Comments on Brandom, "Elaborating Abilities: The Expressive Role of Logic"[*]

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I find Bob's proposal for the demarcation of logic very exciting. I'll try to explain why. Then I'll mention a few things I still find puzzling about the proposal, in the hopes that Bob can clarify them.

I

In my dissertation (which I wrote under Bob's supervision), I argued that in order to understand the confused state of contemporary debates about the demarcation of logic, one has to go back to Kant.[1] Following tradition, Kant thought of logic as a normative discipline, with the job of identifying norms for *thought*. On this broad construal, it makes sense to talk of (say) the logic of jurisprudence, or of geometrical thinking, or of biological thinking. Kant called these "special logics." But in addition to all the special logics, which provide "rules of correct thinking as regards a certain kind of object," Kant recognized a "general" logic, which provides rules for thought *as such*, regardless of its objects (and even regardless of whether it *has* an object).

When Kant made his critical turn, the notion of general logic posed a serious problem for him. He held that concepts could have representational content (objective validity) only insofar as they applied

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[1]*What Does It Mean to Say that Logic Is Formal?*, University of Pittsburgh, 2000. Available at `http://johnmacfarlane.net/diss.html`.

to some object that could be given to us in intuition (that is, in a singular representation). And he now held that (for us mortals) all singular representation is sensible. It follows that concepts can have content only insofar as they apply to potential objects of the senses. So, if we are after norms for thought as such, and accordingly abstract entirely from sensibility, we thereby abstract entirely from representational content, and hence, from truth. The norms of general logic, then, could not be rooted in very general facts about reality, as Kant's Leibnizian predecessors seem to have thought. (Wolff: "It is plain…that principles should be sought from ontology for the demonstration of the rules of logic."[2])

The problem, then, was to explain how there could *be* norms for thought as such, if thought is intelligible independently of its relation to objects. These norms could not be grounded in metaphysics, for the reasons given above; nor could they be grounded in empirical psychology, which tells us how we *do* think, not how we ought to. So by virtue of what are thinkers *qua* thinkers bound by these norms?

Kant's solution is well known, because it had a profound impact on thinking about logic well into the twentieth century. The norms of general logic, he says, concern only the *form* of thought, "the formal conditions of agreement with the understanding."[3] That is why they are binding on thought as such, whether or not it relates to potential objects of the senses. But "since these conditions can tell us nothing at all as to the objects concerned, any attempt to use logic as an instrument (organon) that professes to extend and enlarge our knowledge can end in nothing but mere talk."[4] So we explain the universal bindingness of general logic on thought by taking it to be *formal* and denying that it any content or distinctive concepts of its own.

This is a nice, satisfying story, but in later thinking about logic, it begins to unravel. What happens in Frege is particularly interesting, because given Frege's ambition to show that arithmetic is implicit in pure logic, it really matters how logic is demarcated. Frege retains the Kantian idea that logic is distinguished from other disciplines by providing norms for thought as such, but he rejects the Kantian conception of logic as "formal." His rejection is, I think, overdetermined: it is due in part to

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[2]Christian Wolff, *Philosophia Rationalis Sive Logica*, sec. 89. In *Gesammelte Werke* 2.1, ed. J. École et al., Hildesheim and New York: Georg Olms, 1983.

[3]*Critique of Pure Reason*, A61/B86, trans. Norman Kemp Smith, New York: St. Martin's, 1929.

[4]*Ibid.*

his important technical advances and in part to his philosophical differences from Kant.[5]

Frege's replacement of the old subject-predicate conception of logical structure with a function-argument conception makes Kant's story about the form of thought, as represented in the Table of Judgements, unavailable to him. Universality and negation are no longer regarded as ways in which subject and predicate can be related in judgement, but as concepts in their own right, in the same semantic categories as many nonlogical concepts. "$\forall x$" refers to a second-level concept, just like "applies to Socrates"; "$\neg$" refers to a first-level concept, just like "is a horse." If there is any notion of the "form of a thought" available to Frege, it is the pattern of functional application, but this is too meager to form the basis of anything recognizable as logic.

In addition, Frege rejects some of the Kantian assumptions that required Kant to claim that logic was "formal." He rejects Kant's idea that concepts have content or significance only insofar as they can be applied to objects given in intuition (in part because of his new function/argument conception of logical structure, which allows him to see purely quantified judgements as relating concepts, with no "relation to an object"). He also rejects the Kantian view that all singular representation is sensible, claiming that we can have singular thoughts about nonsensible objects, like numbers. So unlike Kant, he is not forced to the view that norms for thought as such must be grounded in the formal conditions of thought.

In the end, Frege clearheadedly rejects the Kantian doctrine that general logic must be formal. He takes logical norms to be grounded in very general truths about the world, and he takes logic to have its own concepts, from whose content it cannot abstract. "Just as the concept *point* belongs to geometry," he says, "so logic, too, has its own concepts and relations; and it is only in virtue of this that it can have a content."[6]

The trouble is, having jettisoned Kant's explanation of the absolutely general bindingness of logical norms on thought as such, Frege has no very good explanation of his own. What is it about thought that makes it the case that these very general truths about the world—the truths described in Frege's

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[5]For a much more detailed discussion, see my "Frege, Kant, and the Logic in Logicism," *Philosophical Review* 111 (2002), 25–65.

[6]"On the Foundations of Geometry: Second Series," trans. E.-H. W. Kluge, in Gottlob Frege, *Collected Papers on Mathematics, Logic, and Philosophy*, ed. Brian McGuiness, Oxford: Blackwell, 1984.

logical axioms—give rise to norms for thought as such? On this point, he says nothing very useful, and even hints that nothing useful can be said.

Frege's student Carnap takes a different approach. He embraces the Kantian "formality" idea that Frege rejected, while rejecting the conception of logic as normative for thought as such. "The formal sciences do not have any objects at all," he says, "they are systems of auxiliary statements without objects and without content."[7] They are, as such, completely unconstrained by facts about the world; they constrain thought by defining a "linguistic framework" within which thought can proceed. But because we can pick different frameworks for different purposes, no one framework can lay claim to being "general" in Kant's sense, that is, normative for thought as such. We may use different, incompatible systems of rules in different inquiries, for different purposes.

Other thinkers rejected *both* elements of the Kantian view of logic, finding them insufficiently clear for scientific purposes. Since this is Prague, I must mention Bolzano, who combined criticism of Kantian talk of formality with scepticism that any principled line can be drawn between logical and nonlogical notions.[8] In the twentieth century, we find Tarksi first echoing Bolzano's scepticism that any principled line can be drawn between logical and nonlogical notions,[9] and then, later in life, proposing a demarcation of logical concepts as those that are invariant under permutations of the underlying domain.[10] Here he appeals to considerations independent of either generality (in Kant's and Frege's sense) or formality, and certainly incapable of justifying a privileged role for logical vocabulary in conceptual analysis.

By the late twentieth century, things had gotten very confused. There was no shortage of principled proposals for how to demarcate logic. All of these proposals made *some* contact with how the discipline was historically conceived. But it had become quite unclear what the debate is really about. Reflecting on the situation, some thinkers quite reasonably concluded that the demarcation problem is

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[7]"Formalwissenschaft und Realwissenschaft," *Erkenntnis* 5, 1934; translated as "Formal and Factual Science" in H. Feigl and M. Brodbeck, eds., *Readings in the Philosophy of Science*, New York: Appleton-Century-Crofts, 1953, p. 128.

[8]*Wissenschaftslehre*, second edition, ed. Wolfgang Schultz, Leipzig: Felix Meiner, 1929. Partial translation as *Theory of Science*, ed. and trans. Rolf George, Berkeley: University of California Press, 1972.

[9]"On The Concept of Logical Consequence" (1936), in *Logic, Semantics, Metamathematics*, second edition, trans. J. H. Woodger, ed. John Corcoran, Indianapolis: Hackett, 1983, pp. 409–420. Morton White, "A Philosophical Letter of Alfred Tarski" (1944), *Journal of Philosophy* 84 (1987), pp. 28–32.

[10]"What are Logical Notions?" (1966 lecture), ed. John Corcoran, *History and Philosophy of Logic* 7 (1986), pp. 143–154.

a pseudoproblem—either because logic is a family resemblance concept with no principled definition, or because all analytic consequences are to be counted as logical, or because the historical "trunk" of logic had branched into many different things with nothing particular in common.[11]

What I like about Bob's proposal is that it connects quite directly with what I regard as the historically central tradition of thinking about logic, the one that runs through Leibniz, Kant, and Frege. It can even be regarded, I think, as a "pragmaticized," modernized version of the Kantian view. On Bob's view, thought—or as he would prefer to say, discursive activity—has a *form*, insofar as it is made possible by the existence of certain basic "practices or abilities." For example, in order to count as engaging in discursive activity at all, one must be able to do something that counts as classifying propositions into those one would assert and those one would reject, and one must be able to do something that counts as classifying inferences as good and bad. Logical vocabulary is vocabulary that is both *elaborated from* and *explicative of* these basic practices, which we might regard as the pragmatic "form" of discursive activity. It can be legitimately applied in explicating any other vocabulary, because the ability to deploy that vocabulary already suffices, when appropriately "algorithmically elaborated," to deploy the logical vocabulary as well. So we have a kind of explanation of the universal applicability and universal bindingness of logic on discourse that appeals to logic's essential connection to the underlying form or basis of discursive activity. In short, a view with the same basic shape as Kant's. (There are also many differences, to be sure—for example, Bob has no need to deny that logic has its own contentful concepts—but I want to emphasize the similarities.)

Once Bob's proposal is in view, I think, we can see how other demarcation proposals—specifically the Gentzen-inspired proposals of Popper, Kneale, Hacking, and others[12] —might be seen in a similar light. For they all take the logical vocabulary to be vocabulary whose use can be explained by algorithmic elaboration from certain basic abilities, like the ability to distinguish good inferences from

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[11]For a survey and critical discussion, see Mario Gómez-Torrente, "The Problem of Logical Constants," *Bulletin of Symbolic Logic* 8 (2002), pp. 1–37, and my article "Logical Constants" in the *Stanford Encyclopedia of Philosophy*, http://plato.stanford.edu/entries/logical-constants.

[12]Karl Popper, "Logic Without Assumptions," *Proceedings of the Aristotelian Society* n.s. 47 (1946–7), pp. 251–292; William Kneale, "The Province of Logic," in H. D, Lewis, ed., *Contemporary British Philosophy*, London: George Allen and Unwin, 1956, pp. 237–261. Ian Hacking, "What is Logic?", *Journal of Philosophy* 76 (1979), pp. 285–319; Kosta Došen, "Logical Constants as Punctuation Marks," in D. M. Gabbay, ed., *What Is a Logical System?*, Oxford: Clarendon Press, 1994, pp. 273–296.

bad, or to recognize certain kinds of patterns. The missing piece in all these projects is an argument that these basic abilities are essential to anything that can count as discursive activity at all.

(Here there's plenty of room for interesting argumentation. For example: if quantifiers are to count as logical, on Bob's view, it must be the case that any autonomous discursive practice must include subsentential structure. But why should that be the case?)

II

Having said why I like Bob's proposal, I now want to raise some questions about it. At the heart of Bob's account of logicality is the notion of a "universal LX-vocabulary." A vocabulary V is universal LX just in case there are sets P_A and P_B of practices-or-abilities such that:

1. V is VP-sufficient for P_A (that is, V suffices to explicate P_A).

2. $P_A \subseteq P_{ADP}$ (that is, P_A is PV-necessary for *every* autonomous vocabulary),

3. P_A is PP-sufficient for P_B (that is, P_B can be algorithmically elaborated from P_A), and

4. P_B is PV-sufficient for V (that is, P_B suffices for the deployment of V).

The paradigm of a universal LX-vocabulary is the vocabulary of conditionals, V_{cond}. V_{cond}, Bob says, is VP-sufficient for P_{inf}, the practice-or-ability of distinguishing good material inferences from bad ones. That is, V_{cond} is sufficient to make this practice explicit. P_{inf} is, in turn, PP-sufficient for P_{cond}, the practices-or-abilities that underlie our use of V_{cond}. That is, the practices underlying use of conditionals can be algorithmically elaborated from the practices involved in distinguishing good material inferences from bad ones. So we have a neat triangle. The vocabulary of conditionals is elaborated from the very same inferential practice that it explicates.

My questions concern the key relations of PP-sufficiency and VP-sufficiency—the L and the X in "universal LX." Let's start with PP-sufficiency. Bob says:

"...the notion of *algorithmic elaboration* gives a definite sense to the claim that the one set of abilities is *in principle* sufficient for the other. This is the sense in which deploying logical vocabulary requires nothing new on the part of discursive practitioners: anyone who can use any base vocabulary already knows how to do everything needed to deploy any universal LX-vocabulary." (p. 33)

But of course this is true only for practitioners who already possess whatever abilities are needed for the algorithmic elaboration of one practice-or-ability from others: for example, the ability to select which practice-or-ability to exercise based on the state it is in, or the ability to chain together two practices-or-abilities so that the output of one serves as the input to the other, or to substitute one response for another in a repertoire it already possesses. A creature that did not possess these basic algorithmic meta-abilities would *not* have everything needed in order to deploy any universal LX-vocabulary. So a more careful statement of Bob's claim would be this:

Anyone who can use any base vocabulary and who also has capacities for algorithmic elaboration already knows how to do everything needed to deploy any universal LX-vocabulary.[13]

This restatement makes it obvious that underlying Bob's demarcation of logical vocabulary is a *pragmatic* demarcation of capacities into "algorithmically elaborative" capacities and all others.[14] What vocabularies count as universal LX will depend, for example, on whether the capacities that count as algorithmically elaborating are limited to those that can be implemented in a finite state automaton. I wonder, then: how much of the work of demarcating universal LX-vocabulary is being carried by the underlying demarcation of algorithmically elaborative capacities? How sensitive is Bob's demarcation of logic to this underlying demarcation? And what demarcation is he presupposing? As Bob notes, there are serious differences in strength between different idealizations of algorithmic elaborability (single-state automata, finite-state automata, two-stack pushdown automata, etc.). But he does

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[13]Cf. Lecture 2, p. 10: "Algorithmic PP-sufficiency is what holds in case *if* a system does have those algorithmic abilities, then that is *all* it needs to elaborate its basic abilities into the complex one in question."

[14]This is explicit in Lecture 2, p. 5: "*algorithmic elaboration* of primitive abilities into complex ones plays the same role in pragmatic analysis that *logic* does in semantic analysis."

not say which he is presupposing in his analysis, and he does not make clear how much of the load of demarcating logical vocabulary is borne by this choice.

III

Let's now turn to VP-sufficiency. Consider the paradigm example of conditionals. The vocabulary of conditionals is supposed to "suffice to explicitly specify" the practice-or-ability of distinguishing good material inferences from bad ones. On a weak reading, the claim might be just that by using conditionals, we can *partially* describe the inferential practice. On a stronger reading, the claim is that using the language of conditionals, we can *fully* describe the inferential practice.

I suspect that Bob intends the stronger reading here. He says in Lecture 1 that

> *VP-sufficiency* is the relation that holds between a vocabulary and a set of practices-
> or-abilities when that vocabulary is sufficient to *specify* those practices-or-abilities. …
> VP-sufficient vocabularies let one *say* what it is one must *do* to be engaging in those
> practices or exercising those abilities. (p. 16)

To specify a practice, one assumes, is not just to say some true things about it, but to characterize it completely. The stronger reading is also suggested by Lecture 1's syntactic examples: when Bob notes that context-free vocabularies suffice to specify any Turing machine, he means that they suffice to specify the Turing machines *completely*, not just partially. (The latter claim wouldn't be very interesting.) And it seems required for the idea that "pragmatic expressive bootstrapping" can occur when one vocabulary is VP-sufficient for practices-or-abilities that are PV-sufficient for another vocabulary.

However, it seems to me that in the paradigm case of conditionals, Bob is only entitled to the weaker claim. It is plausible that by using conditionals, we can partially describe the inferential practice that gives our concepts their contents. But to *completely* characterize this practice, we will need more expressive power.

One reason for this is that, in order to use conditionals to explicitate an inferential practice involving sentences *A*, *B*, and *C*, one would need to *use* these sentences. "If *A* and *C*, then *B*" expresses an

inferential propriety; "If '*A*' and '*C*', then '*B*'," which mentions the sentences without using them, is ungrammatical; and "if…then" by itself says nothing. So a vocabulary *V* cannot *completely* describe an inferential practice involving, say, snail talk, unless it contains lots of sentences about snails, in addition to conditionals.

It is difficult to see how this simple point can be squared with Bob's view that the vocabulary of conditionals, V_{cond}, is universal-LX. If V_{cond} includes sentences about snails, then it is implausible that a set of practices-or-abilities that is PV-sufficient for deploying V_{cond} could be elaborated out of a set of practices-or-abilities that is PV-necessary for *every* autonomous vocabulary. On the other hand, if V_{cond} doesn't include sentences about snails, it is implausible that it is VP-sufficient for *any* set of practices or abilities at all.

Even if we ignore this problem and allow the explicitating vocabulary to include not just conditionals, but sentences for them to connect, we will still not have enough to make a material inferential practice *fully* explicit. For whether one takes the inference from *A* to *B* to be a good one will depend not just on *A* and *B* but on one's other commitments. For example, I might endorse the inference from "The match is struck" to "it will light" in most circumstances, but not when I also endorse "the match is wet." The language of conditionals allows one to make explicit the inferential proprieties one recognizes relative to one's current background commitments. But doing this only *partially* characterizes one's inferential practices. Two inferential practices that agree on which inferences are good relative to a set *K* of background commitments might diverge wildly on which inferences are good relative to a different set *K′*. To describe the difference between these practices, it seems to me, we will need more than the language of conditionals. (It won't help to add the background commitments explicitly to the antecedents of the conditionals, because in general the required "ceteris paribus" clause will not be finitely specifiable. As Bob says in Lecture 4: "There need be no definite totality of possible defeasors, specifiable in advance.")

If conditionals aren't VP-sufficient to specify an inferential practice, is there some other vocabulary that is? I don't think bringing in modal vocabulary and counterfactual conditionals will help. Counterfactuals can give us *partial* information about how the inferences a speaker endorses depend on background assumptions. But I don't see how they can give us the *full* information about this we

would need for a complete specification of an inferential practice. The reason, again, is that endorsement of the counterfactuals themselves will depend on background assumptions. If I think there's a trampoline below me, I'll endorse the counterfactual "If I jumped out of this building, I'd live," but not if I think there is a moat containing crocodiles.

A vocabulary V such that a set of sentences in the language $L \cup V$ can completely specify the material inferential practices underlying the language L will presumably need to contain a sign for entailment and a way of talking about (countably infinite) *sets* of sentences. We'll then be able to say things like, "the set X of sentences entails the sentence A relative to the set Y of background commitments." The totality of true statements of this form will completely specify the background inferential practices. But now we are outside of paradigm "logical" territory. Certainly this is a far cry from the comfortable conditional, and it seems highly unlikely that this vocabulary could be supported by practices algorithmically elaborable from practices necessary for any autonomous vocabulary.