The ‘Property Arrangement’ Theory of Propositions

Abstract

I develop and motivate a new theory of the structure of propositions. The gist of the theory is that propositions are ordered unities (“arrangements”) of properties. I explain how this theory helps us analyze *aboutness* and opens up a way to understand why there are propositions in the first place. I also show how the theory can help us make better sense of the metaphysics behind various contemporary structural theories of propositions. The result is a precisely articulated and theoretically fruitful account of how propositions could have a structure.

The 'Property Arrangement' Theory of Propositions

"…the three classes, thought, opinion, and fancy, all arise in our minds as both false and true?" Plato (*Sophist* 263d)

1. INTRODUCTION

Philosophers have classified true and false things as *sentences*, token or type,[1] *thoughts*, token or type,[2] and as abstract Platonic entities of some sort.[3] On all these accounts, the nature of truth-value bearers remains puzzling. If they are sentence tokens, it is mysterious how an arrangement of ink bits or chalk can manage to be *true* or *false*. Things are no less mysterious if truth-value bearers are abstract in nature: one wonders how the abstract constituents of an abstract proposition must be related to each other and to the rest of the world, such that their composition manages to be the sort of thing that can be true or false. If we say truth-value bearers don't have constituents of any sort, then we exacerbate the mystery: how can mere *simples* manage to describe a world of complex objects and relations?

I shall develop a new account of the nature of the sorts of the things that can have a truth-value—what I call 'propositions'. The account is designed to help us make sense of the meaning propositions carry, the truth-values they exemplify, and why propositions exist in the first place. I will be focusing on fundamental questions about the inner structure of a proposition, while aiming to give a theory that is adaptable to a variety of frameworks. As I present the theory, I will show how it relates to, or builds upon, major theories of propositions in the literature.[4]

[1] See, for example, Tarski, "The Semantic Conception of Truth and the Foundations of Semantics", p. 342, note 5.

[2] Example: Peter Hanks, "Structured Propositions as Types".

[3] Example: Bealer, "Propositions".

[4] I have in mind especially *structural* theories given by, for example, Russell (in "On Propositions: What They Are and How They Mean"), Frege (in "The Thought: A Logical Inquiry"), Scott Soames (in *What is Meaning?*,

2. Propositions as Arrangements

To start, I shall explain how we may understand propositions as *arrangements of properties*. Start with the notion of an arrangement. At the most general level, an *arrangement*, as I am using the term, is any complex entity that "consists" of things (concrete or abstract) bearing relations to one another. Put differently: an arrangement is anything whose identity depends upon its parts (or constituents) bearing certain relations to one another.[5] Arrangements—unlike Armstrong's states of affairs—may contain solely abstract entities: for example, there can be a wholly abstract arrangement consisting of the number 6 bearing the greater than relation to the number 4. The hypothesis on the table is that, in general, any related things from any ontological category form an arrangement. (A more precise, technical definition of 'arrangement' is given in the Appendix.[6] An intuitive understanding of the term is all that is required for my presentation here.)

Let us consider an example of a proposition to illustrate the theory. Take the proposition that Tibbles is on the mat. That proposition is about Tibbles and a particular mat, and it describes how they are related. Now in order for a proposition to say of some things that they are related in a certain way, the proposition must somehow *pick out* the things that are related. How do propositions pick out particular things? My theory of propositions includes the following answer: a proposition picks out things by containing properties that are necessarily unique to the things they pick out. So, for example, <Tibbles is on the mat> contains a property that is necessarily

pp. 99–130), Nathan Salmon (in *Frege's Puzzle*), Jeff King (in *The Nature and Structure of Content*), and Peter Hanks *(in* "Structured Propositions as Types"*)*. Cf. essays by King, McGlone, Soames, and Speaks in *New Thinking About Propositions* (forthcoming).

[5] I am using the term 'part' in its most general sense to include constituents, pieces, ingredients, members, and any other part-like relation. Some philosophers may prefer to view propositions as having *constituents* rather than as having *parts*. They are welcome to do so. If there is a part-*like* relation that propositions can participate in, then that is good enough for the purposes of this article.

[6] The definition is adapted from Rasmussen 2013.

unique to Tibbles and a property that is necessarily unique to the mat that Tibbles is on. I will refer to the first property as '[Tibbles]' and the second as '[the mat]'. (We'll explore the nature of aboutness further in section 4.)

I propose, then, that <Tibbles is on the mat> is an arrangement of the properties [Tibbles] and [the mat]. Like every arrangement, <Tibbles is on the mat> consists of things tied together by one or more relations. In this case, the arrangement consists of [Tibbles] standing in a certain linking relation to [the mat] to form the proposition that Tibbles is on the mat. I will call this linking relation '|on|' because it is analogous to the *on* relation that Tibbles bears to the mat. We may explicitly define '|on|' as follows:

> '*p* is |on| *q*' $=_{\text{def}}$ '*p* bears a relation *r* to *q*, such that $\Box\forall x\forall y$ (if *p* is a property that is necessarily unique to *x* and if *q* is a property that is necessarily unique to *y*, then the arrangement of *p* bearing *r* to *q* is identical to a proposition that says that *x* is on *y*.)' [7]

This definition defines '|on|' in terms of 'on', which is helpful because we understand what it means for one thing to be on another. (Note that although I have *defined* '|on|' in terms of 'proposition', I have not given a metaphysical *analysis* of |on|. I would say that |on| is a metaphysically primitive relation that links together the parts of <Tibbles is on the mat>.)

I leave it open what more might be said about |on| and other relations that tie the constituents of a proposition together. Some philosophers (such as Scott Soames[8] and Jeff King[9]) account for the relation(s) in terms of activities or types of activities of agents. My theory is compatible with such accounts, broadly construed. One might suppose, for instance, that |on| is a

[7] I am assuming that we can express arrangements using such locutions as 'the arrangement of *x*'s bearing *r* to *y*'. I am also assuming that 'says' is sufficiently intelligible in this context.

[8] *What is Meaning?*, pp. 99–130.

[9] *The Nature and Structure of Content*, pp. 25–64.

relation of ascribing to the instance of [Tibbles] the attribute of being *on* the instance of [the mat]. Other "agent-based" accounts are possible. Note that if propositions can exist independently of token activities, then "agent-based" accounts of propositions should be in terms of activity *types* that can exist prior to their instantiation. Alternatively, one might prefer to treat |on| as a primitive link between various properties. The property-arrangement theory of propositions is compatible with a variety of views concerning how the pieces of a proposition are specifically tied together. The theory provides a deeper account of the general structure of a proposition.

I will further illustrate my theory of propositions with a slightly trickier example (taken from King[10]): <Rebecca swims>. This proposition consists of a property unique to Rebecca tied together to a property unique to the property of swimming. Call the first property '[Rebecca]' and the second '[swims]'. What relation ties these properties together? I suggest it is |exemplifies|, which is a relation *r*, such that the arrangement of [Rebecca] standing in *r* to [swims] is identical to the proposition that Rebecca is (exemplifies) swimming. Here, again, I leave it open what more might be said about the linking relation. My theory of propositions is very much like King's theory because we both treat propositions as consisting of certain things bearing certain relations to each other. So, I am open to King's account of *r*: *r* is analyzable in terms of ascribing the semantic value of [swimming] to the semantic value of [Rebecca], where the semantic values are the things that exemplify the respective properties.[11] (Again, if propositions exist independently of agents, then we should understand the full analysis in terms of *types* of ascribing, or of an abstract language.) Or, we may prefer to say something else about *r*. I leave the exact analysis open.

[10] *Ibid.*

[11] See King, "Structured Propositions".

Or, take a general proposition: <every emerald is green>. That proposition reduces to <*being an emerald* implies *being green*> and so contains a property that is (essentially) unique to *being an emerald* and one that is (essentially) unique to *being green*. Or, consider this quantificational proposition: <some people are happy>. I propose it reduces to <*personhood* is jointly exemplified with *happiness*> and so contains properties unique to personhood and happiness.

Consider, next, a notorious *negative existential* proposition: <Socrates does not exist>. One option is to reduce this proposition to <<Socrates exists> lacks truth>. This proposition would then consist of an essence of <Socrates exists> tied to an essence of truth. Another option is to suppose that <Socrates does not exist> reduces to <being Socrates lacks exemplification>, which in turn contains properties unique to *being Socrates* and to *being exemplified*. The arrangement theory permits options, then, for difficult cases.

An entire research area could be devoted to discussing potentially tricky cases. My goal here is to set the stage for such research and to showcase the advantages of treating propositions as organizations of properties (or concepts or terms). The details of particular cases are not crucial here.[12]

So the gist of the theory, in general terms, is this: for every proposition *p*, there are some properties that are necessarily unique to whatever might have them, such that *p* consists of those properties tied together by one or more relations. Put simply: a proposition is an arrangement of necessarily unique properties. (I will say more about the nature of these properties in the next section.)

[12] But for a discussion of the details for many such cases, see [Removed].

It is worth noting that if propositions are arrangements, as I am supposing, then propositions may themselves be described by "higher-order" proposition. So, for example, a proposition comprised of essences may itself be described by a proposition comprised of essences of essences. I leave it open whether there are "highest" order propositions.

3. About Aboutness

I have proposed that propositions are arrangements of properties. I will now apply this property-arrangement theory to the question of meaning and aboutness. I propose the following account of aboutness: a proposition *p* is *about* a thing *x* if and only if *p* contains a property that is necessarily unique to *x*. Here is a precise, symbolic statement of the account:

(About) '*p* is about *x*' $=_{def}$ '$\exists q$ (*q* is a part of *p*, □ (*q* is exemplified → *x* exemplifies *q*)'.[13]

According to (About), a proposition is about something by containing a property that is (essentially) unique to that thing. So, for example, <Tibbles is on the mat> is about Tibbles and a particular mat because the proposition contains [Tibbles] and [the mat], which are properties that are (necessarily) unique to Tibbles and a particular mat, respectively.

I shall now say something about the relationship between [Tibbles] and Tibbles. I said that [Tibbles] is a property that only Tibbles can have. What property might that be? Here are a few possibilities:

- **Individual Essences**: One may treat [Tibbles] as an individual essence of Tibbles: that is to say, [Tibbles] is a property *p*, such that (i) necessarily, if Tibbles exists, then Tibbles exemplifies *p*, and (ii) it is not possible for there to be anything other than Tibbles that

[13] By 'part' I have in mind *proper* part.

exemplifies *p*. An example would be the property of *being Tibbles* (if there is such a property).

- **World-Indexed Descriptions**: [Tibbles] is a rigidified descriptive property indexed to the actual world; for example, [Tibbles] could be *being the first cat I owned in the actual world*. On this theory, propositions are exceedingly fine-grained.[14]
- **Rigid Descriptions**: [Tibbles] is the following rigidified descriptive property: *being that thing named 'Tibbles'*. The idea here is that 'being that thing named 'Tibbles'' picks out a property that only Tibbles could have, even though it is possible for the name 'Tibbles' to stand for something other than Tibbles. The 'that' in 'that thing named 'Tibbles'' acts as a rigidly referring device.[15] Thus, the property expressed by '*being that thing named 'Tibbles''* is necessarily unique to Tibbles, and it is equivalent to (perhaps identical to) the property of *being Tibbles and named 'Tibbles'*. This option differs from the preceding one because *being Tibbles and named 'Tibbles'* isn't as fine-grained as (say) *being named 'Tibbles' in the actual world*. (Note that given this view, the sentence 'possibly, Tibbles is not named 'Tibbles'' is ambiguous. On a *de dicto* reading, the sentence expresses the false proposition that <Tibbles is not named 'Tibbles'> is possibly true; the proposition is false because <Tibbles is not named 'Tibbles'> is implicitly contradictory. But there is a *de re* reading that gives us a true proposition, namely, <Tibbles is potentially not named 'Tibbles'>.)[16]

[14] Maybe too fine-grained. See note 16.

[15] Therefore, we don't expand 'that thing named by 'Tibbles'' via a Russellian expansion to 'a thing uniquely named by 'Tibbles''.

[16] Scott Soames (in *Beyond Rigidity*, pp. 18–54) gives a trenchant critique of rigidified descriptivist theories of meanings. The heart of Soames' main critique, as I interpret it, is that rigidified descriptions are too fine-grained if they are indexed to the actual world: for if descriptions are indexed to the actual world, then no one in any other possible world brings to mind those same descriptions; the result is that people in nearby worlds cannot believe any

These options correspond to anti-Millian views of meaning.

Debates over particular theories of meaning are entrenched, and it is beyond the scope of this essay to argue in detail for any particular view. What I am after here is a theory that explains the nature of meaning at a fundamental level: meaning, one may think, consists of (necessarily) unique properties that figure into abstract arrangements. I don't insist that any particular anti-Millian view about the meaning of names must be correct. The issue is whether things can have (necessarily) unique properties, whatever those properties might be (and leaving open whether such properties can exist without being instantiated). If things can have (necessarily) unique properties, then those properties can act as the basic ingredients out of which propositions are built. The property-arrangement theory is flexible and provides a *metaphysical foundation* for a variety of views about reference and meaning.

That said, I realize that un-sharable (necessarily unique) properties are not cheap.[17] It is worth observing, however, that un-sharable properties behave almost exactly like singular propositions, which seem to be essential elements of ordinary speech. Just like un-sharable properties, singular propositions essentially pertain to a particular thing. Take, for example, <Socrates exists>. It is *about* Socrates. And it is *true* if and only if Socrates exists. Similarly, the property, *being Socrates*, is *of* Socrates. And it is *exemplified* if and only if Socrates exists. It seems that the proposition and the property play very similar roles. I would suggest, therefore, that un-sharable properties are no more (or less) mysterious (or problematic in nature) than singular

of the same propositions that we, in the actual world, believe. Fortunately, his critique doesn't target the third option, since that option doesn't index descriptions to worlds. Moreover, for what it's worth, I am unsure about Soames' premise that agents in nearby worlds believe the very same proposition we believe. I think there is room for debate here.

[17] Chistopher Menzel explores the challenge of countenancing individual essences in "Problems with the Actualist Accounts".

propositions. One might even think of un-sharable properties *as* singular propositions—except that I wish to analyze propositions in terms of properties. So, although I admit that un-sharable properties are puzzling, they are no more puzzling than singular propositions in terms of the roles they play; and singular propositions surely exist if any propositions do. Moreover, un-sharable properties are useful in accounting for the *nature* of singular propositions themselves. I suggest, therefore, that their price is right—that is, if we are to enjoy an analysis of the nature of propositions.

Allow me to note here a couple interesting implications of (About). First, (About) implies that all propositions are reducible to singular propositions. So, for example, a *universal generalization*, such as <all emeralds are green>, is reducible to a proposition that is rigidly about *being an emerald* and *being green*. Second, (About) *allows* a proposition to be about something that doesn't exist. For example, suppose Tibbles ceases to exist. Then *if* [Tibbles] continues to exist, <Tibbles is on the mat> can continue to exist, since the properties that compose it continue to exist. *Existentialists*—those who think that propositions are only about existing things—will deny the antecedent. And that's fine. My point is just that (About) doesn't *commit us* to existentialism. This is a favorable result because one might think there is a sense in which propositions can be about things that do not exist: one might think, for example, that <Tibbles is on the mat> is about Tibbles *even if* Tibbles no longer exists.

A significant benefit of this analysis of aboutness is that it can be applied to other intentional entities, including token thoughts and token concepts. Suppose, for example, I have the thought that Tibbles is on the mat. We may analyze my thought as an arrangement consisting of me bearing a certain mental relation (such as *entertaining*) to <Tibbles is on the mat>. Then <Tibbles is on the mat> is part of my thought. (It is the *content* of my thought, we might say.)

Since [Tibbles] and [the mat] are parts of <Tibbles is on the mat>, by transitivity, they are also parts of my thought. And since these parts are themselves unique to Tibbles and the mat, respectively, it follows from (About) that my thought that Tibbles is on the mat is about Tibbles and the mat. The result is right. Or take *concepts*. Suppose a token concept consists of a mind bearing some mental relation—such as grasping—to a unique property. Then, every token concept has a property as a part and is thereby *about* whatever might exemplify that property. For example, my concept of Tibbles is about Tibbles by virtue of containing a property that only Tibbles can have. So, (About) generalizes in favorable ways.

I should emphasize that my goal is not to account for every pre-philosophical sense in which a proposition may be about something. I wish to focus on the sense of about that is most relevant to the nature of meaning and reference. In particular, I want to better understand the claim that propositions are about the things they refer to. (About) is handy for that purpose because it allows us to give a metaphysical account of how propositions could be about things beyond themselves; it can thus explain the sense in which propositions carry *meaning*.

That said, we may also use (About) to define an *indirect* sense of 'about'. Consider <Suzy rejects the proposition that Bertrand Russell liked to golf>. There is a (primary) sense in which that proposition is about a *proposition*, namely, <Bertrand Russell liked to golf>. But there is also a sense in which it is about Bertrand Russell and golfing. That sense might be spelled out *recursively* as follows:

(Indirect About) 'p is indirectly about x' $=_{def}$ '$\exists y$ (p is about y & y is indirectly about x')
: $\vee \exists y$ (p is about y & y is about x)

In this way, we can understand indirect aboutness in terms of a series of applications of direct aboutness. The property-arrangement theory of propositions provides a foundational account, therefore, of the way in which propositions may represent (directly or indirectly) the world.

4. Objections and Replies

Let us consider a few possible objections to the property-arrangement theory of propositions.

Objection 1: The property-arrangement theory implies that abstract propositions have parts, but it makes no sense for abstract propositions to have parts.

Reply: Recall, first, that I am using the term 'part' in a very broad sense. I have not defined 'part' in terms of *spatial* overlap or in terms of the axioms of classical mereology. So, it isn't merely a matter of *definition* that parts must be concrete. Moreover, ordinary claims about propositions seem to support the idea that propositions have parts: for example, someone will say, "part of what you proposed is true, but other parts are false." Our ordinary use of language may therefore provide evidence that we at least implicitly believe that propositions have parts.

And even if propositions do not, strictly speaking, have parts, I think we can still recognize a part-*like* relationship between propositions and certain properties. For example, there seems to be some relationship between <Tibbles is on the pillow> and [Tibbles], and that relationship seems to be at least *analogous* to the relationship between a thing and its parts. Therefore, even if one doubts that propositions have parts in any meaningful sense, we can still benefit from treating propositions as "complexes" of properties as long as we recognize a part-*like* relation between propositions and certain properties.

Objection 2: The property-arrangement theory contradicts uniqueness of composition because <John loves Mary> has the very same (proper) parts as <Mary loves John>.

Reply: Notice, first, that uniqueness of composition is already contradicted by my theory of arrangements. The arrangement of *Tibbles sitting on the mat* has the same (proper) parts as the

arrangement of *the mat sitting on Tibbles*, yet these arrangements are different because their parts are linked in a different order; plus, in this case, the one arrangement exists only if the other doesn't. Moreover, the idea that there can be different arrangements of the same things is not counterintuitive. It is not counterintuitive, for example, that *Tibbles sitting on the mat* is a different arrangement from *the mat sitting on Tibbles*. Of course, we may debate over whether there are such things as arrangements or whether arrangements are what I say they are. But the theory appears to be consistent with our ordinary talk about arrangements. So, I recommend that we give up uniqueness of composition when it comes to *arrangements*. The result is that if propositions are themselves arrangements, uniqueness of composition doesn't apply to them.[18]

Objection 3: The analysis commits us to a *structured* view of propositions. But structural theories of propositions have problems.

Reply: The property-arrangement theory avoids many of the problems that arise for traditional structural theories. I will give three examples.

First, there is the problem of understanding what the structure of a proposition might be. Traditional views analyze structure in terms of sequences or functions. But like King,[19] I treat structured propositions as themselves a kind of "fact" (arrangement). Therefore, I have an answer to the general question of what the structure of a proposition is, and I avoid the problems that arise from analyzing propositions as sequences or functions.

[18] Moreover, see King, *The Nature and Structure of Content*, pp. 120–5 for a suggestion on how uniqueness of composition might actually be combined with a structured view of propositions (which is consistent with the property-arrangement theory).

[19] *The Nature and Structure of Content*, p. 33.

Second, there is the problem of accounting for how the structure of a proposition could reflect the structure of our language, considering that the very same propositions can be expressed by very different sentences.[20] Fortunately, the property-arrangement theory provides resources for dealing with that problem, too. Here is a sketch of how we might put the property-arrangement theory to work to explain the relationship between sentences and propositions. According to the property-arrangement theory, propositions are "made up" of properties that are (necessarily) unique to things. Let us suppose, then, that these properties are the "meanings" (or semantic contents) expressed by the terms of sentences.[21] As a result, sentences reflect the complexity of a proposition because for each term in the sentence that expresses a property in a proposition, there is a corresponding part of the proposition. Moreover, *different* sentences can express the *same* proposition because different terms can have the same meaning. For example, 'snow is white' in English expresses the same proposition as '雪是白色' in Chinese. We may account for why they express the same proposition by supposing that (i) 'snow' and '雪' both express the same unique property or essence of snow, (ii) 'white' and '白色' both express the same unique property or essence of whiteness, and (iii) according to the grammar rules of the respective languages, 'is' and '是' are used synonymously to predicate the property expressed by the right term to the item picked out by the left term. Note that the grammar rules for each particular language dictate how the terms should be arranged so that they express a specific proposition. Since the grammar rules differ across languages, there can be different arrangements of terms that nonetheless express the same

[20] See Pitcher, *Truth*, pp. 2-15.

[21] There may still be a different sense of "meaning" that accords with Mill's direct reference theory.

proposition. Therefore, the property-arrangement theory of propositions provides a foundation for a semantic theory according to which language can reflect, to some extent, the structure of a proposition, even while the grammar rules and sentence structures differ widely from language to language.

Third, there is the problem of identifying propositions with non-arbitrary structures.[22] Arbitrariness arises when trying to identify propositions with *sequences*. Is <John is tall> identical to the sequence, <John, tallness>, or is it instead identical to <tallness, John>? Either answer is arbitrary. But if propositions are arrangements, then arbitrariness goes away: <John is tall> is the arrangement of [John] bearing |is| to [tallness]. There is no arbitrariness here.[23]

I'll stop here. I have offered only sketch of how the property-arrangement theory might handle classically difficult questions. Further investigation is sure to reap additional objections—such is the nature of philosophy. But I believe I have said enough to get the property-arrangement theory on the table for fruitful discussion.

5. Benefits of the Theory

I will close this essay by briefly drawing attention to six benefits of the property-arrangement theory of propositions. First, the theory helps us see how the category, *Proposition*, is related to other basic categories. Propositions are special instances of the more general category, *Arrangement*, which in turn is a subcategory of *Complex*. The result is attractive: we don't have to treat propositions as unanalyzable, *sui generis* entities.

[22] Bealer, "Propositions," pp. 6–7.

[23] For a further defense of structural theories against these and related objections, I recommend King's *The Nature and Structure of Content*, pp. 102–126.

Second, the theory makes sense of why there are any propositions in the first place. There are propositions because there are certain kinds of properties (ones that are necessarily unique to a thing) that bear various relations to one another. When these properties bear relations to each other, they *thereby* form arrangements. Some of those arrangements count as propositions, since they are *about* things; and they are about things by being arrangements of (necessarily) unique properties. On the property-arrangement theory, then, propositions automatically fall out of a world in which things have necessarily unique properties. Their existence is not so mysterious now.

Third, the property-arrangement theory allows (but does not require) a proposition to exist even while the things it is about do not. As we have seen, this is because a proposition's parts are *properties* of the things the proposition is about, and one might think those properties can continue to exist even while nothing exemplifies them. So, for example, if you think that properties unique to Socrates can outlive Socrates, then you may suppose that <Socrates is running for President> can exist even if Socrates doesn't exist. This result is advantageous for those who think, as I do, that <Socrates is running for President> exists even if Socrates does not.

Fourth, the property-arrangement theory gives us propositions that are sufficiently fine-grained. So, for example, there are distinct *necessary* truths: <2 + 2 = 4> is distinct from <every triangle has three sides> because they are arrangements of different properties. That seems right. The often-held view that propositions are sets of possible worlds, by contrast, implies that all necessary truths are one and the same proposition. Moreover, the property-arrangement theory also allows us to account for the possibility of distinct propositions about the same things. For example, there is an intuitive sense in which <Venus is The Morning Star> is distinct from <Venus is the Evening Star>, as you might think someone could believe the one without believing the other. The

property-arrangement theory accounts for the difference, since there may be multiple properties that are necessarily unique to Venus. So for example, if Venus has the property of (say) *being Venus and a certain star seen in the morning* and (say) *being Venus and a certain star seen in the evening*, then these different properties can figure into different propositions about Venus.

Fifth, the property-arrangement theory explains how to think of propositions as abstract, non-spatial entities. I spelled out several consequences of the view the propositions are instead concrete, material things, and some philosophers will prefer not to be committed to those consequences. Fortunately, the property-arrangement theory reveals a viable alternative.

Sixth, and finally, the property-arrangement theory opens up a new avenue for investigating the nature of truth-*making*. One of the most profound questions truth theorists ask is, "How can things in the world *make* a given true thing true?" How, for example, is it that when I shove my cat off the pillow, *another* thing—a *proposition* about my cat's location—gets to be true. The property-arrangement theory gives us new resources for investigating the nature of truth-making: a foundation is now in place for exploring a *structural* analysis in terms of (say) things exemplifying the properties contained within a given proposition.[24] I suggest, then, that the property-arrangement theory deepens our understanding of *true things*—and also lays a foundation for new research into the connection between *truth* and *things*.[25]

[24] Rasmussen (2013) has developed one version of how this might go.

[25] Acknowledgements: [removed]

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APPENDIX

(A) '*A* is an arrangement' $=_{def}$ '*A* is a composition of atomic arrangements', where

ATOMIC: '*A* is an atomic arrangement' $=_{def}$ 'there are some *x*s and some *y*s, such that:

(i) *A* is a composition of the *x*s together with the *y*s (that is, *A* is a composition of some *z*s, where (i) each of the *z*s is either one of the *x*s or one of the *y*s, (ii) each of the *x*s is one of the *z*s, and (iii) each of the *y*s is one of the *z*s).

(ii) There is some relation *r*, such that necessarily, *A* exists *if and only if* the *x*s stands in *r* to the *y*s.

COMPOSITION: '*x* is a composition of the *y*s' $=_{def}$ '(i) for all *z*, if *z* is one of the *y*s, then either *z* is part of *x*, or *z* is identical to *x*, and (ii) for all *z*, if *z* is part of *x*, then there is a *w*, such that *w* is one of the *y*s, and *w* overlaps *z*, where

OVERLAP: '*x* overlaps *y*' $=_{def}$ 'There is a *z*, such that (either *z* is a part of *x*, or *z* is identical to *x*) and (either *z* is a part of *y*, or *z* is identical to *y*)'.[26]

Note 1: This definition is designed to be extensionally adequate: every arrangement satisfies the definition, and whatever satisfies the definition counts as an arrangement. (The definition is not meant to be a *metaphysical* analysis in terms of more ontologically basic properties.)

Note 2: This definition allows non-binary relations to link together the parts of an arrangement, assuming that any given higher-place relation holds if and only if certain two-place relations hold.

Note 3: I assume that *between* is a binary relation that connects pluralities (for example, three students are between two professors), where a plurality consists of one or more entities.

Note 4: Other definitions may be possible. Or one may leave 'arrangement' as an undefined primitive.

[26] The definition of '*x* is a composition of the *y*s' is equivalent to Peter van Inwagen's definition of '*x* is a mereological sum of the *y*s' in "Can Mereological Sums Change Their Parts", pp. 616–17.