internally represented a generative grammar …[92]

The same clarification was made in *Language and Mind*, where Chomsky noted "The term "grammar" is often used ambiguously to refer both to the internalised system of rules and to the linguist's description of it."[93] The same point had been explained in Chomsky's Introduction to his *Logical Structure of Linguistic Theory* (written twenty years earlier) where he distinguished the "methodological" interpretation, the linguist's grammar, from the "psychological" interpretation, the speaker-hearer's grammar.[94] The distinction should be obvious enough and context should make clear

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[91] Devitt, op. cit. 2006b, p. 69.

[92] Chomsky op. cit. 1965, p. 25.

[93] Chomsky, N.: 1972, *Language and Mind*. New York: Harcourt Brace Jovanovich, p. 116, fn. 1.

[94] Chomsky, N.: 1975a, *The Logical Structure of Linguistic Theory*. New York: Plenum Press, p. 37.

which of these notions is intended. On its own, this oversight fatally compromises Devitt's critique of the generative enterprise since his ascription of the intentionalist thesis RT to Chomsky is just this mistaken attribution.

Thus, it should be needless to say that Chomsky does not suggest that the *formalisms* of a grammar themselves are in the head, just as Descartes did not propose that Euclidean theorems are literally inscribed in the brain.[95] In part, Devitt attributes the conflation of theory and object as a result of his failure to appreciate the literal, realistic construal of abstractly specified rules and representations. Devitt's mistake is interesting because it is characteristic of a ubiquitous confusion seen not only in relation to linguistics.

10. "Epiphobia" and Causal Efficacy

Chomsky attributes the recalcitrant misconceptions concerning 'psychological reality' to a methodological dualism that makes an invidious distinction between the procedures of linguistics and all other sciences. Specifically, linguistics is expected to attain some higher standard than other explanatory sciences such as physics where the presumed truth of a theory warrants taking its posits as real. The history of the dispute suggests that, while undoubtedly correct as far as it goes, Chomsky's diagnosis does not go far enough. In view of the remarkable obduracy of the complaint, it is of some interest to ask about the underlying causes of this very methodological dualism itself.

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[95] Devitt (2006b, 4) writes, "the linguist produces a 'grammar', which is a theory of the I-language. That theory, hard-won by the linguist, is precisely what the speaker tacitly knows." To be sure, Devitt's wording permits Chomsky's interpretation, but it admirably illustrates the very ambiguity that Chomsky warns against. Devitt evidently intends it to be read in just the sense that is utterly implausible. See discussion of this point in Smith op. cit. 2006, who characterizes Devitt's position as "wildly amiss".

In his efforts to rebut the persistent complaint about "psychological reality" Chomsky describes the term as "hopelessly misleading and pointless". He says:

> I cannot see that anything is involved in attributing causal efficacy to rules beyond the claim that these rules are constituent elements of the states postulated in an explanatory theory of behavior and enter into our best account of this behavior.[96]

Chomsky's appeal to causal efficacy according to the best account of the evidence carries no weight with his critics[97] since they concede the point and still find fault with a grammar on the grounds that we need evidence "to show which grammar's rules are in fact playing the role in linguistic processing, evidence we do not have."[98] Of course, the idea of playing a causal role here is understood only in an implementation or processing sense. Seeking the deeper sources of error in this conception, it is worth noting the relevance of Fodor's[99] diagnosis of "epiphobia" – as he dubs the neurotic fear of the causal inertness of the mental. Devitt says "we should only posit such representations [of rules] if we can find some serious causal work that they have to do."[100] However, in Chomsky's foregoing remarks we saw his grounds for attributing just such causal efficacy to rules – namely, that they have a place in our best explanatory theories. In the same

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[96] Chomsky op. cit. 1986, p. 253.

[97] Devitt, M. and Sterelny, K.: 1987, *Language and Reality: An Introduction to the Philosophy of Language*. Oxford: Blackwell; (Second edition 1999), p. 145.

[98] Devitt and Sterelny op. cit. 1989, p. 511.

[99] Fodor, J.A.: 1990, Making Mind Matter More. In his *A Theory of Content and Other Essays*. Cambridge, MA.: MIT Press.

[100] Devitt, op. cit. 2006b, p. 52.

spirit, Fodor argues that the case against the causal efficacy of beliefs and other psychological posits would also require epiphenomenalism with regard to *all* non-physical properties: "If beliefs and desires as are well off ontologically as mountains, wings, spiral nebulas, trees, gears, levers, and the like, then surely they're as well off as anyone could need them to be."[101] Rules are real for the same reason, even if we have no idea about the underlying microstructure or material realization.

11. "BUT IT DOESN'T REALLY". CONNECTIONISM AND EXPLICIT RULES

As Fodor's diagnosis suggests, essentially the same problem concerning the reality of rules has arisen as a central concern about connectionist models too.[102] Typical of a vast literature,[103] almost at random we can pick Smolensky's remark that in the case of a certain connectionist model, "It's as though the model had those laws written down inside it" but he adds the curious qualification "But it doesn't really."[104] That is, "The system is fundamentally soft" and, therefore, is not really satisfying the hard rules at all."[105] In the same vein, A. Clark writes that in connectionist systems "there

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[101] Fodor, op. cit. 1990, p. 141.

[102] Bechtel, W. and Abrahamsen, A.: 2002, *Connectionism and the Mind*, Oxford: Blackwell, p. 120.

[103] See Van Gelder, T.: 1990, Compositionality: A Connectionist Variation on a Classical Theme. *Cognitive Science*, 14, 355-384; Pinker, S. and Mehler, J. (eds): 1988, *Connections and Symbols*. Cambridge, Mass.: MIT Press; Horgan, T. & Tienson, J. (eds): 1991, *Connectionism and the Philosophy of Mind*. Dordrecht: Kluwer; Ramsey, W., Stich S., & Rumelhart, D.E., (eds): 1991, *Philosophy and Connectionist Theory*. Hillsdale: Lawrence Erlbaum.

[104] Smolensky, P.: 1988, On the Proper Treatment of Connectionism. *Behavioral and Brain Science*s, 11, 1-74, p. 20.

[105] See also Waskan, J. & Bechtel, W.: 1997, Directions in Connectionist Research: Tractable Computations Without Syntactically Structured Representations, *Metaphilosophy*, 28, 1&2, 31-62.

can be no explicit representation of rules" and therefore "the processing can hardly be sensitive to structures which aren't there."[106] In these remarks we see the familiar idea that, although a system might *conform* to rules, they are not real. Pinker and Prince note the basis for such rule-skepticism in relation to neural nets which undoubtedly have a different "feel" to standard symbol processing models. Instead of "explicit" representations, we have weighted connections and activation levels among which "*one cannot easily point* to rules, algorithms, expressions, and the like."[107]

It would appear that theorists use a certain implicit criterion for literal attribution of structure – namely, whether it is apparent to inspection for the theorist. For example, van Gelder explains in characteristic terms "All these regions are formed ... in a high dimensional space, *one that defies scrutiny by means of our native imaginative abilities.*"[108] This criterion seems universal, if implicit, in the view that connectionist networks have no structured representations or rules because, as Pinker and Prince suggest, "one cannot easily point" to them. We see the same considerations operating to deny attribution of other properties to systems. Thus, in an influential article Ramsey, Stich and Garon[109] argue that if some connectionist models are true accounts of cognition, then this would entail the falsity of common-

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[106] Clark, A.: 1990, Connectionism, Competence, and Explanation. *The British Journal for the Philosophy of Science*, 41, 195-222; reprinted in M. A. Boden ed. 1990, *The Philosophy of Artificial Intelligence*. Oxford: Oxford University Press, p. 292.

[107] Pinker, S. and Prince, A. 1988: On Language and Connectionism: Analysis of a Parallel Distributed Processing Model of Language Acquisition. In S. Pinker and J. Mehler (eds) *Connections and Symbols*. Cambridge, Mass.: MIT Press, p. 76; emphasis added.

[108] van Gelder, T. 1992. Making Conceptual Space, S. David ed., *Connectionism: Theory and Practice*, Oxford: Oxford University Press, p. 180; emphasis added.

[109] Ramsey, W., Sitch, S. and Garon, J.: 1991, Connectionism, Eliminativism and the Future of Folk Psychology. In W. Ramsey, S. Stich and D. Rumelhart, (eds) *Philosophy and Connectionist Theory*. Hillsdale, N.J.: Lawrence Erlbaum.

sense views of mental life as consisting of beliefs, desires and other propositional attitudes. This is a surprising claim since the truth of propositional attitude ascriptions, like those of rules, ought to be compatible with any way in which they might turn out to be realized, just as the empirical adequacy of a grammar is independent of how it might be realized in the brain or a 'performance' mechanism. However, explaining the relative advantages of classical symbolic models, they say that in these cases "*it is an easy matter to locate* a functionally distinct part of the model encoding each proposition or state of affairs represented by the system."[110] By contrast, they say "However, in many connectionist networks it is not possible to localize propositional representation beyond the input layer." Again, the obvious question generally not asked is: *For whom*? Occasionally, the agent for whom these properties are salient is mentioned, even though it is evidently not seen as a source of potential difficulty. Thus, Ramsey, Stich and Garon add that the problem of localization in connectionist nets "can sometimes be a real inconvenience *to the connectionist model builder* when the system as a whole fails to achieve its goal because it has not represented the world the way it should."[111]

We see the crucial point made by D. Kirsh who is explicit about explicitness: [112]

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[110] Ramsey, W., Sitch, S. and Garon, J.: op. cit. 1991, p. 209; emphasis added.

[111] Ibid.

[112] Among the few to draw attention to the nature of the problem are Cummins, R.: 1996, *Representations, Targets and Attitudes*, Cambridge, Mass.: MIT/Bradford; Kirsh, D.: 1990, When is Information Explicitly Represented? In Hanson (ed) *Information, Language and Cognition*. Vancouver: University of British Columbia Press; McDermott, D.: 1981, Artificial Intelligence Meets Natural Stupidity, in J. Haugeland ed., *Mind Design*, Montgomery: Bradford Books.

... what humans are able to see is irrelevant. There are many codes we cannot read unaided. ... It means separability by the host system.[113]

Indeed, Kirsh gives an apt diagnosis of just this problem arising from "the bewitching image of a word printed on a page."[114] We will see that this is a key insight into the pernicious error that has plagued theorising about mental representation in all its forms – an illusion of explanatory adequacy derived from tacit dependence on our own interpretative abilities.

12. MACHINE STATE FUNCTIONALISM

Contrary to Stich, Searle, Rey and Devitt, to be simply embodied *is* to be represented, in one central and important sense of this term – namely, the 'functionalist' conception of the mind as the "software" of the brain which has been the central philosophical doctrine since the 1960s and involves precisely the notion of a level of explanation that abstracts from the details of a possible realization or implementation. That is, being merely embodied in Devitt's sense does not preclude or disqualify a system of rules from being internally represented as tacit knowledge precisely because such attribution is non-committal about the nature of the embodiment. Significantly, Fodor explicitly acknowledged that his manifesto for functionalism *Psychological Explanation,* was "in part an attempt to make explicit some aspects of a view of psychological explanation that comports naturally with the generative approach to language."[115] That is, Chomsky's

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[113] Kirsh, D.: 1990, When is Information Explicitly Represented? In Hanson (ed) *Information, Language and Cognition*. Vancouver: University of British Columbia Press, p. 351.

[114] Kirsh, D. op. cit. 1990, p. 350.

[115] Fodor op. cit 1968, p. ix.

grammars illustrate the functionalist conception of mind – the modern statement of what it means to do psychology and to attribute internal representations. Devitt's denial that linguistics is psychology amounts to dissenting from the enterprise of cognitive science and what *constitutes* psychological explanation in the modern information processing paradigm.[116] Chomsky's functionalism is unmistakable in his *Aspects* where he writes:

> The mentalist … need make no assumptions about the possible physiological basis for the mental reality he studies. … One would guess … that it is the mentalistic studies that will ultimately be of greatest value for the investigation of neurophysiological mechanisms, since they alone are concerned with determining abstractly the properties that such mechanisms must exhibit and the functions they must perform.[117]

13. MARR'S COMPUTATIONALISM AS METAPHORICAL GENERATION?

Failing to appreciate Chomsky's idealization that abstracts from any possible realization of the rules, not surprisingly, Devitt says "it is hard to see how it [a grammar] could be a theory at the computational level."[118] Specifically, Chomsky's conception of associating a sound with a meaning

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[116] Devitt (correspondence) objects to this imputation since he embraces functionalism and modern psychology. However, his intentions are irrelevant since I am drawing attention to the unnoticed implications of his doctrines. Devitt is a closet behaviourist just as Skinner was a closet mentalist. Chomsky's (1959) review showed that Skinner was, *malgré lui*, up to his ears in mentalist assumptions while professing a strict behaviourism. In the same way, I am suggesting that Devitt is committed to behaviourist assumptions while professing an orthodox modern mentalism.

[117] Chomsky op. cit 1965, p. 193, fn. 1. See also Chomsky op. cit. 1980, p. 201, 206,7.

[118] Devitt, op. cit. 2006b, p.66.

is misunderstood as a causal, mechanical, processing matter, whereas for Chomsky it is a purely formal, descriptive one. Pylyshyn explains the sense in which a competence theory "may be thought of as a machine (or the program of a computer) which computes a certain recursive function."[119] However, even where Devitt acknowledges the purely mathematical sense of the notion of "generate" he fails to appreciate the precise force of this conception.[120] The term "generate" is used in the clear sense in which one says that an axiom system generates its theorems and has nothing whatever to do with actual mechanisms or causal processes. Above all, the formal sense of the term 'generate' is not "merely metaphorical" in any sense, as Devitt seems to think. He enunciates another principle:

> 7. Distinguish actual from merely metaphorical generation, computation and processing.[121]

Chomsky[122] has repeatedly cited the work of Marr as exemplifying his own Galilean approach, just as Marr,[123] in turn, cites Chomsky's competence/performance distinction as the appropriate methodological analysis of his computational theory of vision. Marr's celebrated analysis distinguished the abstract computational theory of a system from the algorithmic level and the hardware or implementation level. Of course, critics such as Devitt and Rey have not missed Chomsky's allusions to Marr's work and other approaches in the same vein to simpler organisms

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[119] Pylyshyn, op. cit. 1973, p. 44.

[120] Devitt, op. cit. 2006b, p. 68.

[121] Ibid.

[122] Chomsky, N.: 1982, *The Generative Enterprise: A Discussion with Riny Huybregts and Hekn van Riemsdijk*. Dordrecht: Foris Publications, p. 10.

[123] Marr, op. cit. 1982, p. 28.

such as bees. Devitt makes the revealing remark "While there may be some plausibility to the idea that the bee represents its food source, there is little to the idea that it represents whatever rules may govern its dancing."[124] Of course, if this notion of "represent" is taken to mean something like intentionally, then Devitt is obviously right. However, Srinivasan and Zhang,[125] for example, who ascribe mathematical computations as internally represented in bees do not have Devitt's philosophical sense in mind.

14. "R - E - S - P - E - C - T: FIND OUT WHAT IT MEANS TO ME" (ARETHA FRANKLIN)

Devitt elaborates five possible positions on language use, some having two versions, and three versions of the idea that rules might be internally represented.[126] He also enunciates eight numbered precepts, four methodological points, various named theses and technical distinctions that constitute an elaborate apparatus whose point is easy to discern. Once we make allowances and adjust for Devitt's choice of terminology, we have only a re-statement of Chomsky's own views, though much less perspicuous than the original. Among Devitt's essential distinctions are the following:

1. Distinguish the theory of a competence from the theory of its outputs/products or inputs.

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[124] Devitt, op. cit. 2006b, p. 49.

[125] Srinivasan, M.V., Zhang, S.W.: 2004, Visual motor computations in insects. *Annual Review of Neuroscience* 27, 679-696.

[126] Devitt op. cit 2006b, p. 57.

> 2. Distinguish the structure rules governing the outputs of a competence from the processing rules governing the exercise of the competence.[127]

Devitt illustrates his analysis with the case of chess moves which are "rule-governed in that something counts as a chess move at all only if it has a place in the structure defined by the rules of chess." Devitt labels these rules "structure rules" in order to distinguish them from "the rules governing the psychological process by which [a player] … produces chess moves." Devitt irrelevantly but tellingly characterizes the latter as "interesting," but his analysis simply restates Chomsky's competence/performance distinction. Devitt's "interesting" rules are those concerning the "heuristic" aspect of problem solving of the kind exemplified in the work of Newell and Simon,[128] but must be distinguished from the 'epistemological' or formal approach.[129]

That is, the first pillar of Devitt's account – his critique of Chomsky – collapses into a verbal quibble. Devitt says "I emphasize that 'respecting' as I am using it, is a *technical* term" to distinguish processing rules on the one hand, and the "structure rules governing the outputs of that competence on the other hand."[130] However, it is clear that Devitt's "Respect Constraint" is nothing more than Chomsky's competence/performance distinction or, from a different point of view, Quine's qualms dressed up – the idea that the mere "respecting" of rules is not the same as "inclusion of structure rules among

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[127] Devitt, op. cit. 2006b, p. 18.

[128] Newell, A. and Simon, H.A.: 1972, *Human Problem Solving*. Englewood Cliffs, N.J.: Prentice-Hall.

[129] Pylyshyn, op. cit. 1973, p. 22.

[130] Devitt, op. cit. 2006b, p. 22

processing rules". Devitt is simply rehearsing Chomsky's very reasons for distinguishing a level of abstract computations *à la* Marr from the processing levels. Devitt seems to appreciate the point in a footnote: "I do not take it [a grammar] to be real simply in virtue of its meeting the Respect Constraint. But this difference may be just verbal."[131] Indeed, arguably, this footnote vitiates the rest of Devitt's book.

15. 'VERBAL BEHAVIOUR' AS GURGLING AND THROAT CLEARING.

Nevertheless, Devitt's position deserves closer attention as a case study of the tenacious grip of a certain misconception – manifest here as the idea that linguistics is about tokens. Devitt's central thesis that linguistics is not a branch of psychology rests on his argument that "there is something other than psychological reality for a grammar to be true of: it can be true of a *linguistic* reality."[132] This "linguistic reality" is constituted by the "outputs of competence" such as "physical sentence tokens" and the "properties of symbols" or "certain sounds in the air, inscriptions on paper"[133] "like the very words on this page."[134]

Surprisingly, Devitt[135] acknowledges that his position corresponds with the Bloomfieldian 'nominalism' that was supplanted by 'conceptualism' on the basis of Chomsky's powerful criticisms.[136] However, Devitt says: "Yet, so

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[131] Devitt, op. cit. 2006b, p. 67, fn. 6.

[132] Devitt, op. cit. 2006b, p. 17.

[133] Devitt, op. cit. 2006b, p. v.

[134] Devitt, op. cit. 2006b, p. 31.

[135] Devitt, op. cit. 2006b, p. 26.

[136] Katz, J.J.: 1981, *Language and Other Abstract Objects*. Totowa: Rowman and Littlefield.

far as I can see, these criticisms are not of the nominalism of the structuralists but rather of their *taxonomic methodology*, a methodology in the spirit of positivism."[137] Accordingly, Devitt does not demur from a concern with objects that are "parts of the spatio-temporal physical world", "physical sentence tokens" as the "symbolic outputs of the mind/brain."[138] Here Devitt is confessing in effect that he has not taken the critique of *nominalism* seriously. Thus, tellingly, in the same manner, Devitt sees only the *methodological* problems of Skinner's Behaviourism and misses the notorious problem with the very concepts employed. Devitt thinks that a nominalistically conceived "linguistic reality" of physical tokens has an epistemic and explanatory priority over a psychological reality, but the situation is exactly the reverse. Devitt professes acceptance of Chomsky's critique saying: "I very much agree with this rejection of behaviourism."[139] However, Devitt sees the critique as bearing only on "a crude empiricist dislike of things unseen; an unwillingness to posit theoretical entities that explain the observed phenomena." Nevertheless, the undoubted allergy of behaviourism to theoretical posits is merely a symptom of deeper misconceptions. That is, the theoretical posits that Skinner sought to eschew were not merely theoretical entities, but also *mentalist* notions to be avoided by supposedly "objective" concepts such as 'stimulus' and 'response'. Chomsky's remarkable review exposed not just the fear of hypotheses as such, but Skinner's tacit, unwitting commitment to mentalist conceptions. This fatal flaw in the behaviourist apparatus is not the same as the mistake of assuming that behaviour is under stimulus control, as Devitt seems to

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[137] Devitt, op. cit. 2006b, p. 26.

[138] Devitt, op. cit. 2006b, p. 26.

[139] Devitt, op. cit. 2006b, p. 88.

think.[140] Thus, Devitt's very identification of "outputs of a competence," employs what Chomsky describes as a device that is "as simple as it is empty" for it "simply disguises a complete retreat to mentalistic psychology."[141]

As Smith has put it, "Without the cognitive wherewithal to represent sounds as symbols they would be heard as no more than inarticulate gurgling or throat clearing."[142] Laurence makes the same point saying "Even the sound properties in language are abstract, not directly 'there' in the physical realization of language" and, similarly, other features of sentences proposed in grammars "will not be present in the physical realization of language."[143] In short, Devitt's elaborate apparatus reduces either to a futile interest in a heterogeneous range of physical data or an unwitting inquiry into mental competence after all.

16. THEFT OR HONEST TOIL?

Evidently, Devitt's approach has what Russell referred to as "the advantages of theft over honest toil"[144] in his claim that attention to actual tokens may, nonetheless, abstract from the irrelevant features of inscriptions and sounds "focussing simply on the syntactic properties that we are interested in."[145] However, focussing on syntactic properties we are interested in must rely on

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[140] Devitt, op. cit. 2006b, p. 87.

[141] Chomsky op. cit. 1959, p. 32.

[142] Smith, op. cit. 2006, p. 438.

[143] Laurence op. cit. 2003, p. 89.

[144] Russell, B.: 1919, *Introduction to Mathematical Philosophy.* London: Allen & Unwin, p. 71.

[145] Devitt, op. cit. 2006b, p. 24.

precisely the abstract idealizations of a generative approach. Thus, Devitt says he can account for the fact that "The outputs of a linguistic competence, physical sentence tokens, are governed by a system of rules." But of course, this is just sleight-of-hand in which Devitt is tacitly relying on linguistic types and their mental underpinning. The "system of rules" is precisely a generative grammar in Chomsky's sense.

Devitt cites Fodor's statement of the fundamental explanatory problem, namely, the question: What property does an acoustic object – *a token of linguistic type* – have that enables it to convey a message. We have seen that Devitt's answer is that grammatical explanation may be "concerned, quite straightforwardly, with the properties of symbols of a language, symbols that are the outputs of a competence."[146] However, Sylvain Bromberger notes that linguists "habitually conflate mention of tokens with mention of types" but "tokens are not what linguistics is primarily concerned with. Types are."[147] We may note an essential observation bearing on Devitt's view:

> Speech utterances are, after all, very different from other noises and articulatory gestures. Unlike other noises, they are produced by agents with phonological, syntactic, semantic, and pragmatic intentions. They embody and manifest such intentions. And they have attributes that encode such intentions. Their underlying phonological structure, the number and structure of their surface phonological segments, the category of their constituents, their thematic structure, their constituent structure, their logical form are among such attributes.

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[146] Devitt, op. cit. 2006b, p. 31.

[147] Bromberger, S.: 1989, Types and Tokens in Linguistics. In A. George (ed) *Reflections on Chomsky*. Oxford: Basil Blackwell; reprinted in his *On What We Know We Don't Know*. Chicago: University of Chicago Press, 1992, p. 59.

Utterances are endowed with these attributes by their creators, that is, by their utterers.[148]

Bromberger concludes "linguistics is not just about types and tokens but is also inescapably about minds." Thus, he writes:

Types turn out to be rather innocuous things to which only the most unimaginative nominalists should object.[149]

Confirming this diagnosis, in a revealing remark Devitt says: "This work and talk [by linguists] seems to be concerned with the properties of items like the very words on this page."[150] Here we see the way that Devitt is victim of the interpretative illusion Kirsh referred to as arising from "the bewitching image of a word printed on a page."[151]

17. POSSIBLE IDEALIZED HORSESHOES

The 'cognitive revolution' and the study of generative grammar involved a shift that Devitt unintentionally seeks to reverse – the shift described by Chomsky "from behavior or the *products of behavior* to states of the mind/brain that enter into behavior."[152] Although Devitt professes his anti-behaviourist credentials, he endorses a central doctrine of behaviourism,

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[148] Bromberger, op. cit. 1989, p. 73.

[149] Bromberger, S. and Halle M.: 1992, The Ontology of Phonology. In S. Bromberger, *On What We Know We Don't Know*. Chicago: University of Chicago Press, p. 15.

[150] Devitt, op. cit., 2006b, p. 31.

[151] Kirsh, op. cit. 1990, p. 350; see also Hadley, R.F.: 1995, The "Explicit - Implicit" Distinction. *Minds and Machines*, 5, 219-242.

[152] Chomsky op. cit. 1986, p. 3; see also Chomsky op. cit. 2000, p. 5; emphasis added.

namely, a concern with the products of behaviour or physical tokens that are the actual outputs of competence. Devitt illustrates his approach with the contrast between "the competence of a blacksmith and the horseshoes he produces."[153] Devitt's "key point" is "that the "theory" of the horseshoes is one thing, the theory of the competence, another, because horseshoes are very different from the competence to produce them.". For a reader of Chomsky's review of Skinner, it is revealing that Devitt explains that he "is not concerned simply with the actual outputs", but also with "possible idealized outputs."[154] He says "sometimes what a blacksmith produces is not a good horseshoe" and, therefore, "The theory is only concerned with the nature of the outputs of a competence *when it performs as it should*" (emphasis added) in the sense that the theory idealizes from actual products of behaviour. For Devitt, such idealization also involves a concern "with any of an indefinitely large number of outputs that they might produce."[155] However, with this entire counterfactual apparatus, Devitt disguises the central idea of generative linguistics as if his project is something other than Chomsky's own enterprise.

Devitt confirms Pylyshyn's earlier diagnosis that "A constant source of misunderstanding and debate over the relevance of competence theories [to psychology] has to do with the fact that they define infinite sets."[156] For example, Devitt relegates to a footnote a crucial objection that Katz has raised concerning the nominalist restriction to actual physical tokens while

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[153] Devitt, op. cit 2006b, p. 17.

[154] Devitt, op. cit 2006b, p. 24.

[155] Devitt, op. cit 2006b, p. 18.

[156] Pylyshyn op. cit. 1973, p. 40.

committed to an infinite number of sentences – "nonactual possible sentences". Devitt says:

> The truth behind the talk of the nonactual can be simply that the grammar is lawlike. And the truth behind the talk of the infinite can be simply that there is no limit to the number of different sentence tokens that might be governed by the rules the grammar describes.[157]

However, Devitt's preferred talk of there being "no limit" to "nonactual possible sentences" is simply code for Chomsky's familiar talk of our Humboldtian infinite capacity through finite means and the Cartesian "creativity" of language via its productivity. In particular, Devitt's talk of a grammar being "lawlike" evidently means just the generative capacity of recursive procedures. Devitt's notions are cast in a way that suggests some departure from Chomsky's apparatus consistent with a nominalist framework, but in fact simply paraphrase the familiar generative ideas. Devitt's manoeuvre is quite transparent where he explains: "the study of linguistic tokens is not concerned only with actually observed tokens: like any other scientific theory it is modal, concerned with any possible token"[158] – Devitt's philosophical code for a generative grammar. Thus, *good* horseshoes and *potential* horseshoes are not physical in the sense required by Devitt, but a commitment to just the idealization of Chomsky's grammar as "a system of rules that generates and infinite class of "potential percepts,"[159] or perhaps potential horseshoes.

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[157] Devitt, op. cit. 2006b, p. 27, fn. 13.

[158] Devitt, op. cit. 2006b, p. 28.

[159] Chomsky, op. cit. 1972, p. 168.

Devitt responds to the charge that physical tokens are insufficiently abstract and therefore "there aren't enough of them" in a way that is very revealing. He says "One might as well object that a theory of tigers can't be about the beasts that stalk India and excite interest in zoos."[160] However, this is an inappropriate analogy since the finitude of tiger tokens is irrelevant to the central question of interest: Tigers are not artefacts or the products of human creative capacity. A theory of tigers does not need to account for their existence merely as potential instances of recursive procedures. The actual finitude of uttered sentences is not the relevant fact about language, as Devitt insists, but rather the evidence of its unboundedness. Likewise, a theory of numbers must account for their potential infinity even if only a finite subset can ever be realized. Above all, we could hardly expect to understand the fundamental properties of the number system if we confined attention to token numeral inscriptions.

18. THEY AIN'T NOTHIN' UNTIL I CALL 'EM.

Not surprisingly, then, Devitt defends his view by citing as illustrative the very objects of inquiry that are most damaging to his case such as chess pieces or currency – human artefacts and conventional objects guided by rules of social interaction. Devitt asks the crucial question about artefacts: "What makes a physical object a pawn or a dollar?"[161]However, contrary to his own view, pieces of wood and their movements don't even count as tokens of symbols or "outputs of competence" except insofar as they are classified in this way by prior conceptualisation according to mentally represented, intentional rules – a point long familiar in the philosophy of

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[160] Devitt and Sterelny op. cit. 1989, p. 516.

[161] Ibid.

social sciences.[162] John Rawls had made the point also using the analogy of games, saying "the rules of practice are logically prior to particular cases" because "there cannot be a particular case of an action falling under a rule of a practice unless there is a practice."[163] Thus, "No matter what a person did, what he did would not be described as stealing a base or striking out or drawing a walk unless he could also be described as playing baseball, and for him to be doing this presupposes the rule-like practice which constitutes the game."[164]

Devitt takes the analogy with chess to show that linguistic investigation is not psychological. Undeniably, of course, we might abstractly investigate the Queen's Gambit, Sicilian Defence and Nimzovich variation without concern for their status as chess knowledge. However, unlike tigers, the physical chess pieces and their moves do not have explanatory priority. Clearly anything might serve as a token of a knight or bishop. The central issue is not the *independence* of the abstract rules governing these objects, but the very status of the objects as intentional or mental. Indeed, Devitt's assertion of the *autonomy* of an abstract, formal inquiry independent of its possible realization is just Chomsky's own point about the nature and promise of the generative approach to linguistics as "the abstract study of certain mechanisms."[165] Above all, Chomsky claims that language has no

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[162] Winch, P.: 1958, *The Idea of a Social Science*, London: Routledge.

[163] Rawls, J.: 1955, Two Concepts of Rules. *The Philosophical Review*, 64, 3-32; reprinted in S. Gorovitz (ed) *Utilitarianism: John Stuart Mill*. New York: Bobbs-Merrill, p. 189.

[164] Ibid. In a famous anecdote, three baseball umpires remark in turn: 'I call 'em as I see 'em,' said the first, an empiricist. 'I call 'em the way they are,' said the realist. The third, Charlie Moran, explained: 'They ain't nothin' until I call 'em.'

[165] Chomsky, op. cit. 1980b, p. 188.

existence apart from its mental representation,[166] though he doesn't wish to legislate what enquiries someone may choose. On the other hand, however, he says that study of the outputs of competence like horseshoes and language tokens has proven to be sterile.

19. INTUITIONS

Devitt suggest that, rather than being "the voice of competence", linguistic intuitions are "opinions resulting from ordinary empirical investigation, theory-laden in the way all such opinions are" (2006b, 98). Moreover, Devitt argues that "speakers' intuitions are not the main evidence for linguistic theories" (2006b, 96) and do not support the claims for grammars as mentally represented. However, to appreciate Chomsky's conception and the role of intuition we may note that Lerdahl and Jackendoff have developed a grammar of music saying: "We believe that our generative theory of music can provide a model of how to construct a competence theory (in Chomsky's sense)."[167] In particular, Lerdahl and Jackendoff write: "We take the goal of a theory of music to be a formal description of the musical intuitions of a listener who is experienced in a musical idiom."[168] They explain that they are adopting "a stance analogous to that taken in the study of language by the school of generative-transformational grammar."[169] The details are irrelevant here, but music cognition serves to illustrate Chomsky's point concerning the nature of the enterprise. In particular, since music has no content or reference to the world, these

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[166] Chomsky op. cit. 1972, p. 169.

[167] Lerdahl, F. and Jackendoff, R. 1983: *A Generative Theory of Tonal Music*. Cambridge, Mass.: MIT Press, p. xi.

[168] Lerdahl and Jackendoff op. cit. 1983, p. 1.

[169] Lerdahl and Jackendoff op. cit. 1983, p. 5.

factors need not give rise to the irrelevant objections and attributions we have seen in Devitt and Rey. Thus, as I. Giblin[170] has persuasively shown, despite parallel, spurious objections, we may say that a music grammar is internally represented in exactly the same sense as a language – tacit knowledge captured by the rules of a formal generative theory.[171] In particular, we see that Devitt's "Representational Thesis" is utterly inappropriate in the case of musical cognition. Of course, one could gratuitously defend something like Devitt's position by claiming that the formalisms of a generative theory of music were not "psychologically real" and not about a mental reality underlying musical intuitions, but about something else, perhaps a "musical reality" or about the heavenly spheres.

In his efforts to clarify his view, Chomsky[172] has drawn an analogy with mathematics which, like music, can be construed in the manner of a grammar representing tacit knowledge of conceptual structures. Indeed, David Gil[173] has argued that the intuitionist or conceptualist account of mathematics takes intuitions in essentially the same way that a linguist does, namely, as data to be explained by a formal theory. In the same vein, Chomsky writes:

> One could perhaps take the intuitionist view of mathematics as being
> not unlike the linguistic view of grammar. That is grammar does not
> have an independent existence apart from the functions of the human

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[170] Giblin, I.: 2007, *Music and Cognition: Why music is better than its sounds*, doctoral dissertation, University of New South Wales.

[171] See also Peacocke, C.: 1989, When Is a Grammar Psychologically Real? In A. George (ed) *Reflections on Chomsky*. Oxford: Basil Blackwell, p. 119.

[172] Chomsky, op. cit. 1982, p. 16.

[173] Gil, D.: 1983, Intuitionism, Transformational Generative Grammar and Mental Acts. *Studies in History and Philosophy of Science*, 14, 3, 231-254.

mind, but they are in fact precisely systems of principles that the human mind is capable of constructing, given the primary linguistic data.[174]

Of course, propositions of mathematics may be construed as referring to a realm of abstract objects, but such Platonist ontology is irrelevant to the crucial issue of interest here. Even if Platonism is defensible, the status of intuitions and mathematical knowledge itself as internally represented mental structures is unaffected. Indeed, the point is reinforced by Katz's[175] apostasy from his earlier mentalism to Platonism about linguistics itself. Above all, Katz' Platonism is not contrary to the idea that linguistic knowledge is represented in the mind, reflected in intuitions, and may be studied as a branch of psychology. Kurt Gödel's famous argument for a Platonism cited the fact that "we do have something like a perception also of the objects of set theory." In particular, Gödel added:

I don't see any reason why we should have less confidence in this kind of perception, i.e. in mathematical intuition, than in sense perception.[176]

Charles Parsons has argued, "Gödel's conception of intuition … is not quite so intrinsically connected with his Platonism as one might think"[177] and the

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[174] Chomsky, op. cit. 1982, p. 16.

[175] Katz, op. cit. 1981.

[176] Gödel, K.: 1947, What is Cantor's continuum problem? In P.A. Schilpp (ed) *The Philosophy of Bertrand Russell*. Evanston: Northwestern University Press; reprinted in P. Benacerraf and H. Putnam (eds) *Philosophy of Mathematics*, 2nd edition, Cambridge: Cambridge University Press 1983, 470-485, p. 483.

[177] Parsons, C.: 1995, Platonism and Mathematical Intuition in Kurt Gödel's Thought. *The Bulletin of Symbolic Logic*, 1, 44-74.

question of the status of intuition as evidence for internal, mental representations is independent of these ontological speculations. Pylyshyn, too, has explicitly drawn the parallel between the conceptions of mathematical intuitionists such as Heyting and Chomsky for whom "the empirical world with which they deal is a world of mental structures which are explored via intuitions."[178]

20. PERCEPTUAL PSYCHOLOGY

Above all, Gödel's reference to intuition as a kind of perception is crucial here. Despite Devitt's animadversions against intuitions, this form of evidence is commonplace and uncontroversial elsewhere throughout psychology. Nevertheless, Devitt explicitly rejects the analogy of linguistic intuitions with perceptual experience.[179] However, Devitt's objection to the analogy is surprising because he draws precisely the wrong conclusion from his own allusion to Fodor's[180] account of the visual module.[181] Devitt suggests that perceptual judgments are unlike purported linguistic intuitions because the task of the visual module "is to deliver information to the central processor of *what is seen*" which would be analogous to the content of what is said and not syntactic properties of expressions. However, the perceptual judgments that are relevant in the visual case are emphatically not "*what is seen*" in the "success" sense of such terms, but in the psychological sense of what *seems* to be the case. The distinction is, after

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[178] Pylyshyn, op. cit. 1973, p. 31.

[179] Devitt, op. cit. 2006b, p. 112.

[180] Fodor, J.A.: 1983, *The Modularity of Mind*. Cambridge, Mass.: MIT Press.

[181] Ironically, Fodor illustrates his point with Ullman's algorithmic theory, exactly the same example used by Chomsky (op. cit. 1986, p. 264) to illustrate the nature of his own computational theory. See Ullman, S.: 1979, *The Interpretation of Visual Motion*, Cambridge, Mass.: MIT Press.

all, well known to philosophers[182] though Devitt relies irrelevantly on the veridical or "achievement" conception of "what is seen."[183] Devitt's misunderstanding here is further indicated by his reference to "correct" intuitions[184] and doubts about "Cartesian access to *the truth*",[185] as if there is some objective fact of the matter beyond the subject's perceptions. In the same vein, Devitt asks "whose intuitions should we most trust?"[186] and answers "the intuitions that linguistics should mostly rely on are those of the linguists themselves because the linguists are the most expert."[187] However, in psychology as in linguistics, there is no relevant expertise about the data beyond the authority of the subject's own perceptions. In this sense, we are all experts or, in Hoffman's term, "visual virtuosos."[188] The visual module doesn't provide *the truth* about the distal stimulus but only a *perceptual judgment* that Ullman's algorithm purports to explain, just like Chomsky's grammar.

The familiar perceptual phenomena that form a large part of the data for the psychology of vision include such things as the various "constancies," ambiguous figures such as Necker Cube and duck-rabbit, anomalous figures such as the Penrose Triangle, Kanizsa illusory contours, and the ubiquitous Müller-Lyer Illusion, *inter alia*. The phenomena of interest in all such cases are the percepts of normal viewers – the judgments or construals – that

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[182] Ryle, G.: 1949, *The Concept of Mind*. London: Hutchinson, p. 152.

[183] Devitt, op. cit. 2006b, p. 114.

[184] Devitt, op. cit. 2006b, p. 111.

[185] Devitt, op. cit. 2006b, p. 106.

[186] Devitt, op. cit. 2006b, p. 108.

[187] Devitt, op. cit. 2006b, p. 111.

[188] Hoffman, D.D.: 1998, *Visual Intelligence: How We Create What We See*. New York: Norton and Company.

constitute the data to be explained by theories of visual processing. The two interpretations of the Necker Cube known intuitively to a "visual virtuoso" are closely analogous to the two meanings of an ambiguous sentence as percepts of a native speaker. In the light of these remarks, we may better appreciate Chomsky's explanation of the status of grammars, noting the general terms in which it is presented, reflecting standard practice in perceptual psychology. Chomsky continues:

> A grammar is a system of rules that generates an infinite class of "potential percepts", … In short, we can begin by asking "what is perceived" and move from there to a study of perception.[189]

From such remarks we can see that the place of intuition in grammars hardly deserves to be controversial, unless the whole of perceptual psychology is also open to the difficulties alleged to arise for linguistics. Thus, Chomsky explained the interest of his famous pair 'John is easy/eager to please' saying that introspective "data of this sort are simply what constitute the subject matter for linguistic theory. We neglect such data at the cost of destroying the subject."[190]

21. CONCLUSION

Devitt's widely shared concern about the "psychological reality" of grammars appears to be a manifestation of deep errors that account for the persistence of the dispute. Moreover, if this diagnosis is correct, we would expect the same errors to cause perplexity and controversy in other domains

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[189] Chomsky, op. cit., 1972, p. 168,9.

[190] Chomsky, N.: 1964, Current Issues in Linguistic Theory. In *Structure of Language*, J. A. Fodor and J.J. Katz (eds) New York: Prentice-Hall. P. 79.

of cognitive science. Indeed, it is not difficult to recognize manifestations of essentially the same problems in other recalcitrant debates concerning mental representation.[191] Specifically, the debates turn on a certain illusion of explanatory adequacy arising when posited representations are intelligible in a direct, intuitive sense, like the "bewitching image of a word printed on a page." Thus, we have seen that rules are deemed inappropriate as psychological hypotheses if they are not in a form that might actually "guide" behaviour, but are merely being "respected" or conformed with, perhaps "simply embodied". For related reasons, lacking intelligible representations, neural nets are classified as mere embodiments behaving "as if" rule governed. It is not difficult to see that the operative criterion has also been applied to mental representations in other notoriously controversial cases: Searle's criterion of intentionality in his 'Chinese Room' is the intelligibility of symbols to himself, the theorist as homunculus. By contrast, unlike symbolic "squiggles" that *fail* the test of intuitive intelligibility, pictorial representations have been mistakenly deemed appropriate explanations of visual imagery because they *are* intuitively intelligible to the theorist, as Pylyshyn has tirelessly argued.[192] Of course, Searle[193] and Kosslyn[194] do not recognize this specious source of the plausibility of their theoretical posits. For closely related reasons, Carruthers[195] has argued that we think in a natural language rather than

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[191] See Slezak op. cit. 2002a, 2002b.

[192] Pylyshyn, Z.: 2003, *Seeing and Visualizing: It's Not What You Think*. Cambridge, Mass.: MIT Press.

[193] Searle, J.: 1980a, Minds, Brains and Programs. *Behavioral and Brain Sciences*, 3, 417-24; reprinted in in M.A. Boden (ed) 1990: *The Philosophy of Artificial Intelligence*. Oxford: Oxford University Press.

[194] Kosslyn, op. cit. 1983.

[195] Carruthers, P.: 1996, *Language, Thought and Consciousness: An Essay in Philosophical Psychology*. Cambridge: Cambridge University Press. Carruthers, P.:

Fodor's Language of Thought or 'mentalese'.[196] Not surprisingly, Devitt[197] had earlier defended the same claim, even if he has now abandoned it.

We see that positing representations that are intelligible to the theorist is precisely the same mistake as complaining of representations that they are not. The mistake is one that Chomsky had drawn attention to in relation to the unnoticed shortcomings of traditional grammars. Chomsky explained that traditional grammars produce an illusion of explanatory completeness, but in fact have "serious limitations so far as linguistic science is concerned" because the success of the grammar depends on being "paired with an intelligent and comprehending reader". This unnoticed reliance on the user's linguistic ability is illegitimate because it is just what the theory is supposed to explain. That is, it is the reader and not the grammar that is doing a significant part of the work. Speaking of a traditional grammar, Chomsky explains:

> The understanding reader contributes not new facts but a technique for organizing and arranging facts. What he accomplishes can fairly be described as theory construction of quite a nontrivial kind. The abilities that he develops constitute an implicit theory of the language he has mastered, … The reader, is of course, not at all aware of what he has done or how he has done it. … Reliance on the reader's

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1998, Thinking in Language? In P. Carruthers and J. Boucher (eds) *Language and Thought: Interdisciplinary Themes*. Cambridge: Cambridge University Press.

[196] Slezak, op. cit. 2002b.

[197] Devitt and Sterelny, op. cit. 1987.

intelligence is so commonplace that is significance may be easily overlooked.[198]

Ryle[199] had warned against just this kind of error arising from invoking internal representations which have their meaning because we can understand them. Of course, this kind of meaning is just what is to be explained and, therefore, it is not surprising that the most recalcitrant debates in philosophy and cognitive science recur wherever this error is possible.

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[198] Chomsky, N.: 1962, Explanatory Models in Linguistics. In E. Nagel, P. Suppes, A. Tarski (eds) *Logic, Methodology and Philosophy of Science*. Stanford: Stanford University Press, 528-550. P. 528,9.

[199] Ryle, G.: 1968, A Puzzling Element in the Notion of Thinking. In P.F. Strawson (ed) *Studies in the Philosophy of Thought and Action*. Oxford: Oxford University Press, 7-23.