

Having an interpretation

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Abstract I investigate what it means to have an interpretation of our language, how we manage to bestow a determinate interpretation to our utterances, and to which extent our interpretation of the world is determinate. All this is done in dialogue with van Fraassen's insightful discussion of Putnam's model-theoretic argument and of scientific structuralism.

*What the music I love expresses
to me, is not thought too
indefinite to put into words,
but on the contrary, too definite.*

(Felix Mendelssohn, commenting on his
Songs Without Words, in his letter to
Marc-André Souchay of 15 October 1842.)

1 Introduction

In van Fraassen (2008) and in several earlier articles,¹ van Fraassen has developed a close, and on the whole sympathetic, reading of Putnam's model-theoretic argument. As one would expect, van Fraassen's reading is much more than an interpretation. Van Fraassen takes Putnam's theory further in directions that Putnam himself may or may not be happy with. Similarly, I will interpret van Fraassen's work on this subject, and I will try to take it further, and in directions that Bas may find problematic.

¹ The most important ones are van Fraassen (1997a, b).

Having an interpretation is a concept that plays a central role in van Fraassen's argumentation. In the first part of this article, I comment on the role that it plays, and in the course of doing this I give a more fine-grained analysis of what having an interpretation means. Then I overstep the boundaries of friendly commentary by disputing the pseudo-ness of all questions of reference fixing. Having isolated a reference fixing question which I think is anything but pseudo, I then try to see how it can at least in part be addressed. This will eventually take us to matters that have in recent years been discussed under the rubric of scientific structuralism.

2 Van Fraassen's dissolution of Putnam's paradox

Van Fraassen articulates a dissolution of Putnam's paradox. He begins by noting an important feature of the argument (van Fraassen 2008, p. 233):

We are apparently led through a chain of reasoning destined to the conclusion that we can regard the WORLD as having a certain structure. There exists a model of the WORLD's cardinality, there exists a function that will map the one onto the other ... Select one of each! Under what conditions can we do that?

"We can regard the WORLD as having that structure." That is an assertion about us; and what is its basis? The basis is that there *exists* a certain function which maps the model and WORLD one-to-one onto each other. Fine, that function exists—but what does that have to do with us? We *have an interpretation* for the given language *only if we can define or identify such a function*. To do that we must be able to describe both the function's domain and its range, hence both the syntax of the language and THE WORLD, as well as the way in which the former gets mapped on to the latter.

He then continues his argumentation as follows (van Fraassen 2008, p. 234):

As long as we are not given an independent description of both the domain and the range of an interpretation, we do not *have* any such interpretation, nor any way to identify one. Given an independent description of the interpretation's domain and range, however, whether the theory is true under that interpretation depends entirely on how the mapping is defined, using those descriptions.

Thus Putnam's Paradox is finally dissolved in a dilemma (van Fraassen 2008, p. 235). Either we cannot describe the world: then we cannot describe an interpretation of the world. Or we can describe the world; but then our notion of truth may come apart from the notion of true-in- N , because true-in- N may not accord with our description of the range of I_N .

3 Interpretation and appraisal

A key move in van Fraassen's argumentation in the quote above is the following conditional thesis:

Thesis 1 *We have an interpretation for our language only if we can describe or identify it.*²

The antecedent of van Fraassen's conditional thesis will occupy us first and foremost. It raises the question what is meant by, and what is involved in, having an interpretation. It seems that van Fraassen's writings on Putnam's Paradox leave open two answers to this question:

1. Being able to produce an interpretation.
2. Adopting an interpretation.

The second answer involves implicitly accepting and taking some sort of responsibility for the interpretation. The first answer, in contrast, is compatible with remaining aloof. We will have occasion to return to the first interpretation shortly. For the moment, let us concentrate on the second interpretation.

The term 'adopting' hides a second ambiguity. The notion of responsibility can be cashed out in doxastic terms or in pragmatic terms. It was van Fraassen himself who has made the philosophical community sensitive to this distinction (van Fraassen 1980). If adopting is understood in epistemic terms, then it involves belief. If adopting is understood in pragmatic terms, then it involves what van Fraassen calls 'acceptance'. Acceptance is compatible with suspension of theoretical belief. This is not to say that acceptance is so to say gratuitous. In many ways, the commitment of acceptance is deeper. Acceptance involves immersing oneself in an intellectual practice, it involves living the practice.

With these distinctions in mind, let us return to the question at the beginning of this section. If having means adopting in the sense of (theoretically) believing, then van Fraassen's claim appears plausible. Believing, we are told, is a propositional attitude. If we believe an interpretation, then this interpretation has to be present before our minds under a linguistic description. What if having means accepting in the pragmatical sense? Acceptance (or rejection) is in the first place an attitude to an intellectual, religious or social practice. It seems that an interpretation, at least as it functions in Putnam's argument, isn't a practice at all. But still it may make sense to accept an interpretation in the pragmatic sense of the word. It would mean following an interpretation. Van Fraassen has taught us that in general, an attitude of acceptance is compatible with suspension of belief.

When we accept a scientific theory, we take its theoretical claims at face value as guidance for research. Therefore accepting a scientific theory involves propositional understanding of its content. The propositional content of this interpretation is articulated in the scientific theory itself. But with accepting an interpretation for our language this is simply impossible. Suppose we were, in this situation, capable of describing the interpretation of our language that we are pragmatically committed to. Then we would be implicitly committed to accepting the corresponding Tarski-biconditionals for our language. Otherwise we will have landed landed in incoherence: not accepting a Tarski-biconditional betrays less than full pragmatic acceptance of an interpretation. But that would effectively mean that our language

² See also van Fraassen (1997a, p. 21; 1997b, p. 91).

would contain a truth predicate that satisfies Tarski's material adequacy condition. Tarski's theorem teaches us that such is impossible. This means that on the pragmatic interpretation of adopting an interpretation, van Fraassen's conditional claim above is, in its unqualified sense, untenable.³ Of course this entails that on the doxastic reading of adopting an interpretation, van Fraassen's claim is a fortiori untenable. So expressing acceptance fully is incoherent. But expressing acceptance is in practice not an all or nothing affair. We could accept an interpretation to a large extent in the sense that we accept virtually all the Tarski-biconditionals that we are ever likely to encounter in our lives. In particular, we could accept an interpretation in the sense that we accept all the Tarski-biconditionals that are, in contrast to pathologies such as the liar sentence, grounded in the world.

So if accepting an interpretation makes sense, then it *must* be acceptance without full propositional belief as we understand it: it must be acceptance that cannot be fully articulated in words. This also relates to the consequent of van Fraassen's conditional thesis. Van Fraassen seems to use the terms 'describe' and 'identify' interchangeably. But if having means accepting, then the sense of description involved must be partial, whereby the interpretation cannot be *identified*. But even with this qualification van Fraassen's conditional thesis does not hold. Children who do not yet have a concept of truth or interpretation may still have an interpretation in the pragmatic sense of the world. They will not (yet) be able to even partially describe their interpretation of the language they speak.

There is some textual evidence that van Fraassen does not understand having an interpretation as adopting an interpretation. Van Fraassen's terminology is not completely uniform. We have seen how he distinguishes the existence of a function from describing or identifying a function. But in a discussion of what he takes to be an analogous example,⁴ he asks (van Fraassen 1997a, p. 20): "Does this distinction—between the existence of a function and our being able to carry out the mapping—matter here?" This suggests that being able to produce an interpretation is either to be identified with having an interpretation, or that having an interpretation entails being able to somehow produce one, which in turn entails an ability to describe it. So let us for the moment suppose that having an interpretation means or entails producing an interpretation. The only way in which we can produce an interpretation is by describing one. But producing an interpretation does not commit us to the corresponding Tarski-biconditionals, not even to the grounded ones. So now Tarski's indefinability theorem does not hurt us anymore. We can even agree with van Fraassen that the interpretation can be identified.

In such a situation, van Fraassen says, we are in effect treating our theory T as formulated in a foreign language, so that "we are allowed to regard T as true if we can find an interpretation which answers to all our constraints on interpretative engagement, and under which T is satisfied. But note what is allowed, even then: to take T to be true as construed" (van Fraassen 1997b, p. 90). But this falls short of the desired conclusion. For surely we do want to be left, when all is said and

³ None of this prevents us to *partially* capture, by means of axioms, our interpretation of our language.

⁴ The example concerns the distinction between the existence of a coordinate system for the Euclidean plane and our ability to coordinatize the plane.

done, with a notion of truth for which at least the grounded Tarski-biconditionals hold.

The upshot of this for van Fraassen's conditional claim is the following. If having means accepting in either the doxastic or the pragmatic sense, then we cannot fully articulate our interpretation in our own language: our act of acceptance contains an element of doing that cannot be described in our language. Neither do we need to have even the conceptual resources for articulating our interpretation. If having means having produced, then we must have articulated it in our language. But then (white or blue) water appears between truth and truth-in-*N*.

This is not a million miles away from the dilemma in which van Fraassen dissolves Putnam's Paradox. I have only emphasised that we need not and can never fully express the interpretation of our language that we accept. This may seem little more than a footnote to van Fraassen's discussion. But it opens up a philosophical question: how is the interpretation of our language fixed?

4 Reference fixing: a pseudo-problem?

By refusing to treat our vocabulary as the vocabulary of a strange tongue, we can answer questions about reference and interpretation in trivial ways (van Fraassen 1997a, section 9). They express themselves as pragmatic tautologies. The sentence "'Blue' denotes blue things" might have been false; but it is not coherently deniable by me in my own language. One might think, van Fraassen says, that a philosophical question remains that does not receive a satisfactory answer in the form of a pragmatic tautology. In particular, one might ask (van Fraassen 1997a, p. 36):

Under what circumstances do [our predicates] have, or acquire, the right extensions?

But such questions are pseudo-questions, van Fraassen contends (van Fraassen 1997a, p. 36). The only way that we can make sense of them is as sceptical queries: could our word 'blue', for instance, refer to orange things? Thus we are led back to questions that can only be resolved in pragmatic tautologies: there is no further substantial philosophical question to be asked.

Now this may answer the question under what circumstances our predicates have the right extensions (namely when they belong to our language). But they scarcely answer the question how a child, say, succeeds in establishing reference by learning a first language or how we, as a society, have managed to establish reference by developing a language. This is what I call the *reference fixing question*.⁵ That we have established reference is not at issue here, nor is it questioned whether we have accorded our predicates the right extension: the question is how we have managed to do it. This is a substantial question. It is of philosophical importance and relevance, and has been taken as such in the philosophy of language. This is not to say that the reference fixing question may not be to some or even considerable extent an

⁵ I realise that there are really a number of reference fixing questions. Space does not permit me to discuss them separately or even to distinguish between them here.

empirical one: there is no need to distinguish sharply between philosophical questions and empirical questions.

The reference question as I understand it was hinted at (but not quite expressed) in the quote above by the use of the word ‘acquire’. Van Fraassen comes close to what I call the reference fixing question when he writes (van Fraassen 1997a, p. 38):

Trying to complete an interpretation of my language as a whole, in some independent, informative, non-tautological way, can only reduce us to absurdity. For interpreting is an activity involving use of and reliance on my own language and inconceivable without it.

Now I have agreed with van Fraassen that we cannot, on pain of paradox, fully articulate our interpretation of our language in our language. But we somehow have, as individuals and as a society, ‘completed’ an interpretation of our language as a whole in the sense of having succeeded in getting the sounds and scribbles that we produce to refer.

5 Linking up with the world

Pointing may be impolite, but it sometimes helps. Reference of many individual terms can be established ostensively. Whether a putative ostensive reference fixing act succeeds depends, among other things, on the cooperation of the linguistic community. Moreover, there exists in our community a social understanding that the reference of a proper name is transmitted through a ‘historical chain’ (Kripke 1980). Plausibly something like ostension also plays a role, in combination with a privileged role of experts, in fixing the extension of certain predicates (Kripke 1980; Putnam 1975).

It has been recognised in the literature that the early accounts of Kripke and Putnam fail to do justice to the complexity of the actual mechanisms that govern reference fixing. In general, our world and our social practices that determine reference are messier than Kripke and Putnam recognised. But still, to say that their answers to the reference fixing question were totally out of the ballpark can be no more than rhetoric exaggeration.

David Lewis proposed his own solution to Putnam’s Paradox in Lewis (1984). His solution is as disputed as any other hitherto proposed resolution of Putnam’s Paradox. But in the course of articulating his proposal, Lewis made an important point. Laying down, in the form of postulates, linguistic constraints that our preferred theory should satisfy, is never going to pin down reference to a sufficient extent. Reference fixing consists in more than simply imposing satisfaction constraints. Van Fraassen, along with virtually everyone else in the discussion, accepts Lewis’ point. But he adds almost in the same breath that Lewis’ own positive account comes dangerously close to doing just that. On this point, van Fraassen’s reaction to Lewis seems close to Putnam’s reaction to appeal to ‘the causal theory of reference’ for solving Putnam’s Paradox.

The trouble with Lewis’ proposal, in van Fraassen’s view, is that it is speculative and metaphysical: it relies on the distinction between natural and non-natural

properties. In Lewis' view, our scientific predicates pick out natural properties rather than gerrymandered ones. But how does nature 'privilege' natural properties over non-natural ones? How do our predicates manage to latch on the natural ones instead of the monsters of the deep sea? If there is no satisfactory answer to these questions, as van Fraassen suspects, then talk about natural properties is beginning to sound like "just more theory".

In a similar vein, Putnam holds that appeal to the new theory of reference in no way solves the paradox. Van Fraassen would object to the notion of causality being central in an account of reference fixing: more speculative metaphysics. Putnam himself famously claimed that appeal to the causal theory of reference is useless because it is just more theory. This has widely, and rightly, been seen to be an inadmissible move in the dialectic.⁶

But in connection with van Fraassen's response, it seems to me that the new theory of reference does not have to be spelled out using metaphysical notions (such as 'natural property', 'causality'). So it is unfortunate indeed that it is called 'the causal theory of reference'—it would have been better to call it the *social theory of reference*. Kripke and Putnam have done no more and no less than to sketch how we, in our social and linguistic practice, fix the reference of certain terms. This can and should be done without wheeling in metaphysical machinery: it isn't needed and it isn't wanted.

For mathematical discourse the answer must surely be along the same lines: we fix its reference in mathematical practice, but perhaps in a different way. A sketch of how this may be accomplished in arithmetic, is given in Halbach and Horsten (2005).⁷ So both for mathematical and for non-mathematical discourse the reference fixing mechanisms should not be sought in metaphysics, but in the social practices that we engage in. Mathematical reference is established in mathematical practice, and reference to the natural world is established in our engagement with the world.

6 Scientific structuralism

It is plain that the foregoing contains only a partial answer to the reference fixing question. On the side of non-mathematical discourse, ostension will not directly be of help with fixing the reference of theoretical terms such as 'electron'. But then, how do we do it?

Reference can also be fixed by description (Kripke 1980). We can try to fix the reference of the term 'copper atom' as 'the units that make up *this* stuff on a scale of roughly 10^{-15} meter'.⁸ For such a putative reference fixing act to be successful,

⁶ In defence of Putnam, some commentators have said that Putnam should have said that the only notion of causality that we can make sense of is so overdetermined that it is powerless as a reference fixer, or that the model-theoretic argument can be formulated in such a way that the causal theory of reference cannot be invoked as a way out (Douven 1999). I have pointed out my reservations about Douven's reconstruction in Horsten (2001 p. 130).

⁷ There an in rebus structuralism is articulated according to which reference to natural numbers can be seen as multiple reference to concrete objects belonging to (concrete) notation systems.

⁸ I do not mean to suggest that one day there was a gathering of scientists in which the extension of 'copper' was fixed in this way.

certain conditions have to be satisfied. First, such units must exist and must all be somehow similar to each other. Second, the members of the linguistic community must accept such a reference fixing act. Thirdly (perhaps), we must be able to interact with these atoms in suitable ways. But it is not a requirement for successful reference fixing that we have a complete or at least (somewhat incomplete but) correct scientific theory concerning these units. Of course, if our theory concerning the units is totally wrong, if, say, contrary to our belief, they do not carry mass, we are completely wrong about the size of the units, about their power to scatter beams of other units, about their tendency to link up with certain other types of units, then there may be legitimate doubt about whether our putative reference act was successful after all. In particular, it may very well be questioned whether even the proponents of the atomism in ancient Greece had a concept of a copper atom at all.

Now in the past decades, many scientific realist thought that a story along the lines that I have sketched just won't work. They were worried about the pessimistic meta-induction, which is taken to undermine the thesis that there is ontological continuity across scientific revolutions. As a realist solution to this problem, the view of ontological structuralism has been developed (Ladyman 1998).⁹ The thought here is that physical reality is deeply and thoroughly structural. The world does not ultimately consist of objects in anything like the traditional sense of the word. Instead, it consists of positions that stand in physical relations to each other and to experience. These structural positions and relations are gradually captured by physical theories (mostly in the form of equations). And these structural relations are preserved across scientific revolutions, whereas the nonstructural claims about the world often do not survive a scientific revolution.

Van Fraassen has pointed to a striking feature of ontological structuralism (van Fraassen 2006, pp. 293–294)¹⁰:

There is one striking point about the 'ontological position' [...] It must imply: *what has looked like the structure of something with unknown qualitative features is actually all there is to nature*. But with this, the contrast between structure and what is not structure has disappeared. Thus, from the point of view of one who adopts this position, any difference between it and 'ordinary' scientific realism also disappears. It seems that then that, *once adopted*, it should not be called structuralism at all! For if there is no non-structure, then there is no structure either. But for those who do not adopt this point of view, it remains startling: from an external or prior point of view, it seems to tell us that nature needs to be entirely re-conceived!

This is a fair and important observation. But the ontological structuralist should insist that on a scientific realist picture certain questions make sense that do not make sense on the ontological structuralist account. Suppose that there are fundamental symmetries in reality. Then, on the scientific realist account, it makes sense to ask which of these symmetries we are referring to in our (scientific) language. Van Fraassen puts this point in the following way (van Fraassen 2007, p. 49):

⁹ I shall not discuss Worrall's Kantian *epistemological* structuralism here.

¹⁰ Ladyman appears to be somewhat troubled by this question. See Ladyman (2007, pp. 39–40).

Carnap, who was attempting to devise a structuralist view of science in the *Aufbau* came squarely up against this problem. Suppose all that a scientist tells us about something is its structure, and suppose something else has that structure as well ... shouldn't s/he be able to say which of the two s/he is talking about?

If the structure that we are talking about has no automorphisms that leave the empirical substructure unchanged, then again pointing can be a way out (van Fraassen 2007, pp. 51–52). But if the structure has an automorphism that leaves the empirical substructure fixed, then ostension is not available. Now if one is an ontological structuralist, then the question does not make sense at all: there is only one structure, even though there are many different possible systems of objects that could have instantiated it. So there is after all an important difference between ontological structuralism and scientific realism. But an external viewpoint needs to be taken to make the difference visible: it cannot be seen from within the structure.

Note that the existence of fundamental symmetries in the world that leave the observable unchanged would have implications for our interpretation of the world. Consider a position a that is shifted to some position b by some global automorphism. Then we have no way of coining a name for position a . We have seen that ostension is powerless here. But also fixing reference by description won't work, for any condition that is satisfied by a , will also be satisfied by b . So the conclusion would be that although on the view that we are considering we may be able to quantify over all fundamental constituents of the world, there are some constituents (nodes in the 'graph of the world') that we cannot unequivocally name. The problem here is exactly the same as van Fraassen's problem of coordinatising the Euclidean sphere (van Fraassen 2008, p. 234), except that we now have a coordinatisation problem for the natural world.

This is not to say that we cannot name such positions in the structure of the world at all. It is just that our names for them can only be 'relative' or 'ambiguous' names, in the way that i and $-i$ are. None of these names unambiguously denotes one position (in the structure of the complex plane, or in the structure of the natural numbers); but to the extent that one of them denotes a position, the other denotes its additive inverse.

Van Fraassen advocates an empirical brand of structuralism, the core of which can be depicted as follows (van Fraassen 2008, p. 238):

Essential to an *empiricist structuralism* is the following core construal of the slogan that *all we know is structure*:

- I. Science represents the empirical phenomena as embeddable in certain *abstract structures* (theoretical models).
- II. Those abstract structures are describable only up to structural isomorphism.

I find that something is missing here. It suggests that science speaks only about the empirical world and how it can be embedded in a mathematical framework. An empirical structuralism should hold open the possibility that science makes true existence claims about non-observable but concrete entities. Van Fraassen could add

that our scientific theories successfully refer to unobservable entities if and only if at least one of its models is isomorphic to the unobservable structures of the natural world. But then not enough has been said. Suppose the unobservable structure of one of the models of our scientific theory corresponds to the unobservable structure of the world. How do we manage to single out this model that luckily corresponds, as far as the unobservable is concerned, to the world? How have we managed to intend this model instead of another or many other of the myriad models that our best scientific theory has? Again, it would be a mistake to think that considerations about theory satisfaction can solve this problem; only close attention to scientific practice can hold the key to a satisfactory answer.

Let me suggest, in closing, a form of scientific structuralism that is not of the ante rem kind advocated by Ladyman, but also does not reduce to the empirical structuralism advocated by van Fraassen. Suppose that the structure of the world does allow non-trivial automorphisms that leave the realm of the observable unchanged. Suppose, for simplicity's sake, that there is exactly one such non-trivial automorphism. Then one might still maintain that the world is an old-fashioned structure of old-fashioned objects with old-fashioned properties, but one might say that it is not determinate which one it is. And our interpretation of the world could be indeterminate between arranging the connection between language and world in one way and arranging it in another way.

This would be a form of structuralism because on this view science indeed captures the structure of the world and no more than that. It would differ from ontological structuralism by not postulating an ante rem structure.¹¹ Indeed, the structure of the world would on this proposed structuralist view be wholly dependent on the objects there are and the relations they stand into each other: it is an in rebus structuralism. Like in rebus structuralism in the philosophy of mathematics, it does not postulate positions as *sui generis* entities. Thereby it is 'less metaphysical' than ontological structuralism. Yet this alternative form of structuralism would also differ from van Fraassen's empirical structuralism, for it would hold that science captures the structure of the unobservable world as much as the structure of the observable.

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¹¹ For a comparison between ontological structuralism and ante rem structuralism in the philosophy of mathematics, see Ladyman (2007).

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