The case against higher-order metaphysics

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Abstract

Although higher-order metaphysics seems prima facie to be a promising new approach to metaphysics, it is nonetheless based on a mistake. This mistake is tied to a misuse of formal languages in metaphysics in general, not just to the use of higher-order rather than lower-order languages. I hope to highlight the mistake by discussing a popular recent example of higher-order metaphysics: the argument that reality is not structured using reasoning inspired by the Russell-Myhill paradox. A key issue will be the relationship between higher-order quantification in formal languages and quantification in English, in particular the questions whether such quantifiers are already to be found in English, and whether they could simply be added to English if not in order to gain expressive strength. I will conclude that little of metaphysical significance follows from this Russell-Myhill inspired argument against structure. The reason why the results of higher-order logic show little of metaphysical significance generalizes to other uses of higher-order logic in metaphysical theorizing, and with it supports that higher-order metaphysics is a flawed research program. I end with some reflections on what positive role formal tools like higher-order logic can have in metaphysics, and what the fundamental mistake is on which higher-order metaphysics is based.
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1 The promise of higher-order metaphysics

Higher-order metaphysics is a new approach to metaphysics that makes use of the resources of higher-order logic to make progress in metaphysics. Since higher-order languages have an increased expressive power over lower-order languages, in a sense to be discussed below, this holds the promise of us being able to address metaphysical problems in novel ways. And since higher-order metaphysics employs higher-order logic, it also holds the promise of finding precise formal proofs that establish conclusions of metaphysical significance. A number of philosophers have recently systematically pursued this approach to metaphysics, and several of them have declared to have achieved substantial results about what reality is like using this method. One paradigmatic case of such a claimed result is that reality is not fine-grained enough for facts to be structured. That is to say, facts do not have a structure that corresponds to the structure of the sentences that represent them. In particular, it is claimed that it isn’t the case in general that if the fact that an object $a$ has a property of being $F$ is identical to the fact that $a$ has the property of being $G$ then the properties of being $F$ and of being $G$ in turn are identical, as one might have originally thought. A generalization of this thesis is put forward by several authors\textsuperscript{1} to be inconsistent, and thus to be rejected. Establishing that reality is not structured in this way relies on the use of higher-order logic, and thus it is a paradigm claimed result of higher-order metaphysics: a result of metaphysical significance established with the method of precise formal proof using higher-order logic. This argument will be our focus below. Much further progress along these lines is claimed to await those who finally overcome the limitations imposed, in particular, by Quine on restricting ourselves primarily to first-order languages in our theorizing. Once we go higher-order we can achieve so much more, or so the promise of the program of higher-order metaphysics.

In this paper I argue that this promise of higher-order metaphysics is bound to remain unfulfilled. Those who rely on higher-order languages in their metaphysical theorizing are making a key mistake about the use of formal tools in metaphysics. To be sure, the mistake is not to use higher-order languages instead of only first-order languages. The mistake instead is tied to the way formal tools, be they of higher or lower order, are employed. This mistake, I will argue, is so deeply ingrained in the program that there is no hope of overcoming it. With it higher-order metaphysics itself is based on a mistake, since it essentially relies on the use of higher-order logic in just the problematic way. My main goal in this paper is to establish this largely negative claim. But my target is not entirely negative. Once we see what is wrong with higher-order metaphysics, we can also see more clearly what an acceptable alternative looks

\textsuperscript{1}See [Goodman, 2017], [Fritz, 2017], and [Dorr, 2016].
like, one that does not make the mistake of higher-order metaphysics, and which gives formal languages a different role in metaphysics. This alternative approach assigns a distinguished role to our natural language representations in the questions we should ask, the answers we should give, and how to get from the former to the latter. Formal tools can play a positive role in this alternative approach, but it will be a much more secondary role than higher-order metaphysics would have it.

To set up the discussion properly, I have to very briefly review the main idea behind higher-order metaphysics, including one paradigmatic argument within the program for the conclusion that reality is not structured. But since my arguments below do not depend on the technical details of either the set-up of higher-order metaphysics, nor on the details of the particular proof I will focus on, I hope to be able to keep things simple. Nonetheless, some basic setup is necessary.

Higher-order logic (or HOL from now on) generalizes on first-order logic (FOL) in that HOL allows for quantifiers to bind variables in syntactic positions other than that of names for objects. We thus do not only have well-formed sentences like ‘∃xF(x)’, but also, for example, ‘∃XX(a)’. Both of these follow from a simple subject-predicate sentence ‘F(a)’, with the former quantifying into the position of the name ‘a’, and the latter into that of the predicate ‘F’. Furthermore, such quantifiers can directly interact with sentences, allowing also the inference from ‘F(a)’ to ‘∃pp’.

Crucially, in HOL as it is used in higher-order metaphysics (HOM from now on), such different quantifiers do not share a domain. They must be understood as distinct kinds of quantifiers, not distinct restrictions of one and the same quantifier. In particular, there is no universal domain such that all the different quantifiers range over different restrictions of that domain. This HOL based approach is congenial with a type-theoretic approach, where syntactic and semantic types are carefully distinguished, and where quantifiers can interact with expressions of various types. Such a type-theoretic approach can be set up more precisely in various ways. One standard way is to introduce basic types e for objects and t for truth-values, and then construct higher types by combing those. For example, type <e,t> is the type of predicates, which can be understood as a function from objects to truth values, which is just what a predicate would do semantically: mapping all the objects that satisfy the predicate to T, and all other ones to F. And so on and so forth for other higher types. Naturally, this is only the simplest way to get started, and other options are on the table. For example, one could hold that thinking of type t as truth-values is a mistake, and the type associated with sentences should
rather been seen as being more complex and varied, something we will discuss below. Types are also often closely associated with \( \lambda \)-abstraction, which is in essence just another notation for higher-type expressions. No particular approach to HOL or to type theory is standard in the literature on higher-order metaphysics, and we do not need to pick one here. In fact, little of the details of the technical machinery is essential for our discussion to come, and so I won’t spend too much time on it, as the technicalities are not at issue here.\(^2\) So far all this simply concerns artificial, formal languages, but we will move to how it relates to natural languages shortly.

Adopting HOL to formulate various metaphysical theses gives rise to the possibility of giving a precise proof within a logical system of a particular statement of HOL, and with it the hope of a metaphysical result formulated in HOL which is a theorem of HOL. Our example case will be the use of the HOL analog of the Russell-Myhill paradox: the attempt to argue that reality is not structured and facts are not fine-grained using reasoning in HOL inspired by this paradox. Since this will be our main example of HOM, I will need to briefly review this argument.

2 The argument against structure

The Russell-Myhill paradox is originally a paradox tied to propositions that are about sets of propositions. Consider the question when propositions which are about sets of propositions are the same or different. Let \( p_1 \) be the proposition that all propositions in a given collection \( C_1 \) are true, and let \( p_2 \) be the proposition that all propositions in \( C_2 \) are true. Then it is plausible to hold that

(1) If \( p_1 = p_2 \), then \( C_1 = C_2 \).

In other words, if the propositions are the same, then the sets they are about are also the same. Or to consider the contrapositive: if \( C_1 \neq C_2 \), then \( p_1 \neq p_2 \). After all, in that case \( p_1 \) and \( p_2 \) make claims about different sets, namely that all members of these different sets are true. But then, plausibly, they are different propositions, since they concern different sets.

This principle seems to be a special instance of a more general idea, in effect the idea that propositions are structured. The simplest case of this is just the following:

(2) If \( p \) is the proposition that \( a \) is \( F \), and \( q \) the proposition that \( b \) is \( G \) and \( p = q \), then \( a = b \) and being \( F = \) being \( G \).

\(^2\)For a basic overview, see [Gamut, 1991].
In other words, if $p$ and $q$ are both propositions that a particular object has a particular property and $p = q$, then the objects and the properties figuring in these propositions are also the same. We can say that the *structure principle* affirms the proper generalization of (2), i.e. not just for object-property propositions, but also for all other ones: conjunctive ones, conditional ones, universally quantified ones, and so on. How to more precisely state the structure principle in its full generality is left open now, but the idea behind it seems clear enough, and special cases discussed above in (1) and (2) seem intuitively very plausible.

However, the particular instance of the structure principle spelled out in (1) seems to be in conflict with Cantor’s Theorem. (1) seems to require that there are as many propositions as there are sets of propositions. After all, for each set of propositions $C$ there is a unique proposition $p$ which is the proposition that all propositions in $C$ are true. That this proposition is unique is guaranteed by (1), since it guarantees that if $C_1$ is different from $C_2$, then $p_1$ is different from $p_2$. This thus gives rise to an injective function from all sets of propositions to propositions, contradicting Cantor’s Theorem. Although the Russell-Myhill argument is generally associated with a paradox, for our purposes here it is easier to consider the reasoning above related to Cantor’s Theorem.\(^3\)

Naturally there are a number of ways to try to block the argument outlined above: one could reject that there are arbitrary sets of propositions, or reject that there always are propositions that are about arbitrary sets of propositions, or reject propositions that involve truth as somehow problematic, either in general or when applied to sets of propositions, and so on and so forth. All these options are on the table as immediate replies, as is the option of rejecting principle (1): if $p_1 = p_2$, then $C_1 = C_2$. This principle requires that propositions are rather finely individuated: their identity depends on the identity of certain components from which they are built, so to speak, metaphorically. (1) might be false, since the structure principle in general might be false. And it is this structure principle that is the target of the HOM analog of the Russell-Myhill argument. The trick is to try to somehow direct all blame towards the structure principle.

One way to think about the HOM argument against the structure principle is to take it to use a version of the Russell-Myhill argument and to try to get rid of all other options for responding to it besides rejecting (1) and the structure principle. The strategy for eliminating all other options for a response is to use HOL to avoid all talk of sets of propositions and of truth. Here is how the basic idea can go: instead of using statements that claim that all propositions in a particular collection are true we can instead simply use higher-order quantifiers into sentence position to make an analogous claim. Thus instead of using the statement that all propositions

\(^3\)For more on the Russell-Myhill paradox, see [Klement, 2022].
in a set $C$ are true, i.e.

$$(3) \quad \forall x (\text{Prop}(x) \land x \in C \rightarrow \text{True}(x))$$

we use

$$(4) \quad \forall p (Op \rightarrow p)$$

Here $O$ is a sentential operator corresponding to a set $C$ of propositions: $Op$ holds just in case the proposition $p$ is a member of $C$. And we can then generalize the relevant statements: instead of quantifying over all sets of propositions $C$, we use higher-order quantifiers over all operators $O$. (4) is what we can call the logization of (3). It takes a sentence that is about non-logical things — as logic is commonly understood — like sets and truth, and turns it into something which is supposed to be essentially equivalent, but not about these non-logical things any more. Instead it utilizes a more powerful higher-order logic. This logization move is a key move in higher-order metaphysics, and we will discuss it in more detail below. Of course, the logization does not always concern truth or sets, it can concern lots of other things as well: operators, properties, and so on, which would be more relevant in other examples than the one we are focusing on here. In our present case, once talk of truth and sets has been logicized away, we can reason directly with these logicized versions. In particular, we can now formulate the structure principle directly in its logicized version. For our particular case of (2), for example, this can be as follows:

$$(5) \quad \forall p, q \forall F, G \forall a, b (p \equiv F(a) \land q \equiv G(b) \land p \equiv q \rightarrow F \equiv G \land a = b)$$

Here $\equiv$ is a suitable generalization of $=$ which applies to higher types. We can then carry over Cantor’s diagonal argument into an argument in higher-order logic, and thereby reject (5), all on only logical grounds. A simple reformulation of Cantor’s diagonal argument, properly done, will allow us to reject (5), relying on no further assumptions about truth or sets of propositions, since those do not even occur in the new formulation any longer. More detailed presentations of arguments along these lines can be found in, for example, [Goodman, 2017], [Dorr, 2016], [Fritz, 2017], all of whom use it to argue against the structure principle.4

This logicized approach thus avoids all talk of truth and of collections of propositions, and with it it avoids that we can put the blame on issues related to sets or truth. The only thing left to reject is the principle tied to the individuation of propositions, that is the structure principle, which we need to rely on to derive a contradiction. With this one can now claim that the

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4For a discussion of how the Russell-Myhill paradox could be resolved in general, see [Uzquiano, 2015], [Walsh, 2016], and others.
structure principle has simply been refuted by this argument. The rejection of this principle is then closely associated with the claim that reality is not structured and thus less fine-grained than what was widely assumed. Reality, after all is the totality of facts, or relatedly of all true propositions, and so the structure of reality is tied to the structure of propositions. We can show that reality is not fine-grained simply by showing that the structure principle can be disproven in HOL. Logic alone rules this out, in particular HOL. Thus with HOL we can achieve results about what reality is like simply by proving claims in HOL, just as HOM hoped to do. And who knows what else about reality we might be able to discover in a similar way, or so the hopeful outlook of HOM.

Besides acceptance there are several other reactions one can have to this argument. The first one is to question the reasoning in it: is it really so that we can refute (5)? Are all the principles relied upon in this reasoning acceptable? One might, for example, find something dubious in the reasoning in favor of Cantor’s Theorem, due to the impredicativity involved in it. Or one might reject classical reasoning in favor of some other non-classical logic, and so on. I will not pursue any of these options here, as my objections to not concern these aspects of the argument. Since I won’t object to the formal derivations, I took some liberties in skipping the details of these derivations, as well as the more precise formal setup of the higher-order language in which they can be carried out. There are several ways of doing this more carefully, but each of them would require much more space than is necessary for my purposes here.5

A second reaction is to accept the reasoning, but question the status of some of the assumptions. In particular, one might argue that some of the principles relied upon in this reasoning are not properly logical, but rather much more substantial metaphysical principles, and thus that reality is not structured is not established with the claimed authority. I will also not pursue this line, although my arguments below are relevant for these issues.

Third, one could question that the result achieved with the formal proof shows that reality is not structured. This is how I will object to the proposed argument, and relatedly to HOM. What is proven does not show what it is claimed to show: that reality is not structured, that facts are not individuated as finely as we might have thought, and so on. This line of reasoning thus affects the content of what has been shown and how it relates to what is claimed to have been shown. To bring out the central issues, I will in the following in particular focus on the significance of quantification into sentential position, as it occurs in (4) and in (5). Such quantification is generally called ‘propositional quantification’ by proponents of HOM (HOMers for short). But what relation ‘propositional quantification’ in this technical sense has to propositions is not at

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5See [Dorr, 2016] for a precise formal setup, formulation of the structure principle, and a detailed refutation of that principle within that setup, on pages 58-66.
all clear. And with it it is not clear how the truth of sentences in HOL with such “propositional quantifiers” in them relates to what reality is like. To make progress on this issue, I will first consider the relationship between higher-order formal languages and natural languages. Is HOL a more precise and rigorous articulation of what is already to be found in natural languages, or is it instead to be understood as an alternative to it, in particular an improved alternative? We should carefully consider both of these issues in turn.

3 Higher-order logic and natural language

I will argue in the following that the key to understanding the significance of the results of HOL for metaphysics lies in the relationship between higher-order languages and natural languages. In particular, are the resources of HOL somehow to be found in English? Focusing on English might seem surprising on the face of it, since why would the relationship of HOL to English be of special significance for the role of HOL in metaphysics? Metaphysics concerns reality, after all, not our linguistic representations of reality. So why should our own natural languages, and especially English, be of any special significance for metaphysics? Nonetheless, I hope to make clear below that the relationship to natural language is the key issue for the significance of HOL for metaphysics.

HOMers come in two kinds: First there are those who find the resources of HOL in natural language. This first group takes certain natural language quantifiers to be higher-order quantifiers, ranging over a completely different, higher-order domain than other natural language quantifiers. Second there are those who hold that the relationship between HOL and natural language is in the end insignificant, since we can simply add the resources of HOL to natural language if they aren’t already there, and then benefit from the added expressive strength in our metaphysical theorizing. Using HOL instead of natural language is therefore an improvement for metaphysics. I will call the first group the analyzers and the second one the augmenters. The analyzers generally consider various natural language examples to make their case for higher-order logic to be found in natural language, while the augmenters stress the insignificance of natural language and suggest that we might as well move straight to HOL as the language in which we theorize. I will argue that both are mistaken, and that the reason for their mistake is in the end tied to how natural languages relate to HOL.

To make this case I would like to proceed as follows: in this section we will consider whether English quantification is sometimes higher-order quantification, in particular, whether quantifi-

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6See [Künne, 2003] and [Trueman, 2021a].
7See [Williamson, 2013].
cation over facts and propositions in English is higher-order quantification, as some analyzers claim it is. Then, in the next section, we will consider the prospects of being an augmenter and for theorizing in HOL directly.

To get us on the right track, I would like to make clear from the outset that there is nothing objectionable about higher-order languages as such: they are well-defined artificial languages, with a clear syntax, and reasonably well-understood semantics, leaving aside some philosophical debates which naturally always arise in these areas. Thus as far as I am concerned there is nothing wrong with higher-order languages, nor with higher-order logic, understood as formal deductive systems based on these higher-order languages. Similarly, there is nothing wrong with versions of HOL that allows for quantification into sentence position. All that makes perfect sense as a formal language. The issue is simply what the results of HOL show for what reality is like and what role HOL should have in metaphysics.

Although there are several ways one could try to motivate the significance of the results of HOL for metaphysics, there is one particularly direct and especially prominent line of thought that aims to support that such results are of immediate significance. I will call it the direct motivation and it goes as follows: the version of higher-order logic employed above in sentence (4) involves propositional quantification, i.e. quantifiers that syntactically bind variables in sentence position and semantically ranges over propositions. Facts correspond to, or are even identical with, true propositions. Thus reality as the totality of facts is closely tied to the totality of propositions, which in turn is closely tied to propositional quantification in HOL. Results in such a logic therefore are directly informative about what the totality of propositions is like, and with it what the totality of facts is like. Since reality just is the totality of facts, a logical truth involving propositional quantification puts a constraint on what reality can be like. Thus the results of HOL give us insights into what reality in general is like, or so the idea.

But this way of motivating the significance of HOL for metaphysics is quite dubious. The question remains in what sense higher-order quantification that binds variables in sentence position deserves to be called ‘propositional quantification’, and in what sense, if any, it can be understood as ranging over propositions or facts. Such a relationship would be crucial for the alleged direct significance of the truth of sentences involving higher-order quantifiers into sentential position for what reality as the totality of facts is like. One worry here is that the above motivation for the significance of such results confuses higher-order ‘propositional quantification’ with lower-order quantification over propositions. But how are these kinds of quantifiers related, in particular how is quantification over propositions in English related to higher-order quantification into sentence position? If sentential quantifiers do not range over propositions
after all, then how are the results of HOL with such quantifiers related to what reality in general is like? To answer these questions, we need to investigate whether quantification over propositions in English is like higher-order quantification into sentential position. It can’t be assumed, of course, that the analog of quantification over propositions in languages other than English is just like that of English. But since English is the language in which I write this and in which much of this debate is carried out, it is a natural choice of a natural language to look at, as a first step at least. Let us thus look at the relationship between propositional quantification in HOL and quantification over propositions in English.

Is quantification in English ever quantification into sentence position? This question has been debated in various places in the literature, with some holding that special ‘pro-sentential’ constructions, or special sentence-level anaphora, can be bound by quantifiers, which in effect allows quantification into sentential position. A detailed attempt to defend quantification into sentence position as a distinct kind of quantification that can also be found in English is in [Künne, 2003], in which Wolfgang Künne hopes to rely on such quantification to defend a particular minimalist theory of truth. In [Künne, 2003, 368], Künne motivates the intelligibility of quantification into sentence position in English more or less as follows: a sentence like

(6) \( \exists p \ p \)

which can be seen as the logization, in present terminology, of ‘some proposition is true,’ can also be understood as

(7) For some way things may be said to be, things are that way.

With such sentential quantification being available we can then, according to Künne, analyze truth itself in terms of these quantifiers.9

But this way of understanding it does not, in English, involve propositional quantification or quantification into sentence position. Instead it contains quantification over ways, and quantification over ways is not quantification into sentence position. At best ways are closely related to properties, in this particular case properties of things in general, or the world. The proper understanding of (7) thus involves quantification not over propositions, but over ways, restricted to those ways which things maybe said to be. But that is not sentential quantification, nor propositional quantification in any reasonable sense, and thus this example does not motivate

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8 See [Grover, 1972], [Künne, 2003], [Trueman, 2021a], [Prior, 1971] and others.
9 In a nutshell, Künne’s view is that truth can be defined as follows:

(8) \( \forall x (x \text{ is true iff } \exists p(x = [p] \land p)) \)

whereby ‘[p]’ is a singular term like ‘the proposition that p’.
that we have sentential quantification in English.\(^\text{10}\)

Similarly, in [Trueman, 2021a] and [Trueman, 2021b] Robert Trueman tries to understand quantification into sentence position as quantification over ways for the world to be, but then adds that such ways for the world to be are not to be understood as some kind of entity, and in fact, the whole expression ‘ways for the world to be’ should be taken as syncategorematic. But this is clearly not so for ‘ways for the world to be’ in English. That expression is composed from several meaningful parts that combine to give it the meaning it has. Such a syncategorematic understanding of this phrase might well be congenial to the view that we do have sentential quantification in English, but that doesn’t answer the question whether we have such quantification in English. In English, the phrase ‘ways the world may be said to be’ is not syncategorematic, and thus there is no support for the existence of sentential quantification in English to be gained from quantification over ways the world may be said to be.

There are also other attempts to try to find examples of quantification into sentential positions, but we don’t have to go over them.\(^\text{11}\) I think it is fair to say that such examples are at the very best isolated and borderline acceptable, and arguably whatever quantification occurs in them is about something else, like ways, but not proper sentential quantification. The lengthy discussion in [Künne, 2003], which hopes to establish that there are such examples, makes clear just how hard it is to motivate that there are any plausible ones. I won’t attempt to defend or dismiss such individual examples any further now, since this is not the central issue that we are facing. The issue is not whether there is a single example of something resembling quantification into sentence position in English. The real issue rather is how quantification over facts and propositions in English is to be understood in general. That is what we need to focus on next.

Ordinary cases of quantification over propositions or facts in English, as exemplified in

\[(9)\text{ Some facts about dinosaurs are rather surprising,}\]

are not overtly quantification into sentence position. The question remains if they nonetheless are to be understood as such quantification. Maybe on the proper semantic analysis such quantifiers should be seen as quantifying into sentence position after all? Some philosophers have followed Prior’s [Prior, 1971] in holding that quantification which interacts with that-clauses is in fact sentential quantification, since the ‘that’ in

\[(10)\text{ John believes that dinosaurs are extinct.}\]

does not properly belong to the clause ‘that dinosaurs are extinct’, but rather to ‘believes’.

\(^{10}\)I have also made this objection against Künne’s view in [Hofweber, 2005].

\(^{11}\)See [Künne, 2003] and [Trueman, 2021a] for further examples and references.
On this view, ‘believes’ does not express a relation between John and a proposition, but ‘John believes that’ is a sentential operator instead. But this proposal is highly implausible as an analysis of natural language, since “movement”-examples clearly associate ‘that’ with the clause, and not with ‘believes’. So, it is

(11) That dinosaurs are extinct is what John believes.

and not

(12) Dinosaurs are extinct is what John believes that.

This is well-known, and maybe by itself not decisive, since one could hold, with [Trueman, 2021a], that the ‘that’ in the that-clause is vacuous, and a that-clause is just a sentence with a vacuous ‘that’ out front. Thus even in the displaced case of a that-clause, as in (11), what appears to be a that-clause is just a sentence, and what appears to be quantification into that-clause position is just sentential quantification. This, too, is highly implausible, since the ‘that’ can often not be omitted. Consider:

(13) I want you visit me.

is dubious, although perfectly fine with a ‘that’ inserted. In fact, a ‘that’-free version is available:

(14) I want you to visit me.

which indicates that the ‘that’ is not semantically vacuous.

But be all that as it may, in the end the ultimately decisive reason against English quantification over facts being higher-order is something else. There is a simple and straightforward observation that quite conclusively shows that quantification into that-clause position, and with it quantification over facts, is not sentential quantification, nor any other kind of higher-order quantification in English. To make this vivid, it is important to make clear what higher-order quantification, which includes quantification into sentential position, comes down to according to the HOL picture. On this picture higher-order quantifiers are a distinct type of quantifier compared to quantifiers of lower order, in particular quantifiers over objects. It is not that higher-order quantifiers are the same quantifiers as those over objects, except that they range over different restrictions of the same domain. Thus it is not the case that one quantifier ranges over objects, the other over propositions, both of which are subdomains of an all-inclusive domain. Instead, they range over completely different domains which can’t be unified into one

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12See [Künne, 2003] for more.
13These two options are to be distinguished. For example, Tobias Rosefeldt defends the view in [Rosefeldt, 2008] that quantification into that-clause position is higher-order quantification, even thought it is not sentential quantification.
larger domain. For each higher type we have a distinct quantifier with a distinct domain, and no universal domain unifies all these different types.

This typed approach does not just apply to quantifiers, it applies to other types of expressions as well: predicates that combine with different kinds of quantifiers must also be of different types, otherwise the resulting sentences would not even be grammatical. And it does not just apply to predicates, but to most other expressions as well: predicate modifiers that modify predicates that combine with quantifiers over facts must be of a different type than modifiers that modify predicates that combine with quantifiers over objects, and so on.

To be sure, anyone can accept that natural language is typed in an innocent sense. For example, the type theoretic framework outlined at the beginning, where different expressions are associated with different syntactic and semantic types, is widely used in natural language semantics. Everyone can accept this, and it simply concerns what kinds of semantic values should be assigned to what kinds of expressions. On one version of this kind of typing, predicates are of type \(<e, t>\) and noun phrases of type \(<<e, t>, t>\), which affects both how they combine syntactically and what kinds of semantic values they get assigned in a compositional semantics. I will call this innocent typing. Innocent typing is compatible with quantifiers sometimes having different types in an innocent sense, one that is unrelated to our main topic. For example, it might be that the type of ‘some dog’ is slightly different when in subject position than when in object position. So, in ‘Some dog bit me’ the quantifier might get a semantic value of a particular type, while in ‘I bit some dog’ it might get assigned a slightly different type, derivative on how types get assigned and combine to form a sentence. All this is innocent and needs to be distinguished from what we can call serious typing, which holds that quantifiers come in different kinds or types, which range over completely different kinds of domains, with no coherent notion of a unified domain of all the things in these different domains.\(^{14}\)

Proper higher-order logic is based on serious typing, and such serious typing is generally accepted by those who hold that higher-order quantifiers appear in English\(^{15}\) and those who give higher-order logic a special place in metaphysics.\(^{16}\)

This has ramifications for the question whether or not English quantification over facts is higher-order quantification in this serious typing sense. If it were, then this would mean that quantifiers over facts are of a different type or kind than quantifiers over objects. So, the quantifier in

\(^{14}\)And as is well-known, it is challenging to state serious typing precisely, since higher-order quantifiers on this view don’t range over “things” at all, so to say that they range over different things than lower-order quantifiers is strictly incorrect, but gets the idea across.

\(^{15}\)See, for example, [Künne, 2003] and [Trueman, 2021b].

\(^{16}\)See, for example, chapter 5 of [Williamson, 2013].
Some facts are surprising.

would be of a different kind than the quantifier in

Some cars are expensive.

And similarly, the predicates ‘is surprising’ and ‘is expensive’ are correspondingly of different types as well. In particular, the quantifier ‘something’ in

Something is surprising, namely the fact that I won at chess.

is different from the one in

Something is expensive, namely the Tesla.

And this naturally carries over to other quantifiers ‘everything’, ‘most things’, ‘two things’, and so on.

Now, with this in mind we can see quite clearly that quantification in English is not like this: English does not have such a separation of quantifiers into different kinds. We can use one and the same quantifier to interact with both facts as well as objects. First off, quantified sentences like

Something is disgusting.

can be implied by instances that are singular terms or that-clauses: the mess John left behind, or that John is the new head of mess enforcement. The defender of higher-order quantification over facts and proposition might want to insist that there is no single reading of (19) that is implied by both that John’s mess is disgusting and also that the fact that John is the new head is disgusting. But this move does not help, implausible as it might be in addition, since we can in English easily mix such quantification, thereby requiring that one single quantifier ranges over both kinds. To consider just one example:

There are two things that bother John: his ulcer and the fact that I won at chess.

Here there is one quantifier ‘two things’ that ranges over both facts and things. But this would be strictly forbidden on the higher-order approach to quantification: there can be no quantifier that ranges of both facts and things, and a sentence like (20) should not even be grammatical if quantification in English were seriously typed. In an example like this it is not possible to understand ‘two things’ as having different readings, one for facts and one for things, since only on the mixed reading are there two things.\textsuperscript{17} And this is not an isolated example. It makes perfect sense to say that

\textsuperscript{17}See also [Hofweber, 2018] for this argument, which is a reply to [Uzquiano, 2018].
(21) Everything that is disgusting to either Jay or Jess is appealing to Joe.

when what is disgusting to Jay is sauerkraut and to Jess that Jill won the game.

Obviously, a defender of the HOL approach to quantification over facts could try to somehow wiggle out of examples like these, unpromising as that may seem. But we need to keep in mind that at present we are merely considering if quantification in English over facts is higher-order quantification in the technical sense that requires serious typing and completely separate domains. So far we assess this simply as a claim about English, not necessarily already as a claim about whether such quantifiers might not be better suited for metaphysics independently of how things are in English. We will get to that, second, topic shortly. But at least in English we can alway mix quantifiers and make grammatical and meaningful quantificational claims that have both kinds of instances. This is not unrelated to the issue that in English we can almost always nominalize and put things into subject position and thereby make it available for interaction with quantifiers into subject or nominal position. The most famous case of this is Frege’s concept of a horse problem: if predicates stand for concepts, while singular terms stand for objects, then ‘the concept of a horse’ seems to stand for an object, not a concept. And it seems to interact with just the same quantifiers that other singular terms interact with. Nominalizing thus seems to support a single domain over which all English quantifiers range.

There are again ways to try to wiggle out of these problems, but the wind seems to be blowing in a different direction when it comes to understanding how quantification and typing works in natural language. In a way this might not be too controversial even among HOMers. Only some of them are analyzers in our above sense, who find higher-order quantification in natural language. And only some of those think that these higher-order natural language quantifiers are of special metaphysical significance. A large group of HOMers takes features of natural language to be insignificant, and they are augmenters instead: why be concerned with whether natural language contains higher-order quantifiers? Metaphysics has no special relationship to English after all, only to reality. We can’t expect that English is already ideal when it comes to describing reality, and if it isn’t, then there is noting wrong with moving beyond it and moving to a more ideal language. Thus if English doesn’t contain proper higher-order quantifiers, then just add them to it for an improvement. Or more radically, we could carry out metaphysical theorizing directly and exclusively in HOL, leaving natural language behind. Natural language is, after all, only one way to represent the world, and if it is limited because it does not contain higher-order quantification, then it might well not be the most suitable language for metaphysical theorizing. So why not leave it behind and move directly towards theorizing in HOL, or so the augmenters plan for making progress. But none of this is going to work. I will argue in the next section
that what dooms the analyzers in the end also dooms the augmenters, despite their apparently very different approaches to this issue.

4 Higher-order logic as an improvement over natural language

Quantification over facts and propositions in English is not higher-order quantification. But then, why not simply add such higher-order quantification to English and carry out metaphysics with the use of this added resource? Why not augment English, instead of analyzing it? That way we don’t have to worry at all what goes on in English, and just use HOL directly. Williamson suggests this much when he proposes in [Williamson, 2003, 459] that we adopt HOL as our “home language,” reaping the benefits of the alleged increased expressive power that we gain this way, and thereby overcoming the expressive limitations of English. The real issue we now need to discuss is thus this: given that quantification in English is not higher-order quantification, is it an improvement to carry out metaphysics using HOL instead of just English? In particular, do the results we gain in HOL lead to insights into what reality is like, insights that are bound to remain elusive if we stuck with English alone? Should we thus answer the questions we ask in English using HOL? Or should we go further, and even leave our English questions behind, and instead ask our questions directly in HOL to begin with? I would like to now consider both of these two options: first the case where we ask a question like ‘is reality structured?’ in English, and hope to answer it using HOL, and second the case where we give up on the English question, but pursue metaphysics by asking a HOL question instead.

4.1 English question, HOL answer

To make progress on all this we need to address the question what quantification over facts in English is positively like. We saw above, negatively, that it isn’t higher-order quantification in the sense of a distinct kind of quantification that needs to be separated from quantification over objects. In English one and the same quantifier can range over both objects as well as facts or propositions. But how are such quantifiers to be understood, if not as higher-order quantifiers?

When it comes to understanding quantification over facts and propositions in English, there are in essence two main options: they either are restricted quantifiers that range over one large domain that includes objects, facts, and many other things, or else they are like substitutional quantifiers. There is a key difference between these options: The first option takes quantifiers to range over one unified domain, which permits of many different restrictions, while the second, substitutional option takes quantifiers over facts to not range over a domain at all. On this
substitutional understanding of quantifiers, they are not making a claim about some language-
external domain of entities, but rather they relate in a certain way to substitution instances
within the language. Both of these approaches naturally need to be spelled out more carefully
to be worthy of serious consideration, but they are the two natural options if the higher-order
approach is ruled out for quantification in English. Let’s briefly look at those options in turn to
make progress on the issue whether moving to higher-order quantification should be seen as an
improvement over quantification over facts in English.

Suppose that quantification over facts in English is quantification over the same domain that
quantifiers range over in general, except that these quantifiers are restricted to facts in this case.
This is probably the most wide-spread view of quantification over facts and propositions, for
better or for worse. Thus when we speak of ‘all the facts’ we are universally quantifying over
this one domain, with a restriction to the facts. Another restriction of the same domain applies
when we speak of ‘all the chairs’, and so on. If this is the correct view of quantification over
facts in English, then this is of great relevance for the question what significance the results
of HOL have for metaphysics. In particular, it casts serious doubt on the significance of these
results.

To illustrate this, let’s again consider the direct motivation, discussed on page 8 above, for
the metaphysical significance of the Russell-Myhill inspired rejection of the structure principle.
According to that motivation, we can see that reality is not structured, since we can refute the
structure principle (5) in HOL. Reality is the totality of facts, which corresponds to the totality
of true propositions, which is what propositional quantifiers range over, which is the kind of
quantification that occurs in the structure principle (5). Thus the falsity of (5) shows that
reality is not structured, since the propositions that the propositional quantifiers range over are
not structured in the sense made explicit in the structure principle, or so the direct motivation.
But we can now clearly see that this motivation is mistaken. Higher-order quantifiers do not
range over propositions, since quantifiers in English range over the same domain when they range
over propositions and when they range over objects. Thus no proposition is in the domain of
a higher-order quantifier, since those range over a completely different domain. In this last
sentence I used the English quantifier ‘no proposition’, which ranges over the same domain as
quantifiers over objects, as we are assuming now that quantification over facts and propositions
in English is like. And by serious typing this means that this sentence is true: ‘No proposition
is in the domain of a higher-order quantifier.’ This sentence is guaranteed to be true, since
what the English quantifier ‘no proposition’ and what higher-order quantifiers range over are
completely different. The structure principle crucially involves higher-order quantifiers, and it
makes a claim about the fineness of grain of the things in the range of those quantifiers. It makes a claim about when whatever the higher-order quantifier ranges over are the same or different. But these things are not propositions or facts, and so the structure principle does not make a claim about the fineness of grain of reality as the totality of facts.

I think this is not sufficiently appreciated in part because higher-order quantification into sentence position is commonly called “propositional quantification” by proponents of higher-order metaphysics. But that is rather confusing terminology, since there is no direct relationship between such sentential quantifiers and propositions, in particular they do not range over propositions, even though they are intended to range over some domain. I suspect that many HOMers would not put up too much resistance to the idea that higher-order “propositional quantifiers” do not range over propositions, in particular if we grant, as I am sure many would, that quantifiers in English that interact with that-clauses are not higher-order quantifiers. But it remains puzzling why the terminology of “propositional quantification” is so widely used. One reason could be that there is an assumption being made that there nonetheless is a close relationship between sentential quantifiers and propositions. Maybe this is in the background when HOMers draw metaphysical conclusions about reality from results in HOL involving sentential quantification. But how that should go must remain puzzling. The claim was that the falsity of the structure principle shows that reality is not structured and not fine-grained, even though no quantification over facts or propositions occurs in the structure principle. But why would it show this, if not via a justification like the direct motivation? It is notable here that it indeed would follow from the falsity of the structure principle that reality is not structured if these sentential quantifiers would range over propositions or facts. But since they do not, why should we draw this conclusion?

There are a few options a HOMer has to answer this challenge. One is to revisit the issue of what type $t$ is in our basic type-theoretic setup outlined above. It is common in linguistic semantics to think of type $t$ as a truth value, and type $e$ as that of an object, building higher-types the usual way from them. Type $t$ is the type associated with a sentence, and so a truth-value is of the right general kind. But truth values are very coarse-grained, basically grouping half of all sentences together by assigning them the same truth value. Maybe it is thus better to think of type $t$ as more varied and complex, and not as the type of truth values, but as the type of propositions. Propositions, after all, are associated with sentences as well, and they group sentences into many more groups. Here all those sentences that have the same proposition as their content should get assigned the same type $t$ proposition. And so understood, the proposal goes, it makes perfect sense to take sentential quantifiers to range over propositions,
and thus we can justify the label of propositional quantification. They don’t range over type $e$ propositions, but over type $t$ propositions. And this way the structure principle involving higher-order sentential quantifiers is relevant for what reality understood as the totality of facts or true propositions is like, or so the argument.

But this line of motivating the significance of the argument against the structure principle conflates two uses of the term ‘proposition’. To bring this out, note that on the above line the proposition that snow is white is not a proposition. The proposition that snow is white is, in English, of type $e$, not of type $t$. It interacts with regular quantifiers after all, the same quantifiers that also range over objects. Thus what we in English call propositions, which we describe using that-clauses or proposition terms like ‘the proposition that snow is white’ are not “propositions” in this technical sense. So, we need to distinguish “propositions” in the sense of being a member of type $t$, and propositions in the sense in which we talk about propositions in English, like the proposition that snow is white. Whatever type $t$ propositions are supposed to be, they are not propositions in the that-clause sense of the term, the sense in which that concept occurs in English. It is thus confusing and misleading to call the type $t$ things “propositions”, given that this term is already taken in English and widely used in a different sense in philosophy. Thus even in this sense, higher-order sentential quantifiers are not properly propositional quantifiers. They only can be called that if the term ‘proposition’ is used in a novel way.

The problem here is a mismatch between English that-clauses and related terms like ‘the proposition/fact that $p$’ and the intended domain for sentential quantifiers. In English these that-clauses and related terms are in nominal position, and thus interact with quantifiers that are not sentential. Thus propositions and facts, as these terms are used in English, are not in the domain of sentential quantification. And thus reality as the totality of facts is not directly tied to whatever is in the domain of sentential quantification.

But there is another way to defend HOM which takes issue with just this last conception of reality: as the totality of facts. So understood one might think that reality is like a collection of entities — the facts — but that might not be what is intended in this characterization of reality. To bring out the difference, maybe it is best to understand reality not as the totality of facts, but as all that is the case. And what is the case is not a list of facts, but it is specified by a list of sentences: snow is white, grass is green, etc.. So understood reality could be connected

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18To be clear, there is an issue about the type assignment of noun phrases and that-clauses in English, and it is not unreasonable to hold that they are not of type $e$, but of a different type, say $<<e,t>,t>$. But this issue is orthogonal to our issue about a mismatch of that-clauses and the type of a sentence. On anyone’s view, that-clauses are not of type $t$. 18
to sentential quantification. Sentential quantifiers quantify into sentence position, and if the
totality of what is the case is specifiable by a list of sentences, then those two might connect
after all. In this way the mismatch would be avoided, and sentential quantification could be
understood as being directly informative about reality, understood properly as what is the case,
not as the totality of facts, or so the defense of HOM.

But this defense of HOM via a conception of reality as what is the case is once more undone
by how things are in English. It is not the case that the proper answer to ‘What is the case?’ is
a simple sentence like ‘Snow is white’. This is at best elliptical, skipping parts of the proper and
complete answer, which is ‘it is the case that snow is white’. A more proper answer, but still
elliptical, is ‘that snow is white’. But the full answer, for this one example, is ‘it is the case that
snow is white’ or ‘that snow is white is the case’. This is no different than answering the question
‘who is hungry?’ with ‘Fred’. That is a perfectly fine, but elliptical, answer. The full answer is
‘Fred is hungry.’ But even though we do not normally articulate the full answer, and instead
remain elliptical, it would be mistake to conclude something of metaphysical significance directly
from the elliptical answer. To take an extreme example, it would be a mistake to conclude that
propositions are objects, since proper answers to questions of fact are propositions, and ‘Fred’
can be such an answer. Instead we should hold that although proper answers to questions
are propositional and full sentences, ‘Fred’ is a fine, but elliptical answer, elliptical for ‘Fred
is hungry.’ Similarly, when the question is ‘What is the case?’ then the non-elliptical and full
answer isn’t ‘Snow is white, grass is green, ...’ but rather ‘It is the case that snow is white, and
that grass is green, and that ...’. And this way, the answer is still given with a that-clause.19

Thus all that is the case is not crucially different here than all the facts that obtain. All that
is the case is specified with a series of that-clauses, just as all the facts are. This is how things
are in English, for better or for worse, and more on that just below, but it makes clear that
if we ask questions in English, be it about the facts or about what is the case, then sentential
quantifiers in the answer are not a proper match for the question. And here neither thinking
of type t as something other than truth-values, nor thinking of reality as something other than
the totality of facts makes a difference. Sentential quantification is not properly understood
as propositional quantification, as long as ‘propositional’ is understood as it normally is, as
concerning propositions like the proposition that snow is white.

19I should add that understanding reality as the totality of facts or as all that is the case does not mean that it is
merely a collection of entities. This is closely tied to the question whether facts are entities, which in turn is closely
tied to the question whether fact-terms like ‘the fact that snow is white’ or ‘that snow is white’ are referential. Many
metaphysicians take this to be so, but the issue is not at all obvious. This question is connected to the alternative
way to understanding quantification over facts in English, as a form of substitutional quantification to be discussed
just below. For more on that-clauses and reference, see [Moltmann, 2003], [Pryor, 2007], and [Hofweber, 2016]. For
more on sentences vs. entities as specifying the basic aspects of reality, see [Horwich, 2008], especially footnote 19.
It is thus best to avoid the use of the phrase “propositional quantification” for higher-order quantifiers into sentence position, especially for those who do not want to associate it with quantification over propositions. I prefer to use the more neutral label ‘sentential quantification’ instead.

It is easy to make the confusion about sentential, higher-order quantifiers ranging over propositions, not just because of the common label of “propositional quantification” that it has in the literature, but also because we naturally associate the meaning of such higher-order quantifiers with quantification over propositions. I will call the following the direct association, and I suspect it does play a role in the psychology behind all this. To illustrate, it is natural to read

(22) \( \forall p (p \lor \neg p) \)

as being a notational variant of, notational shorthand for, or at least closely associated with

(23) \( \forall p (\text{True}(p) \lor \text{True}(\neg p)) \)

But this is, of course, a mistake on everyone’s account. The quantifier in (22) is supposed to be of a completely different kind than the one in (23), and these two sentences are not directly related. If there is a significant relationship between them, then this needs to be argued for. And relatedly, it needs to be argued for why the falsity of the higher-order structure principle (5) shows that reality is not structured. As far as I can see, no such argument is ever given in the literature surrounding the higher-order Russell-Myhill argument. Instead the rejection of the structure principle is simply taken to show this, with little or no justification.

Essentially analogous considerations also apply in case quantification in English over facts and propositions is a version of substitutional quantification. Although there are different ways to spell out and defend this idea, a common theme is that substitutional quantifiers and their analogs do not range over a domain at all; they generalize over the instances within a language instead. If English quantifiers over facts or propositions are like substitutional quantifiers, then they do not range over a domain, and in particular propositions are not to be found as entities in some domain or other. This view is naturally combined with the view that that-clauses and fact-terms do not refer, and are rather non-referential singular terms. This leads to just the kind of view, briefly alluded to above, that takes reality as the totality of facts, but not as a collection of entities. We won’t look into the details of such an approach any further now, since my main point here is merely about the significance of answers in HOL with sentential quantifiers for English questions. And here the mismatch is just as bad as before. Sentential

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20See [Hofweber, 2016] for a more detailed development of English quantification over propositions as something like substitutional quantification, combined with the non-referentiality of that-clauses.
quantifiers in HOL do range over a higher-order domain. But none of the things in that domain are propositions, in the sense that they are different than what quantifiers over propositions in English range over: the latter range over no domain at all, while the higher-order quantifiers do range over higher-order domain. Thus either way, whether quantifiers in English are objectual or substitutional, higher-order quantifiers do not range over propositions.

Overall then we face this problem: whether quantification in English over facts is objectual or substitutional, such quantifiers are not higher-order quantifiers, and they are not like sentential quantifiers in HOL. Thus if the questions we ask are formulated in English, in particular involving English quantification over facts, and the answers we give are formulated in HOL, then we face a mismatch between the question and the answer. The answer doesn’t address the question we asked, at least not directly. One is about the facts, the other about whatever sentential quantifiers range over, which are not facts or propositions. We can call this the problem of the question-answer mismatch. The way out of this problem is obvious: we either need more HOL or less HOL. Either we should state the question in English and answer it in English, or we should state the question in HOL and answer it in HOL. The former cuts out HOL, and therefore isn’t a way to pursue HOM. The latter is thus the proper way to pursue HOM. Either way we overcome the question-answer mismatch, but only in one way are we still doing HOM. HOMers thus have to go all the way, and state both the question and the answer in HOL. But this, I will argue now, makes things even worse for HOM.

4.2 HOL question, HOL answer

So far our goal or target was to find out whether reality, understood as the totality of facts, i.e. all the facts, is structured. This target was specified in English:

(24) **English Target:** Is reality structured?

But maybe this was our key mistake that stopped us from appreciating the significance of HOL for metaphysics. Reality is generally understood as the totality of facts, i.e. all the facts. Thus this conception of reality is tied to quantification over facts in English, since I just now characterized it in English using quantification over facts. To be completely clear, this does not mean that reality is distinctly tied to quantification in English, and that somehow English rather than other languages has an intimate connection to reality itself. It only means that English quantification over facts is suitable to spell out the notion of reality, as likely are many other quantifiers in many other languages as well. But if we set the target we hope to reach in this metaphysical debate using English quantifiers, then it might not be too surprising that we
didn’t reach that target with a result in HOL. The mismatch between English quantification and higher-order quantification in HOL might be too great. Maybe we should thus have set the target differently instead. Maybe we should not have asked about reality being structured, and thus not about how things are with the totality of facts, but about something else.

There is a modest and a radical way to pursue this idea. The modest one is to hold that the target should not be the totality of facts, but the totality of something else: states of affairs, truths, or what have you. This way the target is still specified in English, but it does not involve quantification over facts, but quantification over something else. But this modest way won’t help with our main problem, simply because by parallel reasoning quantification over states of affairs will also not match up with higher-order quantifiers, and the question-answer mismatch will remain. That the structure principle, as a statement in HOL, is false shows little about how things are in general with regards to facts and equally little how they are with regards to states of affairs. Slightly adjusting the target won’t help. To make progress and to properly defend the significance of HOL for metaphysics one needs to be more radical.

Thus maybe reality needs to be articulated differently, not with English quantification over this or that, but directly with higher-order quantification. Maybe the target itself can’t be properly articulated in English, but instead requires higher-order quantifiers. And for our particular case — one we initially characterized as the question whether reality is structured — maybe it needs to be directly asked in HOL, not English? If so, then we would leave natural language behind, not merely in the answers we give, but also in the questions we ask. We thus need to state the target itself in HOL, not English. Then there would be no further mismatch between what the quantifiers in the question and in the answer range over. So, let’s restate the target itself in HOL. This is the radical option to pursue HOM. I will call this the revisionary approach to HOM, since it changes the target itself, not just the way we reach our target.

On this revisionary approach to HOM the natural candidate for the question to ask is the structure principle itself, except with a question mark at the end:

\[
(25) \text{HOL Target: } \forall p, q \forall F, G \forall a, b (p \equiv F(a) \land q \equiv G(b) \land p \equiv q \rightarrow F \equiv G \land a = b) ?
\]

This is a natural progression of the HOMer’s position, but it cannot be overstated just how revisionary and radical this proposal really is. To begin with, we should note that if the question itself is not to be articulated in English, since English lacks the expressive resources like proper higher-order quantification, then the target of our investigation will be ineffable in English. We cannot state in English what the question is that we hope to answer in the project that we are engaged in. But what’s more, for the revisionary approach to HOM to make sense, it should lead to a better question for us to ask. It should lead to a question which is more suitable for
the project of metaphysics than the English Target. But why is HOL Target a better question to ask than English Target? And how can we be in a position to appreciate that it is a better question, since HOL Target is ineffable in English after all. Let’s look at these issues in turn.

First, why should we think that we are asking a better question when we ask HOL Target instead of our original English Target? After all, we can avoid the question answer mismatch in two ways, going all English or all HOL. If we go all HOL and formulate both the question as well as the answer in HOL, then this should be based on some reason that this question is the better question to ask than the one we started with in English. But what reason do we have for thinking that?

Here there is little reason to think that this HOL question is a better question. To the contrary, there is good reason to think that it is a worse question. The English Target question asks about whether reality is structured, and with it whether the facts in the totality of facts have a structure and how finely they are individuated. That is a good question, since reality is the proper target of inquiry. Reality is the totality of facts, facts correspond to the truths, and truth is the goal of inquiry. There is thus an intimate connection between inquiry and finding out about reality as the totality of facts. Metaphysics, as it is commonly understood, is a part of inquiry, one that aims to investigate general features of reality. Thus asking about the facts and what they in general are like seems to be a perfect target for metaphysics. In particular, establishing claims about all the facts is of special interest for metaphysics, as therefore would be to answer our English Target question.

But asking the HOL Target question (25) instead is not asking about what facts in general are like. Since the sentential quantifiers in that question do not range over facts, but something else altogether, this question is not directly about what facts in general are like, and it is thus not directly tied to the goal of inquiry itself. It might well be a meaningful question to ask, but when we compare the significance of English Target and HOL Target, in particular when it comes to the significance for metaphysics as a part of inquiry, all pointers seem to be directed at English Target as the more significant and better question. Replacing English Target with HOL Target seems to be step in the wrong direction.

The revisionary proposal is thus much more radical as it might at first seem: it proposes to replace our initial questions with ones that are ineffable in English, and it distances metaphysics from other parts of inquiry, since these new and allegedly better questions for metaphysics are not as closely tied to reality as the totality of facts and all the truths as the original questions they aim to replace.

Second, why would it be rational for us to move from asking English Target to asking HOL
Target instead? Do we have good enough reasons to make this switch in what question we pursue and hope to answer? Here we need to keep in mind that for speakers of just English, the HOL Target question is ineffable. We are assuming at this point of the dialectic that English does not contain proper higher-order quantifiers, therefore when we are English-only speakers we can’t represent HOL Target in a meaningful way. But then, how could it be rational for us to abandon a perfectly meaningful question like English Target in favor of one that we can’t even represent like HOL Target? When we consider the reasons for or against making this switch we are considering this question before having made the switch, and at this point we are simply speakers of English that consider switching to asking a HOL question instead of an English one. But so understood it would seem clear that the weight of the reasons speak against it and require us to stick with English Target.

But things are in fact quite a bit worse for the revisionary approach to HOM than this would make it seem. So far it was at least implicitly assumed that HOL Target is a perfectly meaningful question, one that has a simple Yes or No answer, an answer that is simply true full stop, not merely true in this or that model or other stipulated semantic evaluation. But whether this is indeed so is not at all clear, and it is in fact quite dubious. Sometimes formal sentences can simply be abbreviations of English sentences, as when we casually write ‘∀x x = x’ instead of ‘everything is identical to itself’. But this is, of course, not the case with higher-order quantified statements. They are not taken to be abbreviations for English sentences, since English sentences do not contain higher-order quantifiers. They are not intended to be formal shorthand for what we can already say, but a true addition to what we can say. They aim to increase what we can already say, and that is why it is so tempting take them to be useful in metaphysics. Who wouldn’t want to be able to say more? But there are good reasons to think that this increased expressive power is illusionary.

To be sure, there is a sense in which HOL has greater expressive power than FOL. In HOL we can distinguish more finely in a technical sense. When we give such languages the usual model theoretic semantics, then there are classes of models that can’t be distinguished in FOL, but that can be distinguished in HOL. For example, higher-order arithmetic can pin down the standard model of arithmetic up to isomorphism, but no first-order theory of arithmetic can do this. In this technical sense of expressive strength, HOL is an improvement over FOL. But even though HOL is an improvement over FOL in this technical sense, this does not mean that HOL is an improvement over natural languages like English. In particular, it does not mean that HOL is expressively stronger than English in a non-technical sense, namely that there are propositions that can be stated in HOL, but not in English.
This claim might seem surprising, in particular in light of the fact that English does not contain higher-order quantifiers. Wouldn’t simply adding them increase its expressive strength in the non-technical sense? But once more, this is quite dubious. First, English is lacking quantifiers that interact with sentences directly, but that does not mean that there is a limitation to what can be expressed in English. This syntactic limitation is not necessarily a semantic or expressive limitation. Second, English does contain quantifiers over propositions, so it is not that it is lacking propositional quantification in the literal sense of the phrase. And third, although English does not contain higher-order quantifiers, it is unclear if adding quantifiers that by stipulation range over a completely different domain than English quantifiers add any expressive strength, since it is unclear whether such stipulated quantifiers would range over anything at all. Such quantifiers only add to expressive strength if there indeed is such a domain unreachable with ordinary English quantifiers. But that is not something one can stipulate. One can stipulate this in formal languages with formal models. There, by stipulation, one quantifier ranges of this domain, and another over that domain, both of which are specified in English to the best of our abilities. We are free to stipulate the models we use in formal semantic theories. But we can’t stipulate what things there are in the world, and with it we can’t stipulate that there are quantifiers that range over totality different things. Thus adding higher-order quantifiers does not by itself give us an expressive gain over sticking with English alone. In light of all this one might suspect that higher-order quantifiers add zero expressive strength to English.

Let me illustrate this issue with a different example. In English we have intensifiers like ‘very’, but we have no sentential intensifiers: ‘Very’ can modify adjectives or adverbs, but not sentences. ‘Very snow is white’ is not possible in English. But we can nonetheless get the basic idea of what a sentential intensifier might be like. Maybe we even have approximations in English even if we don’t have the real thing. We can say that it is very much so that snow is white. Or that something is very true. Those are not quite sentential intensifiers directly, but even if not, why not simply add sentential intensifiers? Maybe even more than one? We could characterize such intensifiers in various ways, making clear what their syntax and inferential behavior is supposed to be, giving them a formal semantics that says when sentences with such intensifiers are true, possibly using these intensifiers in the metalanguage. And if we don’t have them in English already, why not add them? Let’s call Rune English the extension of English that contains various rune symbols like $\exists$ or $\forall$, which are syntactically sentential operators and which are borrowed from formal languages with the alluded to semantics for sentential intensifiers. We can then use Rune English to ask new questions and propose new answers, and
make progress in metaphysics by replacing English questions with ones in Rune English.

Now, obviously this is absurd. Why should we think that these new Rune English questions are better questions than the ones we had in English? Why think that these rune symbols have any determinate meaning at all, even though they play a role in various formal languages? Even if the rune symbols have a clear formal semantics and are true in various models of formal rune languages, this does not settle whether they have a clear content when added to English. After all, English assertions are not evaluated in a model, they are simply true or false. Having a formal semantics is not the same as having content full stop, and the suspicion must remain that the rune symbols do not have content full stop.

To be clear, Rune English and HOL added to English are not completely analogous, and there are numerous ways one could try to point to differences between them. But the point remains that simply adding something to a language that overcomes a syntactic limitation and has well-defined syntactic features and a well-defined formal semantics neither means that it is meaningful in the ordinary sense, nor that it leads to expressive gain in the non-technical sense of the notion. There is a real gap to bridge here, and I do not see how this gap has been bridged for the case of higher-order logic based on serious typing.

But maybe all this so far has still been too cautious and not radical and revisionary enough. The problem might simply be that I am privileging English in all the above arguments: HOL is ineffable in English, it is hard for us English speakers to see what is better about it, it is hard for us, in our present position, to see why we should switch to using HOL, and why it might even be meaningful. But why privilege English and our present position? Maybe we can only properly appreciate the greatness of HOL from the point of view of HOL, so to speak. Only if we properly use HOL itself might we able to appreciate the benefits we get from it. We thus should ‘take the plunge’ [Williamson, 2013, 259] and use HOL as our home language, i.e. our new adopted language. We should then just speak in HOL, as our main language, and evaluate questions and our own situation using that language. This way some worries might disappear.

For example, what does ‘∀p p ∨ ¬p’ mean? It means ∀p p ∨ ¬p, of course. And is HOL Target a better question than English Target? Only after taking the plunge can you properly assess that question, and since I haven’t taken it, who am I to pass judgment?

I believe that taking the plunge is the natural conclusion, and last resort, for HOMers. But I also believe that it is a terrible mistake, for two reasons. First, one certainly can take the plunge, but one shouldn’t. This is at first just a comment concerning what makes sense for one personally to do. To take the plunge is to jump in and use HOL as one’s main language. That is something one can do. But to take the plunge rationally is to do this for good reasons:
to have reasons in favor of jumping in that outweigh those against jumping in. Those reasons should be reasons I can appreciate at the point of deliberation, when I consider whether to take the plunge. But at that point I have not yet taken the plunge, and I have not adopted HOL as my home language. I am thinking in English, so to speak, about whether I should jump in. And in that position there is little reason to jump in and lots of reason against jumping in. I can reason, as spelled out above, that if I were to jump in I would speak a language where good parts of it are devoid of meaning, where I would ask questions that are bad questions, like HOL Target, and I would neglect questions which are better questions, like English Target. And what is worse, I might, after taking the plunge, falsely think that HOL Target is a better question, and that HOL is a meaningful and substantial addition to English. I might put myself into a position where I am unable to recognize what I have lost by jumping in, and I might be unable to climb back out. Thus on balance of the reasons, I should not jump in and not take the plunge. All this is especially pressing, since we have reason to think that HOL adds no new content to English, just as our runes add no new content to English, even though they add new syntactic material. Merely using HOL as one’s first language is not enough to overcome this, although active use can certainly give one the illusion of content.

These worries so far concern only personal mistakes, so to speak. What might be worse is, second, that jumping in puts metaphysics on a bad course, not just one’s personal metaphysical projects, but the discipline as a whole. If enough jump in, then this leads to the danger of turning metaphysics into a disciple that loses much of its value and significance, and results in esoteric metaphysics in the sense of [Hofweber, 2009a] and [Hofweber, 2016]. Those who jumped in will talk to each other in HOL, they will claim to have achieved all kinds of results this way, but those on the shore will be unable to appreciate what they are talking about and why what they say matters for what metaphysics hopes to achieve. Metaphysics, or rather HOM, will turn into a project for insiders, one that only those can pursue who took the plunge. For the rest of us, it will appear as being misguided and with little value. If metaphysics turns into HOM, then it will become esoteric in the just this sense: it is only for those who took the plunge, and inaccessible for the rest of us who are on shore. It is a discipline for insiders only, one that cannot be appreciated by outsiders. And what is more, it is one that can be appreciated by outsiders as mistaken and confused: it loses sight of the goal of metaphysics, as it is commonly taken to be. HOM so understood doesn’t focus on what reality as the totality of facts is like. This way it would lose touch with the rest of inquiry, and be disconnected from it, and the rest of the community of inquirers. Its goals and the contents of its statements are at best only accessible to those who pursue HOM, and arguably neither is accessible even to them. It is truly
Thus it is best to stay on land, and to stay dry. The questions we ask must make sense
from our starting point, where we are now, and they must be accessible to all. They must be
appreciable as valid and good questions before taking the plunge, so that we can see that it
would make sense to jump in. Metaphysics in Rune English does not live up to that standard,
and neither does revisionary HOM in the spirit of an augmenter. Simply adding features of a
formal language to English does not ensure that sentences with these new expressions in them
have content, even if they have a formal semantics in the formal language from which they arose.
This applies to runes just as well as to higher-order quantifiers. In neither one of these cases
can we appreciate from dry land what we would gain if we took the plunge, and in both cases
do we face the danger that we move towards esoteric metaphysics, pursuing questions with no
value and no content.

I am not a fan of HOM, and I have given my reasons why not here. But even if one does not
share my overall assessment of this project, I hope we can all agree that these issues need to be
addressed more in order for HOM to be on solid ground, if it ever can be. I find it remarkable how
little of the general philosophical basis of this project has been articulated in the recent flurry
of literature on HOM. There are numerous sophisticated and lengthy papers which carry out
proofs in higher-order logic and claim some philosophical significance of these results, with very
little explicit discussion why these results have the significance they are taken to have. There is
a real disproportion between the efforts invested within the program and the efforts invested to
show that the program itself is sound and the results of the proofs have the significance they are
claimed to have. The Russell-Myhill inspired reasoning against the structure principle was my
main example, and it illustrates this point well. The justification that reality is not structured
is usually derived from the refutation of a version of a HOL structure principle using a Russell-
Myhill style argument, with little attention given to why this would show that. Even thought
the sentential quantification in these arguments is often labeled “propositional quantification” it
remains unclear what these higher-order results have to do with facts or propositions, and thus
what they show about the structure of reality. I see little connection here, as I argued above,
and thus I see little of metaphysical consequence tied to this result.

What then does the argument using the Russell-Myhill inspired reasoning show about reality?
My own assessment of the version discussed above is that it points to a variant of the largely
unresolved issues tied to the set-class distinction, except formulated with propositions which
themselves can be about sets, in particular sets of propositions. But it does not show anything
about what facts in general are like, what reality in general is like, or how fine-grained reality is.
I see no good argument for such a grand conclusion from this argument. The line of reasoning that formulates the structure principle like (5) and then refutes it with Russell-Myhill style arguments does not show this, since the higher-order quantifiers used in this argument do not range over facts or propositions. I can understand them as a logicized version of quantifiers over facts and propositions, via the direct association, as outlined above, and this way rejecting structure becomes one of several options one has in dealing with the Russell-Myhill argument. But it is just one among many options, and in no way a refutation of the structure principle. In fact, rejecting that principle seems like the least attractive of several options, all of which are on the table once we see “higher-order” sentential quantifiers merely as shorthand for quantifiers ranging over propositions and talking about truth, as discussed in the cases of (22) and (23) above. Here HOL is notationally convenient, but not truly novel or expressively more powerful. And with that, there is not true progress to be found in metaphysics with the use of HOL.

The Russell-Myhill inspired argument against reality being structured was my main example of HOM, but others would have worked just as well. The problem with HOM is a more general one, one about the use of formal tools, in particular in metaphysics. Such formal tools unquestionably have a place in metaphysics and in philosophy, but HOMers routinely misuse them in a way that affects their whole project negatively. I would like to end by briefly outlining how they should be used instead.

5 The primacy of natural language

When we pursue philosophy, including metaphysics, we start with various questions that we articulate in our own natural language. These questions can get reformulated as time goes on, hopefully for the better and hopefully they can also be answered, but so far, things are just carried out in natural language. Our natural language itself is not completely transparent to us. It is often not clear what implies what, how a sentence is structured syntactically, and so on. Because of this it makes sense to develop precise models of various aspects of natural language, and we can effectively do this with the use of artificial languages. There languages are more precise, but also simpler, than our natural languages, and this trade-off of precision and simplicity makes them ideally suited to model particular isolated aspects of natural language. Doing this is a role that formal tools clearly and legitimately have. Different artificial languages can be useful for different tasks: some are great for syntax, some are great for modeling inferential relations, and so on. Modeling inferential relations, in particular, is a classic goal for formal logic: trying to uncover and explicitly formulate patterns of valid inferences. We can call this general approach the modeling conception of formal tools, with a particularly significant target
being *inferential modeling*. On this conception, we can say that a formal language gives us an *inferentially faithful formal model* (IFFM) of natural language: an effective assignment of formal language sentences to some natural languages sentences such that inferential relations between the natural languages sentences and the formal language sentences are exactly mirrored. Here the inferential relationship between natural language sentences is simply that of implication, taken as an undefined notion, whereas that between the formal language sentences is a precisely defined relation among these sentences. IFFMs are useful in that they allow us to reason about what follows from what via thinking about precise formal languages.

On such a conception of the role of formal tools in metaphysics, there is no assumption being made that the formal languages capture other things about natural language than what they hope to model. For example, inferential models do not have to preserve features of the syntax, nor that of equivalence in meaning. They simply mirror inferential relations. This use of formal tools is helpful in metaphysics as well, but it is not itself a guide to what reality is like. Here formal languages can make inferences more explicit, they can point to errors in our own reasoning, but they do not by themselves increase the expressive power of natural languages, nor do they lead to new bright horizons in metaphysics. All insight into reality comes from reasoning with natural language first and foremost, including what implies what and how it is best modeled in a formal language. Once we have the IFFM set up we can then reason about the formal language to draw conclusions about what follows for the natural language analogs. But the focus and priority is clearly on the natural language representations on this picture. In particular, the formal language does not in any meaningful way go beyond what can be done in natural language, it merely models features of natural language, and thus by itself it is not a source of insights that are bound to remain hidden if we merely stick with natural language. The insights coming from the formal model might be easier to get this way, since the formal model is in some respects more explicit. But they are available as well by thinking about natural language directly. In particular, the formal language does not go beyond natural language in what can be expressed with it; it merely models inferential relations. It isn’t a novel source of metaphysical insights, although it can be helpful in gaining such insights.

HOM is ultimately based on a different conception of the place of formal languages in metaphysics. On this alternative approach, natural language is taken to be restrictive, flawed, and limited. This limitation can be overcome by endorsing HOL as an improved alternative to, or augmentation of, natural language. Once we have taken this step, so the idea, we can then

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21 Such an assignment will be recursively defined, exploiting some syntactic features of both the natural and the suitable formal language, without the target of the assignment being syntactic adequacy in a sense that might be pursued in linguistics. See [Hofweber, 1999, 57ff.] and [Hofweber, 2009b] for more.
articulate and achieve novel results that were elusive before. We can call this the *expressive improvement* conception of formal tools. They allow us to do and say things that so far were off limits. And why not? Natural language is just a language, so it might well be that there is another language which is expressively richer, and higher-order languages might fit the bill. This is not implausible if we think of natural languages as somehow being lower-order languages, and if we somehow think that Quine has falsely persuaded many that higher-order languages are verboten. But the lower vs. higher-order distinction first and foremost applies to formal languages. It applies to natural languages only derivatively, where it can be seen either as a syntactic or a semantic distinction. It is a syntactic one if the issue is whether a natural language only allows for quantification into nominal or NP position. But that, of course, is merely about syntax so far. If it is a semantic one, then the issue could either be whether we can quantify over properties and propositions, for which the answer is clearly ‘yes’, or whether such quantifiers are a distinct kind of quantifier in natural language, for which the answer, I have argued above, is ‘no’. But primarily the lower vs. higher-order distinction applies to formal languages, where there is a clear syntactic and semantic difference between lower and higher-order languages. This way moving from lower-order languages to higher-order gives rise to an expressive improvement in the technical sense discussed above, but that again only compares formal languages. It does not mean that adding a higher-order formal language to natural language leads to expressive improvement in the non-technical sense.

Anyone can agree that there is much use in formal tools on the inferential modeling conception of them. But this use of formal tools does not justify a new approach to metaphysics. The question remains what else formal tools can do for us in metaphysics. If they would truly lead to expressive gain over natural languages, and not just over some other formal languages, then there would be legitimate hope for progress. But nothing of this kind has been well supported in the defense of HOM. Instead, HOMers rush to this conclusion either by falsely reading things off formal sentences that they do not say, as when someone takes sentential “propositional” quantification to say something about propositions or facts, or by falsely declaring that expressive gain has been achieved when compared to natural language alone, since we are no longer bound by Quine’s restriction to first-order languages. Neither one of these moves is justified, and with it HOM is not justified as a new approach to metaphysics. HOM is thus not a fruitful new research program in metaphysics. HOM is inextricably tied to a mistake about the role of formal tools in metaphysics, and it should therefore be rejected.

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