The puzzle avoidance motivation for deflationary nominalism

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1. Introduction

In a series of works, Jody Azzouni has defended a view he calls *deflationary nominalism*: mathematical sentences that appear to quantify over numbers are strictly and literally true, but they confer no ontological commitment to numbers. For example, the following sentences are all literally true on Azzouni's view:

"Not every rational number is a natural number"

"There is exactly one even prime number"

"Some but not all natural numbers are divisible by 16"

On the face of it, these sentences contain standard objectual quantifiers that range over numbers, which might encourage us to think that they couldn't be true unless numbers existed. But according to Azzouni, this is based on a conflation between the ontological commitments and the "quantifier commitments" (as he calls them) of a sentence. Rejecting Quine's quantificational criterion of ontological commitment, Azzouni maintains that 'There is'-sentences can be strictly and literally true without implying the existence of the objects they quantify over. Thus, deflationary nominalism promises to satisfy two desiderata in the philosophy of mathematics that seem to be in tension with each other: on the one hand, like standard forms of nominalism it dispenses with commitment to abstract objects, but on the other hand, like standard forms of platonism it "takes mathematics seriously".[1] Although deflationary nominalism is a view about mathematical objects, it can be (and has been) extended to other kinds of things in obvious ways, for example to hallucinations (Azzouni 2010: Ch. 2), fictional characters (Azzouni 2010: Ch. 3), and holes (Azzouni 2012: 957). In what follows, my main focus will be on numbers, though many of the points I will raise are easily generalizable to other kinds of things (cf. Liggins 2010).

Why accept deflationary nominalism? Azzouni defends the view partly on the basis of semantic considerations: he argues that it's an empirical matter whether ordinary people use 'There is'-statements in an ontologically committal way, and their linguistic behavior (their patterns of assertion, retraction, clarification, and so on) strongly indicate that they don't. Hence, he proposes the "separation thesis", the view that a 'There is'-sentence can be literally true but ontologically non-committal. (In Azzouni's view, there is no linguistic device in natural languages that unambiguously expresses ontological commitment; we

[1] See Bueno and Zalta 2005 and Bueno 2009 for presentations of platonism and nominalism as different ways of prioritizing these desiderata.

always have to fall back on non-semantic cues, such as intonation and body language.[2] The details of this will be immaterial to what follows.)

In this paper, I won't be concerned with the empirical arguments for deflationary nominalism. What I'm interested in is a certain kind of philosophical *motivation* for it. The view is often thought to be attractive because it's supposed to help us avoid philosophical puzzles about numbers and other problematic kinds of entities. These entities raise several familiar puzzles: What sorts of things are they? How can we individuate them? How can we have knowledge of or even justified belief in them, given that they aren't in space and time and are not accessible to perception? And so on. On the face of it, deflationary nominalism offers the best of two worlds: on the one hand, it allows us to agree that certain sentences we are strongly inclined to accept are strictly and literally true, but on the other hand, it avoids positing strange philosophical entities, and along with that, the various puzzles surrounding them. Call this the *problem avoidance motivation*.

Problem avoidance is often considered a major appeal of deflationary nominalism. In the introduction of his 2004 book, for instance, Azzouni emphasizes the he can avoid the problems traditionally associated with realism[3] about problematic entities (especially numbers):

> "The main advantage of the separation thesis, overall, is that it simplifies so many metaphysical tangles. […] The separation thesis provides so many simplifications in metaphysics simply because it eliminates the need to postulate something as existing just because certain *truths* prove indispensable; many metaphysical entanglements arise because this is taken for granted." (Azzouni 2004: 5)

Later in the book, Azzouni discusses several philosophical problems about numbers, and his discussion makes it clear that he attributes a significant role to his deflationary nominalism in addressing (or rather, dissolving) them. On this point, even Azzouni's critics tend to agree. For example, in the *Stanford Encyclopedia of Philosophy* entry on mathematical nominalism, Otavio Bueno mentions a number of problems for realist interpretations of mathematics (§2) and presents Azzouni's view as a potential solution to them (§5). And while deflationary nominalism has been criticized on many other grounds, there seems to be a consensus that it at least avoids the problems usually thought to beset views that posit abstract objects.[4]

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[2] See especially Azzouni 2004: Chs. 4-5 and 2007.

[3] Here and in what follows, I will refer to the position that numbers exist as 'realism'. Though most realists are platonists and also believe that numbers are mind-independent abstract objects, there are dissenters (see, e.g. Maddy 1990). The difference will be important in section 4.

[4] For example, Bueno and Zalta (2005) and Contessa (2012) problematize the relation between truth and reference on Azzouni's views, Colyvan (2005, 2010, 2012) questions the grounds on which Azzouni concludes that numbers don't exist, and Raley (2009) objects to his method of arguing for the independence criterion of existence (on which see section 4). But none of them calls into question the puzzle-solving ability of deflationary nominalism.

I think this consensus is mistaken: problem avoidance is a poor motivation for deflationary nominalism. This is because the puzzles that motivate the position are, surprisingly, no less challenging for deflationary nominalism than for its realist alternatives. To be clear, this doesn't mean that deflationary nominalism is false, or that there are no good reasons to accept it. It's just that the ability to avoid the traditional puzzles isn't among them. I also don't claim that *Azzouni* is unable to avoid the familiar puzzles. Rather, if he can avoid them, this is because he accepts optional add-ons that neither entail nor follow from deflationary nominalism. Even so, the view itself plays no significant role in solving these problems – or so I will argue.

The point I wish to make is a general one, but establishing it goes slightly differently for different types entities. Hence, in order to streamline the discussion, in the rest of the paper I will focus on one particular problem for one particular kind of philosophical entity: Field's reliability challenge to belief in numbers. Though I think that my main point generalizes to other problems for other kinds of things, I won't argue for this in detail. In section 2, I will present Field's original challenge and explain why deflationary nominalism may be thought immune to it. In section 3, I will make my initial case that the view doesn't help with the challenge. In section 4, I will consider a natural response based on Azzouni's independence criterion of existence and argue that even if this response succeeds, it does so independently of deflationary nominalism and could be (and sometimes has been) co-opted by realists. In section 5 I will close with the surprising conclusion that the ontological import of 'There is'-sentences, and the distinction or lack thereof between ontological and quantificational commitments, is irrelevant to Field's reliability challenge. I will also briefly sketch how the argument could be generalized to other puzzles about other philosophically problematic entities.

2. Field's reliability challenge

Field originally proposed his reliability challenge as an improved version of Benacerraf's argument against mathematical realism. Strictly speaking, both Benacerraf and Field presented their arguments as *challenges* to mathematical realism, rather than direct refutations of it. But to streamline the discussion and to bring out their significance in motivating nominalism (deflationary or otherwise), I will reconstruct them as valid arguments for the conclusion that there are no numbers. Here goes Benacerraf's argument, thus understood:

(B1) If there are numbers, we have knowledge of abstract mathematical objects

(B2) If we have knowledge of abstract mathematical objects, we are causally related to them.

(B3) We are not causally related to abstract mathematical entities

(B4) So, there are no numbers[5]

[5] See Benacerraf 1973.

The consensus today is that although Benacerraf was on to something, this version of the argument is ultimately unconvincing. The reason for this is that B2 presupposes a causal theory of knowledge, which we have independent reason to reject.[6]

For this reason, Field offered a more cautious formulation of the argument in terms of reliability. It goes roughly as follows. If there are numbers – non-spatiotemporal, causally inert abstract objects –, then that's what mathematical truths are about. And in that case, there should be an explanation of how mathematicians can reliably track truths about such objects. But precisely because numbers are non-spatiotemporal and causally inert, there cannot be a causal explanation of this. Moreover, it's unclear what an appropriate non-causal explanation would look like. So if there are numbers, there is no explanation of mathematician's reliability about them, contrary to our starting assumption. This is implausible, so we should conclude that there are no numbers. In premises and conclusion form:

> (F1) If there are numbers, then there is either a causal or a non-causal explanation of why mathematicians are reliable with respect to forming beliefs about them
>
> (F2) There is no causal explanation of why mathematicians are reliable with respect to forming beliefs about numbers
>
> (F3) There is no non-causal explanation of why mathematicians are reliable with respect to forming beliefs about numbers
>
> (F4) So, there are no numbers[7]

Field's reliability challenge has generated a large and impressive body of literature, and various different solutions have been proposed in response to it. Some philosophers reject F1 on the basis that mathematical statements are necessarily true, if true at all, and since they couldn't be false, there is no need to explain why we are reliable about them. There is no possible scenario in which the mathematical beliefs we actually have are false because the mathematical truths are different.[8] Others reject F2 and insist that there is a causal explanation of mathematical reliability, since we are in causal contact with states of affairs that also involve mathematical entities. For example I can *see* that I have ten fingers, and thereby acquire perceptual access to the number ten.[9] More recently, there have been serious attempts to reject F3 by constructing a substantive non-causal explanation of our mathematical reliability; the basic idea is that we have intellectual access to mathematical entities, which in many ways works analogously to our perceptual access to concrete

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[6] For the causal theory of knowledge, see Goldman 1967; for classic criticisms, see Shope 1983 and Swain 1998, and for criticisms of the theory specifically in relation to mathematical knowledge, see Linnebo 2006.

[7] Cf. Field 1989: 25-30. My formulation closely resembles that of Liggins 2010.

[8] Lewis 1986: 108-115; cf. Clarke-Doane 2016

[9] Maddy 1990: Ch. 2

objects.[10] Finally, some philosophers attempt to partially meet the request for explanation and partially reject it as illegitimate. For example, Rosen and Burgess (1997: 42–49) argue that there is a kind of causal explanation of our mathematical reliability, in which the development of mathematics in past centuries and the evolutionary history of our mathematical beliefs plays a significant role, but that any further pressure for a deeper explanation ought to be resisted. Since the causal explanation they invoke doesn't feature any mathematical facts as causes, it seems best to interpret Rosen and Burgess as rejecting F1 rather than F2.[11] An analogous solution is due to Balaguer (1995), who argues that mathematical reliability is an easy epistemic achievement because for any consistent mathematical beliefs, there are some mathematical objects of which those beliefs are true. Again, it's not fully obvious whether we should take this as a rejection of F1 or a rejection of F3. The former seems more appropriate to me, since Balaguer denies that we either have or need an explanation in terms of non-causal access to mathematical objects.[12]

So far, so good. But what would a distinctively deflationary response to Field's challenge look like? Presumably, such a response would go roughly as follows. Field's challenge attacks the idea that reality contains mathematical objects. The deflationary nominalist claims that although existential sentences in mathematics are literally true, they have no such ontological implications. Thus, there is no need to establish the kind of "thick" explanatory connection between mathematical truth and mathematicians' beliefs that true believers in numbers are obliged to establish. So, once we clarify that 'There are numbers' carries no ontological commitment to numbers, Field's reliability challenge evaporates.

Unfortunately, matters are not so simple – or so I will argue in the next section. In fact, there is nothing in deflationary nominalism that automatically makes it immune to Field-style puzzles.

3. Why deflationary nominalism doesn't answer the challenge

In this section, I will argue that deflationary nominalism offers no distinctive solution to Field's reliability challenge. My argument will be simple. If the view does offer such a solution, then it ought to provide us with some guidance as to which of F1-F3 has to be rejected. But we can quickly verify that it gives us no such guidance. So, deflationary nominalism fails to address the challenge.

In the penultimate paragraph of the previous section, I deliberately phrased what might *seem* like a natural deflationary response in broad terms, without specifying which premise we should understand this response as attacking. But on reflection, it is far from clear where, by the deflationary nominalist's lights, the culprit with Field's challenge lies.

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[10] Chudnoff 2013 and Bengson 2015

[11] See also Clarke-Doane 2016 for a related strategy.

[12] Balaguer does take himself to have given an explanation of mathematical reliability, so he wouldn't accept my classification of his view. This is just a matter of bookkeeping, and depends on how much we demand from an account to count as an explanation. I could have formulated the first premise as the claim that (F1*) if there are numbers, there is either a causal or a non-causal *access-based* explanation of why mathematicians are reliable with respect to forming beliefs about them, and read Balaguer as denying F1*.

To be clear, I don't deny that Azzouni can reject one premise or other of the argument – after all, I'm not assuming that Field's argument is *sound*. All I say is that deflationary nominalism gives us no special reason to reject any of its premises. To see this more clearly, let's go over them.

First, F1 is plausible, since its consequent is plausible: it shouldn't be a brute fact that mathematicians are reliable in forming number beliefs or mathematical beliefs more generally. And of course, they have many such beliefs, despite the fact that (according to deflationary nominalism) the sentences that express them don't confer ontological commitment to numbers. Moreover, it's an analytic truth that if mathematicians' number beliefs are explained, they are explained either causally or non-causally, provided that by 'non-causal explanation' we mean 'an explanation that is not causal'. Thus, deflationary nominalists should accept F1.

F2 seems plausible as well. If anything, deflationary nominalism should make F2 *more* plausible. Field's own rationale for F2 was that if there were numbers, we couldn't have causal access to them. But of course, if numbers don't even exist (as on Azzouni's view), then it's even harder to have causal access to them. So, whatever we think of Field's reasons for maintaining that mathematicians' reliability doesn't have a causal explanation, those reasons remain at least as good (and possibly better) on the assumption that although quantificational sentences about numbers are true, numbers don't exist.

Finally, it also isn't clear what special reason the deflationary nominalist has for rejecting F3. As we have seen, some mathematical realists reject it on the basis that we have intuitive/rational access to abstract objects. But presumably, if numbers don't exist, this doesn't make it easier to have intuitive/rational access to them. (I don't know how easy it is to have such access to non-existents, but it seems plausible that it's as least as hard as having it to existing things). I expect that at this point, Azzouni would complain that he does have a special non-causal explanatory story about mathematician's reliability, one that is not available to garden-variety realists about numbers. I will consider this response in the next section; in the meantime, we can at least conclude that there is no *obvious* distinctively deflationary response to Field's reliability challenge.

The above line of reasoning will no doubt strike many as very confused. After all, deflationary nominalism was all but *designed* to avoid the puzzles that beset realist views. How can I say, then, that it doesn't avoid Field's reliability challenge, one of the most well known such puzzles? In the next section I will consider a more specific (and more promising) response on the deflationary nominalist's behalf. But first, I want to get this worry out of the way and give a general diagnosis of why there is no quick route from deflationary nominalism to puzzle-avoidance.

As I stated it, deflationary nominalism is a view about the relation between ontological commitment and quantificational statements in mathematical discourse. As such, it essentially appeals to certain pieces of philosophical jargon ("ontological jargon", as I'll refer to it in what follows): 'ontological commitment', 'out there in reality', and the like. Azzouni frequently asks what gives 'There is'-statements "ontological force"[13], how to

[13] Azzouni 2004: 77

determine the folk's "ontic predilections"[14], and what the "furniture of the universe"[15] includes. Now, one might complain that the way he uses the ontological jargon makes his position obscure.[16] However, I'm not making this complaint. I simply observe that Azzouni's position cannot even be *stated* without appealing to the jargon. This will be important for what comes next.

Take another look at premises F1-F3 of Field's reliability challenge. Unlike deflationary nominalism, these premises don't require any appeal to the ontological jargon. They are phrased plainly in terms of what there is; considerations pertaining to "ontological commitment", "ontological status" or the "furniture of reality" don't enter the argument at any point. For this reason, it's hard to see how deflationary nominalism *could* even in principle be relevant to the reliability challenge. This simple observation has nothing to do with whether the ontological jargon is in good standing. I'm happy to give Azzouni all the terminology he needs to state his position; the point is that none of that terminology is needed to state Field's reliability challenge.

Note that it won't do to complain that for the deflationary nominalist, 'There are prime numbers' has "no ontological bite", or anything else along similar lines. That's just more jargon. Azzouni is already on record for denying that by accepting such sentences he is ontologically committed to numbers, but this doesn't help him with the argument as I formulated it above. This is because he still accepts that 'There are prime numbers' is true, and the conclusion of Field's argument implies the negation of this sentence. If you prefer, call truths like the one expressed by 'There are prime numbers' *shmontological* truths. I'll give Azzouni the word 'ontology' and allow that ontology concerns the entities we are ontologically committed to. Shmontology, by contrast, is simply the study of literally true 'There is/are…'-sentences and their consequences.

The deflationary nominalist can emphasize all he wants that the truth of 'There are prime numbers' has no ontological import. It still has shmontological import, since it disquotationally entails that there are prime numbers, and therefore numbers. Moreover, Field's reliability challenge threatens to undermine this claim, and with it the truth of 'There are prime numbers'. And, I should add, there is nothing special about Field's reliability challenge here (see section 5 more on this). There are similar puzzles about other philosophical entities, and we can state these puzzles without invoking the ontological jargon. It is therefore generally unclear how a position like deflationary nominalism could possibly help with these puzzles.[17]

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[14] Azzouni 2007: 210

[15] Azzouni 2007: 206

[16] Hofweber (2007) raises a similar concern when he worries that it's not clear what question Azzouni's deflationary nominalism is trying to answer. See also Parent 2014 for a related concern about 'ontological commitment'-talk. Parent argues that there is no formal criterion of ontological commitment, and that even the vocabulary that has been designed to express ontological commitment (i.e., the ontological jargon) has non-committal uses. At the same time, he thinks that we can understand certain terms to be univocally committal *within a fixed conversational context*.

[17] This echoes and generalizes a point recently made by Korman (2015) about material object ontology: reformulating once-familiar thesis about which material objects there are as views about which material

We can refer to the kind of problem I introduced in the preceding paragraphs as "the puzzles of shmontology". The puzzles of shmontology pose a serious challenge to would-be deflationary nominalists moved by the problem-avoidance motivation. However, this is not the end of the matter. Although a blanket acceptance of deflationary nominalism doesn't make the puzzles of shmontology go away, Azzouni may well have extra theoretical resources that go a long way toward addressing them. In the next section, I will argue that even if there are such resources, they are independent from deflationary nominalism itself and are also available to those who reject the view. Thus, deflationary nominalism offers no distinctive solution to Field's challenge.

4. Existence and mind-dependence

Azzouni's complete account of mathematical discourse doesn't stop at deflationary nominalism; rather, it consists of a negative and a positive thesis. The negative one is the aforementioned rejection of Quine's criterion of ontological commitment. According to Quine (1948, 1951), a regimented theory's ontological commitments are the entities that have to be values of the variables bound by the theory's existential quantifiers in order for that theory to be true.[18] Without rejecting this criterion, Azzouni couldn't say that 'There is exactly one even prime number' is true and in the same breath deny that he is ontologically committed to numbers.

The full package, however, also contains a positive criterion of existence in place of Quine's, which Azzouni calls the *ontological independence* criterion: something exists just in case it doesn't depend on mental and linguistic phenomena.[19] This requires clarification on two scores. First, Azzouni uses the expression 'ontological dependence', but he doesn't have in mind the relation usually at issue in the specialized literature on ontological dependence. The latter is usually taken to be an ordering relation that holds between less and more fundamental things of any ontological category, comes in various species (rigid and generic, existential and essential, etc.), and perhaps characterizes the notion of substance.[20] To avoid confusion, for the rest of the paper I will follow standard terminology and refer to Azzouni's notion simply as "mind-independence". The second point I should make clear is that Azzouni doesn't base the independence criterion on substantive philosophical arguments. Rather, he thinks we should accept it because our linguistic community

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objects fall into the domain of the most joint-carving existential quantifier will fail to solve the puzzles that originally motivated these positions. In short: which objects exist in the most fundamental sense is irrelevant to puzzles concerning which objects exist, in the plain old English sense of 'exist'.

[18] Or so goes the textbook recap. As Azzouni (2004: Ch. 3) quite rightly notes, there are many interpretative puzzles concerning Quine's criterion, and it's far from clear what the criterion ultimately comes down to. However, none of what follows hangs on these interpretative difficulties. As Parent (2014: 200) points out, Quine's criterion is compatible with the claim that *some* uses of 'There is' are non-committal; however, Azzouni's view is that it has *no* committal use.

[19] Azzouni 2004: Ch. 4

[20] For useful surveys of this notion, see Correia 2008, Koslicki 2013, and Tahko and Lowe 2015. Azzouni is aware that he deviates from standard usage; see Azzouni 2012: 955.

reserves the word 'exists' for mind-independent things; it's a fact about our practices concerning the word 'exists' that we use it all and only for mind-independent things.[21]

Once this background framework is in place, Azzouni's argument for deflationism is fairly straightforward. Given the independence criterion of existence, mathematical objects exist only if they are mind-independent. But if mathematical objects are mind-independent, we aren't justified in assenting to the mathematical sentences we typically assent to. However, we *are* justified in assenting to them; and so, ordinary mathematical statements are true, though the objects they are about don't exist. Which is to say, deflationary nominalism is true. It's worth quoting the argument in Azzouni's own words:

> "Here's an argument that we shouldn't take mathematical abstracta to exist any more than we take fictional items to exist: Mathematical abstracta are ontologically dependent on our linguistic practices in just the same way that fictional items are [...] This argument, however, requires establishing that mathematical abstracta are ontologically dependent on us in the appropriate sense. How do we manage that? It's easy. Mathematical objects can't be ontologically independent of us because then we wouldn't be justified in claiming that the statements we take to be true of such mathematical objects are true. But that we're so justified is simply a datum of mathematical practice" (2004: 103)

Azzouni moves somewhat freely between the *literal truth* of mathematical sentences and our *justification* for their literal truth. For his remarks to add up to a valid argument for deflationary nominalism, we need to assume that we can get the former from the latter. This requires Azzouni to use the word 'justify' differently from the way it's typically used by contemporary epistemologists. But since none of what follows will hang on this point, I will simply grant it to Azzouni. Then, in premises and conclusion form, the argument will go as follows:

> (A1) If mathematical objects exist, they are mind-independent and our mathematical sentences are about them
>
> (A2) If our mathematical sentences are about mind-independent mathematical objects, we are unjustified in asserting them
>
> (A3) If we are unjustified in asserting mathematical sentences, then those mathematical sentences are false
>
> (A4) Our mathematical sentences are true
>
> (A5) So, mathematical objects don't exist, but our mathematical sentences are true. So, deflationary nominalism is true

As I just said, I'm happy to grant A3 despite its somewhat unclear status. The first half of A1 is a straightforward consequence of the independence criterion, and its second half (that if

[21] Azzouni 2004: 92-99

mathematical objects exist, our mathematical sentences are about them) is independently plausible. To establish A4, Azzouni relies on the Quine-Putnam indispensability argument. Of course, he doesn't believe that the argument establishes the existence of mathematical objects, but he thinks it does establish the literal truth of (at least a large number of) mathematical sentences.[22]

What about A2? Azzouni's remarks on this premise are somewhat condensed, but he clearly accepts it on the basis of epistemological problems in the vicinity of the Field-Benacerraf challenge.[23] Why does he think that his own view is immune to the challenge? The answer lies in the special epistemic status he attributes to mind-dependent objects:

> "If something is ontologically dependent [that is, mind-dependent] on an author, for example, then he or she isn't seen as needing to square the properties of that thing with something else: There is no requirement that he or she justify the claim that the item in question has the properties attributed to it. If someone isn't making something up, then he or she *is* trying to square its properties with something else and thus *is* required to provide an explanation for why the properties attributed to the item must be the properties it has." (Azzouni 2004: 99)

The upshot is that mind-dependent things are epistemically cheap because they don't have properties we could go wrong about (in fact, Azzouni's official view is that they don't have any properties whatsoever, since mind-dependent things don't exist and non-existent objects don't have properties). As he later says, numbers are posits to which our epistemic access is "ultrathin".[24] Depending on the exact construal of the relation between minds and mind-dependent abstracta as causal or non-causal, we can take Azzouni to deny either F2 or F3 of Field's reliability challenge. Either way, there is an explanation of mathematician's mathematical reliability: the things their beliefs are about are mind-dependent (and therefore non-existent) things; in Azzouni's words, we "make them up".

Now, it's not entirely obvious to me that an object's mind-dependence automatically shields it from Field-style epistemological concerns.[25] But never mind. Notice instead that deflationary nominalism itself – Azzouni's radical view about the relation between

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[22] See Azzouni 2004: Chs 1-2. The rationale for the qualification 'at least a large part of' is that the Quine-Putnam indispensability argument seeks to establish the literal truth of only those parts of mathematics that have applications in the empirical sciences. For this reason, Azzouni appears to agree that his case for deflationary nominalism about unapplied mathematics is somewhat weaker (2004: 48).

[23] Azzouni usually focuses on Benacerraf's argument rather than Field's, and also adds a third argument of his own, the "epistemic role puzzle". Azzouni takes this to be different from Benacerraf's problem (Azzouni 1994: 55–64), but his assessment has ben challenged; see McEvoy 2012 and Azzouni 2016 for further discussion. None of these details are relevant to the argument that follows.

[24] Azzouni 2004: 127–128. See Colyvan 2005, 2010, and 2012 for criticism of Azzouni's method of determining when our access to some posit is ultrathin.

[25] Suppose, for example, that we have *one-way* causal access to created abstract objects: we can cause them to exist but they can't cause anything. In that case, even if we can create abstracta, how can we know that they are the way we intended them to be? (See Liggins 2010: 74-75 for a similar line of thought: how do we know that mind-created abstracta have the properties we stipulated them to have? See also Field 1989: 27 on "mathematical idealism".)

quantification and ontological commitment – plays no role in his proposed way out of the problem. All the heavy lifting is done by the assumption that numbers and other mathematical objects are mind-dependent; the independence criterion of existence is an optional add-on of no epistemological significance.

This becomes especially clear when we direct our attention to views that also treat numbers as mind-dependent objects but make no revisionary claims about their ontological status. Julian Cole (2009) has recently defended just such a view. In line with platonist views, Cole maintains that numbers and other mathematical objects exist, and that they are abstract objects. But contrary to platonists, he also thinks that they are mind-independent things that owe their existence to our creative powers. Since mathematical objects are abstract, Cole doesn't think that their dependence on us is causal. Instead, he categorizes them (along with games and social groups) as *constitutive social constructs*: constructed entities that exist "in virtue of a group of individuals having granted some item a normative role in certain of their activities".[26] Moreover, just like games but unlike social groups, mathematical entities are *pure* constitutive social constructs in that they don't require the antecedent existence of any mind-independent entity that members of the group would only need to endow with certain features.[27]

Cole claims that his view (which he calls Practice-Dependent Realism) addresses the Field-Benacerraf challenge to mathematical realism, and his story is essentially the same as Azzouni's: since our mathematical practices determine the features of mathematical objects, and we have causal access to these practices, there is no deep puzzle about the reliability of our mathematical beliefs.[28] The availability of a view like Practice-Dependent Realism makes especially vivid why deflationary nominalism as such is irrelevant to Azzouni's solution to the reliability challenge: what matters is the idea that mathematical

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[26] Cole 2009: 597. See also Thomasson 1999 for socially constructed, mind-independent artifacts in general.

[27] Bueno (2009: 70–71) has independently developed a similar view, which he calls "fictionalism": mathematical statements can be interpreted as referring to human-created abstract artifacts. However, unlike in the case of Cole, it's not entirely clear if Bueno thinks that it's these mind-dependent things that mathematical statements are *already* in the business of referring to according to our standing practices, since he is merely agnostic about (but doesn't deny) the existence of mind-independent platonic abstracta (see Azzouni 2015 for a criticism of this element of Bueno's view). On my reading, Bueno thinks that *if* our mathematical statements are literally true, they refer to such platonic abstracta, but that even in the absence of such abstracta, they could easily be *reinterpreted* to refer to mind-created abstract artifacts.

Sometimes Dummett, too, speaks as if he held views in this vicinity. For example, he suggests an interpretation of Frege according to which the world "does not come to us as articulated in any way; it is we who, by the use of language […] impose a structure on it" (1981: 504), and "pure abstract objects [abstracta that don't require the existence of any concrete objects, e.g. pure sets) are no more than the reflections of certain linguistic expressions" (1981: 505). Elsewhere, he says that it's "pointless" to ask whether mathematical entities are discovered or invented (1991: 227), and that the real question concerns whether the domain of quantification (rather than individual mathematical objects) are discovered or invented (228). It's not entirely clear what Dummett's answer to this question is. He appears to deny that mathematical objects are mental constructions (1991: 240), but then again adds that "it would certainly be wrong to say that [a mathematical] system existed in advance of our conceiving it" (1991: 311). Ultimately, it's unclear what Dummett's position on mathematical ontology was; his remarks strike me as indeterminate between contemporary neo-Fregean views and a mind-dependent view similar to Cole's.

[28] Cole 2009: 607

objects are dependent on our thought and language; whether such dependence implies that mathematical objects don't exist or that we aren't ontologically committed to them is neither here nor there.

Of course, it might be objected that we should still prefer deflationism to Practice-Dependent Realism on independent grounds. Indeed, Azzouni offers extensive linguistic evidence to the effect that our conventional criterion of existence is mind-independence. If he is right, then (barring other differences between the two views) Practice-Dependence Realism should give way to Azzouni's view. This may well be true, but it's entirely irrelevant to my main point. My point has been merely that it's misguided to accept deflationary nominalism on the basis of its potential to help us get rid of philosophical puzzles. The fact (if it's a fact) that linguistic evidence favors deflationary nominalism over structurally isomorphic Quinean views doesn't tell against this point. I therefore conclude that Azzouni's deflationism isn't properly motivated by problem-avoidance considerations and offers no distinctive solution to Field's reliability challenge.[29]

5. Concluding remarks and potential generalizations

Azzouni's deflationary nominalism tells us that existential sentences can be strictly and literally true without implying that the things they quantify over exist. It would seem prima facie reasonable to expect such a radical view to have interesting consequences for Field's reliability challenge for numbers. But when we take a closer look, we find this not to be the case: surprisingly, deflationary nominalism leaves the puzzle entirely intact. It's another matter that the view can be combined with some other doctrine (i.e., that mathematical objects are mind-dependent), which might go a long way to solving the puzzle. But the doctrine in question is independent from deflationary nominalism; we can easily verify this by noticing that the solution it suggests would work just as well (or just as badly) even if we dropped the nominalist component.

This latter claim is difficult to establish with full generality, so I confined myself to arguing for it in the case of one particularly influential puzzle, Field's reliability challenge to realism about numbers. But it's not very hard to see how the foregoing argument could be generalized to other problems about other philosophical entities. First, the argument can easily be extended to puzzles similar to Field's about properties, propositions, possible worlds, and the like. These, too, are non-spatiotemporal, causally inert objects on their standard construal, so any set of beliefs about such entities faces a challenge similar to Field's about mathematical objects.[30] Deflationary nominalists could try to appeal to the same sort of maneuver to overcome these problems as the ones I mentioned toward the end section 3 (about how 'There are propositions' and the like have "no ontological

[29] In this regard, my conclusion agrees with the letter of Schechter's (2010: 439), who argues that the Field-Benacerraf challenge doesn't concern mathematical *ontology*. However, he would also make a stronger claim I disagree with: that the challenge doesn't even concern mathematical "shmontology" in my sense (but, rather, the objectivity of mathematics). See also Clarke-Doane 2016: 17–25 for further discussion.

[30] See Liggins 2010: 74-75 for this general point. For attempts to expand the scope of the Field-Benacerraf challenge, see Swoyer (1996: 250-252) on properties Divers (2002: Ch. 9, 230-234, 272-274) on possible worlds.

import"), and these maneuvers are doomed to fail for the same reasons I discussed there: deflationary nominalism is a thesis about ontological commitment in natural language, but the puzzles in question can be formulated without any reference to ontological commitment, ontological status, or the ontological jargon in general. Moreover, deflationary nominalists could (and presumably would) argue that these objects, too, are mind-dependent (and so don't exist). But as in the case of numbers, these responses would be entirely independent from deflationary nominalism itself, and could be co-opted by realists about the requisite objects.

The argument could be extended not only to similar puzzles about different entities, but also to different kinds of puzzles about those entities. I cannot defend this claim in any detail here, but by now, the argument should be predictable. Take Benacerraf's individuation problem about numbers[31], Bradley's regress (about relations)[32], or any other familiar puzzle about entities usually thought to be philosophically problematic. The setup of none of these problems requires us to use the ontological jargon. They can all be formulated as puzzles resulting from the traditional realist's view of which 'There is'-sentences are true, and the deflationary nominalist *agrees* with the realist on which of these sentences are true. The most the deflationary nominalist can do is transform these ontological problems into shmontological ones, but this doesn't make the need to solve them any less pressing. And of course, the deflationary nominalist is free to adopt supplementary theses such as the mind-independence of the relevant entities. But that route is also open to realists, which means that radical as Azzouni's separation thesis is, it ultimately plays no role in solving these puzzles.

Where does this leave us? There may be perfectly legitimate reasons to accept deflationary nominalism. Perhaps the view gives us a better understanding of which questions we should count as genuinely ontological. Perhaps there is also strong empirical evidence for some version of the view, because attention to ordinary speakers' linguistic behavior reveals their underlying non-committal tendencies. Any of these claims, and perhaps some more, might provide strong motivation for deflationary nominalism. But you shouldn't endorse the view on the basis that the view offers a distinctive solution to puzzles that are not open its realist rivals. Any appearance to this effect is an illusion arising from too much reliance on the ontological jargon.

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[31] Benacerraf 1965

[32] See Maurin 2012 for a helpful overview.

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