Dispositional and categorical properties, and Russellian Monism
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Abstract: This paper has two main aims. The first is to present a general approach for understanding "dispositional" (or "structural") and "categorical" properties; the second aim is to use this approach to criticize Russellian Monism. On the approach I suggest, what are usually thought of as "dispositional" and "categorical" properties are really just the extreme ends of a spectrum of options. The approach allows for a number of options between these extremes, and it is plausible, I suggest, that just about everything of scientific interest falls in this middle ground. I argue that Russellian Monism depends for its plausibility on the unarticulated assumption that there are no properties in the middle ground.

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This paper has two main aims. The first is to present a general approach for understanding "dispositional" (or "structural") and "categorical" properties; the second aim is to use this approach to criticize Russellian Monism. On the approach I suggest, what are usually thought of as "dispositional" and "categorical" properties are really just the extreme ends of a spectrum of options. The approach allows for a number of options between these extremes, and it is plausible, I suggest, that just about everything of scientific interest falls in this middle ground.

The existence of this middle ground creates terminological issues. Some define 'dispositional' and 'categorical' (or related terms) as contraries (Alexander Bird 2007 514), while others (C. B. Martin 1993, John Heil 2003 Chap. 11) hold an "identity view" that all properties are both dispositional and categorical (or are both "powers" and "qualities"). It is not useful for us to try to settle such a dispute by stipulating definitions of our own. Instead, we should see what metaphysical roles the intended referents of these terms are supposed to play, and try to

figure out what plays those roles. I will suggest that the roles people have in mind for dispositional and categorical properties are both occupied, and are occupied by the same things. I suggest, tentatively, that the best description of this situation is that the properties in the middle ground are both "dispositional" and "categorical". That suggestion is merely terminological, however; the philosophical point is that the middle ground between the extreme positions exists, and is occupied.

I apply this approach to criticize Russellian Monism. Russellian Monism holds that physical theory reveals only the natures of the "dispositional" properties, and leaves the intrinsic natures of the "categorical" physical properties hidden. Given that these natures are hidden, Russellian Monists conclude that those natures are likely *experiential* (or *phenomenal* or *proto*phenomenal). That view is then taken as a novel "panpsychist" solution to the mind-body problem that splits the difference between traditional physicalist and dualist views.

I will argue that the beginning point of this line of thought is unjustified: there is no reason to think that physical theory reveals the natures of dispositional properties while leaving those of the categorical properties hidden. That is because these are the same properties. I argue that Russellian Monism depends for its plausibility on the seemingly unarticulated assumption that there are no properties in the middle ground between the extreme positions.

1. The distinction as usually understood.

I will let others try to explain what the distinction between dispositional and categorical properties amounts to. Some initial presentation of Rusellian Monism will creep in too.

Here is Derk Pereboom (2015):

Dispositional properties are essentially tendencies to produce certain effects, and while categorical properties may have powers to produce effects, they are not essentially tendencies to produce them.... Many find it intuitive that categorical properties are required to account for dispositional properties.... The more specific Russellian monist proposal then is this: the most basic properties contemporary physics reveals are all dispositional, and thus it leaves us ignorant of the categorical properties needed to explain them. (301)

Here is David Chalmers explaining some terms as set-up for defending Russellian Monism (2015).

> Here we can say that *quiddities* are the fundamental categorical properties that play the fundamental roles specified in physics. Alternatively, we can say that quiddities are the categorical bases of the microphysical dispositions characterized in physics. We can stipulate in addition that quiddities are distinct from the roles or the dispositions themselves. A view on which there are only role or dispositional properties, and no distinct properties playing those roles or serving as the basis of the dispositions, is a view on which there are no quiddities. (Chalmers 2015 254)

Chalmers thinks that both categorical and dispositional properties have some role to play in physical theory, or in the philosophical understanding of it. He continues:

> We can say that *narrowly physical* properties are microphysical role properties, such as the dispositional property associated with having a certain mass, or the second-order property of having a property that plays the mass role. We can say that *broadly physical* properties are physical role properties along with any properties that realize the relevant role properties: categorical bases for the mass dispositions, first-order properties that play the mass role.
> In effect narrowly physical properties include structural properties of microphysical entities but exclude quiddities, while broadly physical properties include both structural properties and quiddities. (2015 255-6)

Alexander Bird (2007, 2016) defends a "powers ontology". This view holds that all fundamental properties are "powers"; those are at least closely related to what others call "dispositional properties". Bird suggests by way of explaining his view:

> What all are agreed on is that the very same power could not have a different dispositional character or causal role: that character or role is fixed across possible worlds.... Powers, being modally fixed properties, contrast with properties that are *quiddities*. The latter are properties with primitive identity; they do not retain dispositional character across worlds; they are modally variable properties. (2016 346)

Bird's "quiddities" appear to be what others call "categorical" properties.

Here are Sungho Choi and Michael Fara explaining "dispositionalist", "categoricalist" and "quidditist" views (2016 Sec. 3):

The dispositionalist holds that the essence of a property *P* is wholly constituted by the nomic or causal roles *P* plays—for short, theoretical roles.... Dispositionalism thus implies the following transworld identity condition for properties: properties *P* and *Q* are identical iff they play the same theoretical roles.... On dispositionalism, therefore, *P* invariably endows its instances with the same dispositions, in which sense dispositionalism implies that properties have dispositional essences—and only dispositional essences.

Categoricalism—also known as categorical monism—is the position that all properties, or at least all sparse properties are categorical properties....

[M]ost categoricalists... subscribe to *quidditism*, according to which the essence of a property is constituted by its internal or self-contained nature, that is, what is called *quiddity*, that is only contingently related to the specific theoretical roles it plays.... On quidditism, the essence of a property puts *no constraint whatsoever* on how its instances are disposed to act or react under various circumstances. This is why quidditism goes along with categoricalism which asserts that properties have no dispositional essences.

I will pause for a moment to explain "quidditism" a bit more. 'Quiddity' is a term of art, and it tends to be used somewhat ambiguously. There is one clear understanding of it, however, that I prefer. That understanding treats 'quiddity' as denoting for properties what haecceities are for individuals. A haecceity of individual x is a property H such that necessarily x and only x possesses H:

H is a haecceity of x iff necessarily, for any y, y has H iff y = x

So, for example, a haecceity of David Chalmers's would be a property such as *being identical to David Chalmers*. Necessarily, anything that has that is him, and necessarily, he has it (if he exists).

Similarly, on my preferred understanding, a quiddity of a property P would be a property Q such that necessarily P and only P has Q:

Q is a quiddity of P iff necessarily, for any Y, Y has Q iff Y = P

On this sort of account, it is widely acceptable that quiddities exist. So, in order to be interesting, views in the neighborhood of the "quidditism" of Choi and Fara must hold more than that properties *have* quiddities; they must hold instead that properties such as the quiddities I described are the *only* essential properties of properties -- nothing beyond the identity of a property is essential to it[1]. I will call a property that has such an impoverished essence a "bare quiddity"[2], and will call the view that all properties (in class X) are bare quiddities "Bare Quidditism" (about X). Davis Lewis famously endorses Bare Quidditism for fundamental physical properties[3].

2. Dispositional roles are second-order properties.

This section suggests a "second-order" understanding of dispositional and structural "roles", and begins to suggest that this approach reveals some unclarity in the common understanding of dispositional and categorical properties.

Chalmers gives a general illustration of his "microphysical role properties" as being things such as "the dispositional property associated with having a certain mass" and "the second-order property of having a property that plays the mass role". By contrast, the "quiddities" and "fundamental categorical properties" are the "first-order" properties that "play" such roles and that "realize the relevant role properties". Chalmers holds that the first-order categorical properties are distinct from the second-order role properties.

On Chalmers's usage, the term 'second-order property' apparently applies to properties of individual objects that are specified by using quantification over properties. Suppose there is some dispositional or structural role R that a property might play. (I will say more about these "roles" soon.) Chalmers's "second-order properties" look to be things like:

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[1] This statement is a bit rough, and it is not entirely obvious how to fix it. For example, if numbers are necessary existents, then this property would equally serve as a haecceity of David Chalmers: being identical to Dave and such that 2 + 2 = 4. And if a singleton axiom was necessary, so would this: being the unique member of {David Chalmers}. I will not address such issues here, however.

[2] Note that this usage already compromises clarity. I defined a quiddity as a *second-order* (or level-2) property, a property of properties. The more common use treats 'quiddity' as expressing a kind of *first-order* property. What kind that is seems unclear to me (as I illustrate later). I am compromising clarity by allowing 'bare quiddity' to apply to first-order properties which have especially impoverished essences.

[3] See for example the "Introduction" to Lewis 1986b, 2009 208-10, and more generally 1986a Sec. 1.8.

the property P such that necessarily, for any x, x has P iff for some property Q, Q plays
role R and x has Q

The "categorical properties" are supposed to be the Qs that play these roles. Objects x and y in
different worlds could share P by having distinct categorical bases of P, for example. Maybe Q_w
plays role R in world w, while distinct Q_u plays R in world u. The second-order property P is
supposed to be common to things that have Q_w in w and things that have Q_u in u.

There is a second sense of 'second-order property' on which it applies to properties of
properties. So, for example, *being a color* is a second-order property in this sense. *Being a color*
is not possessed by individual flowers or cars or walls. Flowers and cars and walls have colors
such as *redness* and *greenness*, and those color properties in turn possess the second-order
property *being a color*.

I think it is important to see that the "role property" R mentioned a moment ago is a
second-order property in this second sense, and is not a second-order property in the first
sense. To get at this point, I will explain a bit more about what sorts of things I take these
"roles" to be.

First, I will change the terminology a bit to avoid ambiguity. Suppose that there are
individual objects at level-0, properties and relations of level-0 objects at level-1, properties and
relations of level-1 properties at level-2, and so on.

Brent Mundy suggests a "second-order theory of quantity" (Mundy 1987), and I will
assume that this is right (or on the right track). On Mundy's view a quantity such as mass
includes mass properties such as 1 g, 2 g, etc. Those are level-1 properties possessed by level-0
individuals such as protons and pencils and planets. The *quantity* mass is something like the set
of those level-1 properties; I will treat it as the level-2 property common to all and only those
level-1 properties. I will now start capitalizing terms for quantities: Mass, Volume,
Temperature, Distance, etc. Mass is to 1 g and 2 g as Color is to redness and greenness, and
being a Mass property is like *being a color*.

Mundy proposes that the level-1 properties in the quantity Mass are importantly
characterized by further level-2 relations. In particular, Mundy postulates as theoretical entities
two level-2 relations among properties, $\leq$ and * (1987 37). These have formal features

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analogous to ≤ and + on the real numbers (37-8). The ≤ relation orders the set of Mass properties, and * creates relations among its members analogous to sum, difference, product, etc.[4] Given that, if we can merely specify one member of the set of Mass properties as a unit, say 1 g, then we will be able to refer to each member of the infinite range of Mass properties using terms such as '2 g', '10 g', '10^{24} g', '10^{-24} g', etc.

My own paradigms of "structural" and "role" properties derive from Mundy's level-2 relations. I will use '≤' and '+' to refer to his level-2 relations[5]. Then these are paradigmatic structural features of 2 g:

being an X such that 1 g ≤ X
being an X such that X ≤ 4 g
being an X such that 1 g + 1 g = X
being an X such that X + X = 4 g

A set of such level-2 features (or maybe a sort of conjunctive property of them) is a "structural role" for 2 g.

Those structural features are not immediately dispositional ones, but I take dispositional features to fall under this more general category of structural features[6]. For example, Newton's second law 'F = ma' constrains the behavior over time of objects, and the Mass properties it covers give objects numerous dispositions to accelerate in reponse to various forces impressed on them. So, for example, it is true of the property 1 kg that anything that has it and is subject to net force 1 Newton in direction d accelerates at 1 meter/second^2 in d. This is a level-2 dispositional feature of the level-1 property 1 kg:

being a property Y such that for any object x and time t, if x has Y at t, then if x has net force 1 N in d at t, then x has acceleration 1 m/s^2 in d at t

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[4] Mundy's quantities are organized into "rays". These are sets of level-1 properties that are related to each other by the level-2 relations ≤ and *. Any two Mass-properties stand in ≤ to each other, as do any two Temperature-properties, while the Mass and Temperature properties are not so related to each other.

[5] For ease of presentation I will allow myself to slide ambiguously between treating '+' as a three-place relation like *sum* (4 is the sum of 2 and 2) and as a two-place function like *plus* (+(2, 2) = 4).

[6] I do not have any exact characterization of "dispositional" features to add. I take them generally to be ones that concern or constrain the broadly causal relations that things enter into. Dynamic, cross-temporal relations are my paradigm examples of "broadly causal relations". Many philosophers discuss phrases such as 'x is disposed to φ' and 'the disposition to φ given stimulus S'. I do not have anything much to say about those phrases.

1 kg has that level-2 feature: it is a property Y as described. 'F = ma' requires that 1 kg has infinitely many such level-2 features, for different values of the quantities Force and Acceleration. A set of such level-2 features is a "dispositional role" for 1 kg[7].

By contrast, the corresponding sort of "second-order property" that Chalmers mentioned would be:

> the property P such that necessarily, for any object x and time t, x has P at t iff x has some Y at t such that for any object z and time t', if z has Y at t', then if z has net force 1 N in d at t', then z has acceleration 1 m/s^2 in d at t'

That P is a level-1 feature of objects -- the property of level-0 individuals of having some-or-other level-1 property that has the level-2 feature. This sort of "second-order" (level-1) property is very different than the "second-order" (level-2) property I just described. They are possessed by different things, namely level-0 objects v. level-1 properties.

For purposes of this paper, I am simply assuming that Mundy's second-order account of quantities is right (or on the right track). To my mind, the main argument for the account is that it provides a highly natural explanation of how physical theories can both concern mathematical objects and also be about the physical world. For example, on this sort of account 'F = ma' says roughly this (ignoring vectors for illustration): for any object x and time t, the number that represents the Force property of x at t on the Newton scale = the number that represents the Mass property of x at t on the kilogram scale × the number that represents the Acceleration property of x at t on the m/s^2 scale. I hope you agree that that is a highly natural understanding. The equation is "about" numbers in a sense, but ultimately those serve merely as representational devices. The truth or falsity of the equation depends on what physical properties exist and how they relate to each other.

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[7] It is common for philosophers to characterize the nomic roles of properties in terms of Ramsey sentences (as in Lewis 2009 206-7). The approach I am describing complicates that picture. In order to be finitely stateable, the relevant theoretical postulates and laws have to concern level-2 quantities such as Mass rather than level-1 properties such as 1 g. The postulates describe relations among level-2 properties (or sets of level-1 properties). The relevant Ramsey sentences then quantify over those quantities, rather than the level-1 properties directly.

The immediate point of this discussion is that it is entirely standard and seemingly unavoidable that structural and dispositional "roles" are level-2 features of and relations among level-1 properties. Chalmers treated the "categorical" properties as the "first-order" ones that "realize" the "second-order" "dispositional", "role properties". He treats both of these as *level-1* properties of individuals. He treats the level-0 objects as having distinct "categorical" and "dispositional" level-1 properties. I submit that this picture is at best optional. The structural and dispositional roles of 1 g consist in its having various level-2 properties and relations to other level-1 properties, such as to other members of the quantity Mass and to members of other quantities such as Force and Acceleration. The "role" and "realizer" properties are distinct, as Chalmers says, but the realizer is a level-1 property and the role a level-2 property. The thing that "plays the role" of 1 g is just 1 g itself; its playing the role consists in its having the level-2 property. No further level-1 property is needed to "realize" this role (maybe 1 g is physically fundamental)[8]. So, the level-1 property 1 g would thereby seem to qualify as a "categorical" property: it is the thing that has the level-2 dispositional features and "plays the role". But for exactly that reason, 1 g looks equally like a "dispositional" property too. The role it plays is a dispositional one, after all.

There are genuine distinctions to draw in this neighborhood, however. The next section attempts to describe some.

3. Some varieties of Structuralism.

On the general approach I described, level-1 properties such as *mass 1 g* have level-2 properties and relations to other level-1 properties, such as *being ≤ 2 g*, and *being an X such that anything that has X and has Force .001 N accelerates at 1 m/s^2*. This section attempts to describe some distinctions among such features of properties. The upshot is that there are many options available between treating a property as what I will call "super-dispositional" and "super-categorical".

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[8] The term "realize" is sometimes used to indicate a relation in the neighborhood of supervenience or necessitation. In this sense, an arrangement of particles might "realize" a higher-level fact such as a certain sample of water's having a given temperature. The particles' havings of their properties necessitate the sample's having the temperature. The relation between level-2 role properties and level-1 "realizers" of them is distinct from that one.

A first distinction is between *essential* and *individuative* features. I will treat an essential feature of x as a property P such that necessarily, if x exists, then x has P. Maybe you are essentially human, for example, in the sense that you could not exist without being human[9]. An individuative feature of x is a P such that necessarily, anything that has P is x. It is much harder to find uncontroversial examples of individuative properties for objects. The only obvious candidates are *haecceities*, such as the property *being identical to x*.

A second distinction is between "pure" and "impure" structural features. A *pure* structural feature is of the sort *bearing R to something*. An *impure* structural feature is of the sort *bearing R to B*. For example, 1 g has the pure feature: being an X such that for some Y, X ≤ Y; 1 g bears the *less-than* relation to something. 1 g also has the impure feature: being an X such that X ≤ 2 g; 1 g bears the *less-than* relation to 2 g in particular[10].

Suppose abstractly that A and B stand in a structural relation R[11]. Given that R(A, B), there are four general options about how tightly R is connected to A's identity:

Weak Essentiality Condition: Necessarily, for any X: if X = A, then ∃Y R(X, Y)

Strong Essentiality Condition: Necessarily, for any X: if X = A, then R(X, B)

Weak Individuation Condition: Necessarily, for any X: if R(X, B), then X = A

Strong Individuation Condition: Necessarily, for any X and Y: if R(X, Y), then X = A

I will illustrate these conditions in the case of Mass properties.

A view that accepted only the Weak Essentiality Condition for Mass properties might hold that what is essential to 1 g is only something like *being a member of a positive scalar*

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[9] This is a fairly "thin" conception of essential properties, I realize. For example, if 2 + 2 = 4 is necessary, then *being such that 2 + 2 = 4* would be an essential property of anything. Some people want a "thick" conception of essence which rules out such properties. I hope the thin conception is enough for the purposes of this paper, however. I am primarily interested in the contrast between essential and individuative properties.

[10] I am confident that I get this pure v. impure distinction from Sydney Shoemaker, though I am not able to point to a specific location at present.

[11] I have no terribly precise account of what a "structural relation" is. Paradigm examples are relations describable in some relatively neutral vocabulary, such as one restricted to logical, mathematical, and (maybe) metaphysical terms (such as 'property'). At some point we may also need a nomic term such as 'It is a law that...'. Mundy's relations ≤ and * are of this sort; so is the relation I see as being expressed by 'F = ma'.

quantity. On such a view, standing in ≤ and + relations to some-or-other properties might exhaust the essence of 1 g. Such a view would hold that 1 g could not "play the role" of unit negative charge, for example, or be a member of a vector quantity; but such a view might also hold that 1 g could "play the role" of 10^{24} g, and that 1 g could exist without 2 g[12]. Maybe in some world w, 1 g + 1 g = 2 g*, where 2 g* is some property other than 2 g that nonetheless stands in its position in a space of Mass-ish properties[13]. This "weak" view allows for the seemingly paradoxical claim that it is possible that 1 g > 2 g[14].

The Strong Essentiality Condition would hold (in this case) that it is necessary that if 1 g exists, then 1 g ≤ 2 g. 1 g could not exist without bearing ≤ to 2 g specifically. This view would deny that it is possible that 1 g > 2 g.

The Weak Individuation Condition would hold (in this case) that necessarily any X such that X + X = 2 g, is 1 g. This view of 1 g is related to the view that accepts the Strong Essentiality Condition for 2 g. If satisfying the condition that 1 g + 1 g = 2 g is essential to 2 g, then it is individuative of 1 g and vice versa: any X such that twice X is 2 g is thereby 1 g; and any Y that is twice 1 g is thereby 2 g[15]. A more general version of this view would hold that wherever any

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[12] I want to remain officially neutral on the question of whether properties are necessary existents. If you think they are, then you should read examples in which I say that certain properties do not exist as examples in which the relevant properties are not instantiated. I am somewhat inclined toward a middle ground: what properties exist is lawfully but not metaphysically necessary. This view allows for uninstantiated properties, such as twice the total mass of this universe, while still not treating properties as fully necessary existents. I do think that it is not *conceptually* necessary what properties exist. Like Mundy, I treat them as theoretical postulates.

[13] One might be puzzled by this. Surely '1 g' and '2 g' are rigid designators, so wouldn't '1 g + 1 g = 2 g' thereby be necessary if true at all? Maybe, but maybe not. '1 g' is rigid, but '1 g + 1 g' is potentially nonrigid; it designates the property that occupies a certain position in a "space" of properties with respect to 1 g. It is conceptually open that that position is occupied by different properties in different worlds, but that may or may not be really possible, depending on one's metaphysical view of the properties. Whether '1 g + 1 g' is rigid is a metaphysical question rather than a narrowly semantic one.

[14] What seems paradoxical about this is that '1 g < 2 g' is surely a priori, as is '1 g + 1 g = 2 g'. That's just how '2 g' is defined, after all ('the Mass-property that is twice 1 g'). But depending on the metaphysical view of the properties that one takes, those could be either necessary a priori, or contingent a priori. They are necessary, if they are, due to facts about the natures of the properties; by contrast, they are a priori for generally semantic reasons having to do with how we fix the references of terms such as '2 g'. '1 g < 2 g' is a priori in the manner of 'Hesperus is visible in the evening'. But in this case it might also be in the essence of 1 g to be less-than 2 g. The mere fact that we pick out one property by its relation to another does not require that that relation holds necessarily. More subtly, even if the relation *does* hold necessarily, it does not hold necessarily *because* that is how we picked out the thing.

[15] The connections between the conditions are a bit more subtle than my statement in the text indicates. Suppose Weak Essentiality holds for both A and B, and that the structural relation R satisfies a uniqueness condition (if R(A, Y_1) and R(A, Y_2) then $Y_1 = Y_2$; and similarly for A). Mundy's + relation satisfies this sort of uniqueness condition, for example. Then A satisfies Weak Individuation iff B satisfies Strong Essentiality. ⇒: Suppose Y = B. Then Weak

member of the Mass quantity exists, every other member exists too and they stand in their actual ≤ and + relations. The impure structural features of the Mass properties would serve to individuate them.

For the actual Mass properties to satisfy that sort of condition is still compatible with its being possible for there to be a completely different set of properties that stand in the same pure structural relations to each other. Such a set of such properties could be a Mass-ish quantity in which each position in the space is occupied by something other than an actual Mass property. A generalized version of the Strong Individuation Condition would say that not even that is possible: any properties that merely stand in the right pure level-2 relations to each other would thereby be the actual Mass properties. This view holds that the *pure* structural features of a property fully determine its identity.

At some risk of oversimplification, I will try to describe some general "structuralist" views[16]. Let the complete set of nomic relations that a property enters into be its "nomic role". Nomic roles can be pure or impure, depending on whether the relations that make them up are of the pure sort, $\exists X\,R(A, X)$, or impure sort, $R(A, B)$. As I noted, if a set of structurally related properties all satisfy the same general sort of structural condition, the Strong Essentiality and Weak Individuation Conditions tend to collapse into each other. So, three main varieties of Structuralism emerge from this approach:

> *Weak Structuralism about X*: For each property P in class X, the pure nomic role of P is essential to P.

> *Moderate Structuralism about X*: For each property P in class X, the impure nomic role of P is both essential to individuative of P.

> *Strong Structuralism about X*: For each property P in class X, the pure nomic role of P is both essential to and individuative of P.

Essentiality for B requires $\exists X\,R(X, B)$, and Weak Individuation for A requires $R(A, B)$. $\Leftarrow$: Suppose $R(X, B)$. Strong Essentiality for B requires $R(A, B)$ and Uniqueness requires $X = A$.

[16] Some "Ontic Structural Realists" want an even more radical sort of "structuralism" than the kinds I describe. James Ladyman (Ladyman and Ross 2007) wants a sort of structuralism that eliminates both individual objects and monadic properties of them too, in favor of relational structures. The structuralisms I describe accept individuals and monadic properties (and relations), and differ on the extent to which the identities of the properties are tied to their relations to other properties.

All of these views are potentially simplifications of a messier reality. One likely candidate for X is the class of physically fundamental properties (as in Bird 2016), though some propose as a sort of middle ground position that spatiotemporal properties are categorical while others are dispositional (Ellis 2010). The Weak and Moderate sorts of structuralism amount to a different kind of middle ground: they hold in effect that all the X-properties are *both* categorical and dispositional (or maybe neither; I turn to this question in a moment). One could potentially combine those two sorts of middle ground position too, accepting Weak Structuralism for some properties and Strong for others. In addition, one could hold that different structural conditions hold for different components of the nomic roles of a given quantity or the properties in it. For example, maybe the $\leq$ and $+$ relations among Mass properties are strongly essential to them, while the relations of those properties to Acceleration ones are only weakly essential to them. A view of that sort could allow that 'F = 2ma' is possibly satisfied by the actual Mass, Force, and Acceleration properties. The Mass properties may be individuated by their relations to other Mass properties, and may be necessarily connected to *some* Acceleration properties, while it may be accidental to them which Acceleration properties those are. I do not know whether that is genuinely possible, but it at least appears conceptually open. A view like that would count as "Weak Structuralism" in the scheme above, and not as "Moderate", though really it splits the difference between their motivating ideas.

If the relevant nomic roles are also dispositional ones, then we could distinguish corresponding Weak, Moderate, and Strong versions of Dispositionalism[17]. I will call properties that satisfy Strong Structuralism "super-structural" properties, and ones that satisfy Strong Dispositionalism "super-dispositional" ones.

A further option is to hold that no structural or dispositional features are either essential to or individuative of a given property P. P may be what I earlier called a "bare quiddity". I will also call these bare quiddities "super-categorical" properties.

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[17] Further distinctions are available for dispositional essences. Shoemaker distinguishes between "forward-" and "backward-looking" causal features of properties, for example. Whichever set of features is in question, however, there are distinctions between Weak, Moderate, and Strong sorts of Dispositionalism.

Though it is a simplification, I will continue to discuss four main views: Bare Quidditism, and then Weak, Moderate, and Strong Structuralisms. The immediate point of this section is that there is a range of options between the views that a given property is super-dispositional (as in Strong Structuralism) and that it is super-categorical (as in Bare Quidditism).

4. Are the middle ground properties dispositional or categorical?

I suggest that "both" is the best answer for a nonideal world.

Chalmers characterized his "second-order" "role" "dispositional" properties by appealing to second-order descriptions of the sort "having a property that plays the mass role". This is to treat dispositional properties as what I called "super-dispositional" ones. For example, suppose Moderate Structuralism holds for the Mass properties, while Strong Structuralism does not. Let Mass* be some possible quantity whose members have pure nomic roles similar to those of the Mass properties, while still being distinct from them. Suppose world w has the Mass* properties but not the Mass ones. In w, x has 1 g*, but not 1 g. Then x satisfies the description 'has a property that plays the 1 g role', but lacks 1 g. So, by Chalmers's lights, a Moderate Structuralist view of 1 g would seemingly disqualify it from being "dispositional". His "dispositional" properties appear to be super-dispositional ones.

It is not entirely obvious whether Chalmers's "categorical" properties are what I called "super-categorical" ones. In favor of this option, Chalmers calls them "quiddities", and that term is sometimes used (as by Choi and Fara) to mean what I called a "bare" quiddity; those are "super-categorical" properties. Another option is that Chalmers's means "categorical" to cover all the "nondispositional" properties. Given that his "dispositional" ones are super-dispositional, this alternative usage would make every less-than-super-dispositional property count as "categorical"[18].

Pereboom said that dispositional properties "are essentially tendencies to produce certain effects" (2015 301). The phrase "are essentially tendencies" can seemingly be read either as a predication or as an identity. On the predication reading, Pereboom says that

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[18] A third option is that Chalmers (and others) do not distinguish these first two options because they have not recognized that the middle ground positions are conceptually open. A fourth option is to hold that the first two options are not really different in fact because the middle ground positions are not occupied.

dispositional properties have these tendencies essentially; that would seemingly count all more-than-super-categorical properties as "dispositional". On the identity reading, Pereboom says that dispositional properties are identical to these tendencies; that would seemingly count only super-dispositional properties as "dispositional".

Recall the earlier characterizations of Choi and Fara of "dispositionalism" and "categoricalism" (2016 Sec. 2.3):

> The dispositionalist holds that the essence of a property P is wholly constituted by the nomic or causal roles P plays.... Dispositionalism thus implies the following transworld identity condition for properties: properties P and Q are identical iff they play the same theoretical roles....

> [M]ost categoricalists... subscribe to *quidditism*, according to which the essence of a property is constituted by its internal or self-contained nature, that is, what is called *quiddity*, that is only contingently related to the specific theoretical roles it plays.... On quidditism, the essence of a property puts *no constraint whatsoever* on how its instances are disposed to act or react under various circumstances. This is why quidditism goes along with categoricalism which asserts that properties have no dispositional essences.

Given those characterizations, properties that satisfy only Weak or Moderate forms of Dispositionalism or Structuralism would seem to be *neither* "dispositional" *nor* "categorical". Such properties have some "dispositional essences", and so do not satisfy "categoricalism". But they also do not unambiguously satisfy the dispositionalist "transworld identity condition" of being identical to anything that merely plays the same "theoretical role". A Weak view would deny that identity condition outright; a Moderate view would deny it for "theoretical roles" understood in the "pure" way, but not the "impure" way. Both of these views would also deny the "categoricalism" that holds "the essence of a property puts *no constraint whatsoever* on how its instances are disposed to act". Both Weak and Moderate views allow that the relevant properties can have rich dispositional essences. Both views can also allow that quiddities exist on my preferred characterization (P's quiddity is the property of being identical to P). But both views would then deny that these quiddities are "only contingently related to... theoretical roles". If P is necessarily connected to effect E, then so (trivially) is P's quiddity.

Bird suggested that a "power" "could not have a different dispositional character or causal role". He continued:

> Powers... contrast with properties that are *quiddities*. The latter are properties with primitive identity; they do not retain dispositional character across worlds; they are modally variable properties. (2016 346)

Properties that satisfy only Moderate Structuralism would seem to count as both "powers" and "quiddities" as Bird explains those terms here. The "dispositional character or causal role" of such a property is "fixed", so it would seem to be a "power"[19]. Such properties would seem also to be "*quiddities*" in Bird's first sense of "properties with primitive identity". They would not be "quiddities" in Bird's other sense of being "modally variable".

Henry Taylor (forthcoming) says: "An increasingly popular view is that properties have a dispositional nature. Call this view *dispositionalism*" (Sec. 1). That would seem to count all more-than-super-categorical properties as "dispositional". Dustin Locke describes a view (which he does not endorse): "Property Structuralism: Properties are individuated by their nomological roles" (2012 347). That view draws a line in yet another place: properties that satisfy Moderate Structuralism are "structural" (because they are individuated by impure "nomological roles") while ones that satisfy only Weak Structuralism are not.

I hope these quotations illustrate that 'dispositional property' and 'categorical property' (and related terms) are used unclearly in the literature. 'Dispositional property' could be used to apply only to super-dispositional properties, or it could cover all more-than-super-categorical ones. Similarly, 'categorical property' and 'quiddity' could be reserved for super-categorical properties, or could be applied more broadly to all less-than-super-dispositional properties. The "super" uses of these terms appear to be most common at present (though they are not universal). There is nothing wrong with that common usage in itself, yet it also appears to be assumed implicitly that the distinction between categorical and dispositional properties is exhaustive (among properties). Taken together, this set of usages is intolerable because it ignores the middle-ground, nonsuper options. Maybe in an ideal world, we would just get rid of

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[19] I suspect that Bird himself intends his term 'power' to apply only to what I call "super-dispositional" properties, though his formulation in the quotation does not require that.

the usual terminology. I suggest as a solution for a nonideal world that we adopt the broader usages of these terms, and count the middle-ground properties as both "dispositional" and "categorical". They are dispositional in the sense that they have "dispositional natures" and have dispositional features *essentially*. They are categorical in both the senses that they "play" and "realize" "dispositional roles" and also that they are not fully individuated by those roles (the "pure" roles at least). That suggestion is of course merely terminological; the philosophical point is that the middle-ground options exist.

5. *Prima facie* arguments and a general moral.

This section suggests *prima facie* arguments against both Bare Quidditism and Strong Structuralism, and suggests a general moral about the metaphysics of properties.

My *prima facie* argument against Bare Quidditism is brief and inadequate but nonetheless fully convincing (to me at least). It is this: surely the Mass property 1 g could not "play the role" of *being a fried egg*. That is simply wild. Surely at least standing in the $\leq$ and + relations to some other Mass-ish properties is essential to 1 g. That is, surely at least a Weak Structuralist view is correct for 1 g, with respect to at least some of 1 g's actual structural features. So, Bare Quidditism is wrong.

I am fully aware that this argument is only an appeal to intuition. Nonetheless, the intuition seems so glaringly obvious to me that I hope it will be widely shared. One motivation for Bare Quidditism derives from the big and general metaphysical idea that there are no necessary connections in nature; all necessity must reduce to logical or conceptual necessity. I will not attempt to take on this big view here. Just about every property I can think of seems to me to serve as an intuitive counterexample to the view, so I simply lack the intuition in its favor. At present, this big issue may boil down to a clash of intuitions.

My *prima facie* argument against Strong Structuralism is also brief and inadequate; John Hawthorne (2006) develops it at greater length. The argument holds that it is readily conceivable, and surely possible, for there to be distinct properties that have symmetric structural and nomic roles. Distinct properties can nonetheless share all their pure structural nomic features. Here is an imperfect example of a Hawthorne-style objection. Suppose there is

a world that has two fundamental types of particles: matter and anti-matter. The kinds of matter and anti-matter particles have perfectly symmetrical nomic relations. Protons bond with protons by weak nuclear forces, and anti-protons bond with anti-protons by weak nuclear forces. Protons and anti-protons do not bond with each other, however, but annhiliate each other when brought into close proximity. These properties share their *pure* structural features, but nonetheless differ on their *impure* ones. Each kind has the pure feature of bonding with things of its own kind: each is a property X such that if y_1 has X and y_2 has X in circumstances C, y_1 bonds with y_2. But the kinds differ with respect to the impure feature of bonding with *protons*: protonhood has while anti-protonhood lacks the feature of being an X such that if y_1 has X and y_2 has *protonhood* in C, then y_1 bonds with y_2. Protonhood and anti-protonhood are distinct despite sharing all of their pure structural features. Strong Structuralism says such cases are impossible, so it is wrong.

Weak and Moderate forms of Structuralism are perfectly compatible with this objection[20]. Bonding with other protons could be essential to protonhood, for example. And protonhood and anti-protonhood might be essentially connected to each other, so that their symmetric relation is weakly individuative of them: maybe anything that bears these impure structural relations to anti-protonhood is thereby protonhood.

I will try to suggest a general moral. Hawthorne-style examples support for properties what Max Black's famous example supports for objects. Black (1952) suggests an example of a world whose material contents consist only of two qualitatively indistinguishable iron spheres *a* and *b* (and their parts). The spheres have the same "pure" level-1 properties and relations. Each is a sphere of a given size, shape, and composition; they duplicate each other in every microphysical detail. They stand in the same pure relations too: each is 1 km away from an iron sphere of a certain sort, for example. The two spheres are distinct nonetheless. What makes sphere *a* distinct from sphere *b*? There is no very good answer to that question. Easy answers are available, but they just postpone the inevitable. For example, *a* is distinct from *b* because

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[20] Hawthorne notes in his Appendix that (what I am calling) "Moderate Structuralism" avoids his objections. Hawthorne intends to argue against Sydney Shoemaker's "causal theory of properties" (esp. 1980). Shoemaker's own statements are a bit slippery; in 1980 his view looks like my Strong Structuralism, but in 1998 (subtly, 412-3), and in response to Hawthorne (more explicitly), Shoemaker goes for something more like Moderate Structuralism.

they are composed of distinct iron atoms. Such answers only put off the main question, however, because each of these parts has a qualitative duplicate too. At some point, these easy answers have to give way to some metaphysically basic facts about identity and distinctness. Maybe the fundamental particles that make up the spheres are primitively distinct; or maybe it is the points or regions they occupy. Some identities can be explained in terms of others, but when we get down to physically or metaphysically basic entities, some facts about identity and distinctness will have to be basic themselves[21].

Since the spheres *a* and *b* are distinct, they do have distinct "impure" properties and relations. The haecceities *being identical to a* and *being identical to b* are distinct, and *a* has while *b* lacks the relational feature *being 1 km from b*. I take it that these impure relations do not provide any metaphysical explanation of why *a* and *b* are distinct in the first place, however. The distinctness of *a*'s and *b*'s haeccieties is grounded in the more basic distinctness of *a* and *b* themselves. That *a* ≠ *b* is either a basic fact itself, or is grounded in some basic facts about distinctness (of further particles or points, for example).

None of these points require, or even suggest, that *a* and *b* could have been fried eggs. I have no great theory about what is essential to objects of their sorts, but it is at least plausible that they are essentially made of iron. If *a* is essentially made of iron, then *a*'s haecceity is also necessarily connected to *being made of iron*.

Black's example supports the moral that pure *essences* do not *individuate* level-0 objects (sometimes, at least). The essences of *a* and *b* are exactly the same, as far as pure level-1 properties and relations are concerned, yet they are distinct objects nonetheless. Those essences do not determine their identities. Their "impure" level-1 properties differ, but that difference is derivative from the more basic distinctness of the level-0 objects in the first place.

Hawthorne-style examples support the analogous moral that pure essences do not individuate level-1 properties either (sometimes, at least). In my example, the pure structural essences of protonhood and anti-protonhood were exactly the same, while the properties were

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[21] Matters are a bit more complicated if there are no physically or metaphysically basic objects. Maybe space is "gunky", for example. I think this sort of view would make for more rather than fewer basic facts about distinctness. We could no longer explain the distinctness of *a* and *b* by distinctness of their basic components, so this seemingly higher-level distinctness fact might itself have to be basic. In general, on this view there would seemingly have to be fundamental facts about the identity and distinctness of nonfundamental things.

distinct nonetheless. The level-1 properties do differ in their impure level-2 properties (my "quiddities"), but that difference is metaphysically derivative from the more basic distinctness of the level-1 properties in the first place[22].

This moral for properties seems to me to be a natural consequence of treating structural and dispositional roles as level-2 properties of level-1 properties. On that approach, the question of which level-2 properties are essential to or individuative of what level-1 properties is analogous to the question of what level-1 properties are essential to or individuative of what level-0 objects. There are two extreme views in both cases: an entity's identity could be fully determined by its properties, or it could be completely independent of them. In the case of level-0 objects, an extreme sort of "Haecceitism" would claim that there are qualitative duplicates of this world in which the identities of objects are swapped around in any way one pleases. Maybe in one such case I am located where Napolean is here, and you are a fried egg. That strikes me as highly implausible. An extreme view of the other sort would hold that the identities of objects are fully determined by their properties. Black's case is an apparent counterexample to that view. Similarly, in the case of properties an extreme sort of Bare Quidditism would hold that worlds that duplicate this one on pure structural features could nonetheless have the identities of the properties swappped in any way one pleases. The Mass properties here could play the roles of Charge properties there, and the charge of the electron could play the role of *being a fried egg*. That strikes me as highly implausible. By contrast, Strong Structuralism would hold that the identities of level-1 properties are fully determined by their level-2 properies. Hawthorne-style cases are apparent counterexamples to that view.

Both of these extreme options are *prima facie* implausible both for objects and for properties; surely the truth standardly lies somewhere in between them. I am not trying to argue for much more than that. On any such view, properties commonly have nontrivial

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[22] Dustin Locke (2012) argues for a position he calls "Austere Quidditism": "Properties are individuated by numerical identity" (351). That is similar to the view I suggest, though I express it by saying that there are metaphysically basic facts about identity and distinctness of (some) properties. Locke contrasts this position with two further ones: "Property Structuralism: Properties are individuated by their nomological roles" (347), and "Extravagant Quidditism: Properties are individuated by their quiddities" (351). Locke's Austere Quidditism is compatible with his Structuralism -- Moderate Structuralism satisfies both. Extravagant Quidditism barely makes sense on my approach. It seems to hold that each property is individuated by a higher-level property.

essential features, but are not individuated by those essential features (the "pure" ones at least).

Rejection of my suggested "essences do not individuate" moral appears central to the motivation for Strong Structuralism. Bird is fairly explicit about rejecting this moral. He says:

> I shall follow Aristotle (*Met*. H 7) in taking the essence of an entity to be that whereby a thing is what it is. Thus we should expect the essence of a property, its dispositional character if it is an essentially dispositional property, to determine the identity of the property. According to the dispositional essentialist, therefore, the essence of such a property is determined by its relations to other properties. (Bird 2007 524)

"Dispositional essentialism" is Bird's own view. So, Bird seemingly rejects the "essences do not individuate" moral. I find the moral plausible myself, though I will not attempt to further investigate or adjudicate the issue here. For current purposes I want primarily to note that this is the main difference between the Strong Structuralist view and others. The Strong Structuralist view holds that the essences of properties individuate them. The weaker versions of structuralism allow that physical properties have structural essences while accepting that their pure essences do not individuate them (sometimes, at least). Lewis's Bare Quidditism also accepts this moral: bare quiddities are distinct from each other, while all (or many) share the same empty (or nearly-empty) essence[23].

For the sake of seeing some options, let me describe a view which I do not endorse.

Structural-Categorical Identity Theory: All scientifically interesting properties are both structural and categorical.

(a) All scientifically interesting level-1 properties are *categorical* in the sense that they *have* some nomic level-2 structural features.

(b) All scientifically interesting level-1 properties are *structural* in the sense that they have some nomic level-2 structural features *essentially*.

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[23] The qualifications are there because bare quiddities may have some highly minimal essential features. Maybe monadic properties are essentially monadic, for example. Still, they differ from each other despite having the same nearly empty essences. Locke (2012, Appendix) argues that Lewis's own version of "quidditism" is Locke's "Austere" kind, which is also close to my "basic identity fact" kind.

(c) No scientifically interesting level-1 properties are *super-structural* in the sense that none are fully individuated by their pure structural features.

(d) No scientifically interesting level-1 properties are *super-categorical* ("bare quiddities") due to (b).

For brevity I will call this the "Identity Theory". It is of course vague and somewhat subjective what a "scientifically interesting" property is. Yet surely it will be at least typical for such things to have interesting nomic relations to other properties (which do the same). The intuitive argument against Bare Quidditism seems to generalize widely. The Temperature property 50 C could not play the role of *being a fried egg*; neither could a property like *being an amino acid*. Surely scientific theory reveals *something* about the natures of physical properties; so surely at least the structural relations in the most central and basic laws concerning such properties are at least weakly essential to them. So, the super-categoricalist view would seem to be implausible for just about anything of "scientific interest"[24].

The issues concerning Hawthorne-style arguments against Strong Structuralism are complex, and I do not pretend to have settled them here. I myself find Hawthorne's argument against Strong Structuralism moderately convincing; surely that is at least an allowable attitude at present[25].

So, it seems likely to me that it will be at least commonplace for properties of scientific interest to be the structural-and-categorical ones the Identity Theory describes. I will call that

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[24] Bird 2016 emphasizes that his "powers" ontology is intended to apply only to physically fundamental properties. Nonfundamental properties may well essentially involve relations to their more fundamental realizers, he allows, instead of or in addition to pure dispositional features (Secs. 3 and 4). That seems plausible to me as well. Maybe in a world with different Mass-ish properties, the Temperature-ish properties are thereby different also, even if they have the same pure structural features as Temperature properties have here. So, it seems likely that nonfundamental properties would commonly not be super-structural ones, even if the fundamental ones were (which I doubt).

[25] Bird 2007 responds to "regress" arguments against the view that properties are "powers". The version of the objection that Bird finds most plausible holds that the identities of powers are not adequately "fixed" by their relations to other powers, whose identities are also supposed to be fixed in the same way. Bird responds by holding that it is possible for the total system of nomic relations among properties to be asymmetric. Hawthorne's objection is in effect that it is equally possible for such a system to be symmetric. Surely both are right in their claims about what is possible. It is somewhat difficult to adjudicate this dispute because it is somewhat difficult to see what the modal commitments of the relevant views are.

position the "Weak" Identity Theory: *many* properties of scientific interest are both structural and categorical. I tentatively endorse that view.

C. B. Martin (1993) and John Heil (esp. 2003 Chap. 11) defend the view that properties are both "powers" and "qualities" (which I take to be what I mean in saying a property is both "dispositional" and "categorical"). I hesitate over the explanations that Martin and Heil offer, however. Martin initially suggests that a property is like a "two-sided coin" (1993 184). Heil expands on this idea by suggesting an "Identity Theory":

> If P is an intrinsic property of a concrete object, P is simultaneously dispositional and qualitative; P's dispositionality and qualitativity are not aspects or properties of P; P's dispositionality, P_d, is P's qualitativity, P_q, and each of these *is P*; $P_d = P_q = P$. (Heil 2003 111)

I agree that many properties are "simultaneously dispositional and qualitative". I find Heil's further explanation of that shared idea difficult to understand. The term 'dispositionality' strikes my ear as referring to a level-2 property; 'dispositionality' would seem to name the property that characterizes certain level-1 properties, namely the ones that are dispositional. But Heil also says that P's dispositionality is not a property of P, and is P itself. So, I do not know what he intends. I hope distinguishing level-1 "realizers" and level-2 "roles" explains how our shared "identity" idea is a perfectly sensible position to hold[26].

My first aim in this paper was to defend the middle ground view that many properties are both structural and categorical. More weakly, I have tried to defend that this view is plausible and ought to be taken seriously. It seems unfortunately commonplace in the literature for this position to be ignored. I think Russellian Monism provides an example of a philosophical position that depends for its plausibility upon ignoring the middle ground position. My second aim is to criticize that view.

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[26] Henry Taylor (forthcoming) argues that there is no clear difference between Heil & Martin's identity Theory and Bird's "pure powers" view. Distinguishing level-1 properties and level-2 roles seems to me to make at least one difference reasonably clear. The "pure powers" view holds that Strong Structuralism (or Dispositionalism) is true of some fairly extensive class of properties (maybe all, or maybe only the fundamental ones). My own (Weak) Identity Theory denies that in favor of Moderate or Weak Structuralisms. I am not sure whether Heil would take my suggestion about how to understand the "Identity Theory".

6. What is Russellian Monism?

This section and the next criticize Russellian Monism. This section attempts to figure out what Russellian Monism is in the first place. I suggest that it depends centrally on the assumption that the middle ground properties do not exist.

Here are some initial characterizations of a "broad" version of Russellian Monism.

> The latter theory [Rusellian Monism] says roughly that phenomenal (or protophenomenal) properties serve as categorical grounds of the basic properties that physics describes, which are fundamentally dispositional. (Alter and Howell 277)

> Russellian monism consists of the following two claims: i) that science describes physical entities structurally but does not capture their intrinsic nature, and ii) that the intrinsic nature of physical entities is integral to the explanation of phenomenal consciousness. (Tom McClelland[27])

This broad version of Russellian Monism is offered as novel solution to the mind-body problem that splits the difference between traditional physicalist and dualist approaches. Traditional versions of physicalism hold that mentality arises only from special features and arrangements of matter (such as ones that we have and rocks lack). Broad Russellian Monism is a kind of "panpsychism" that holds that mentality exists everywhere, including at the level of fundamental physical entities.

This broad view faces a threat. For example, it is logically compatible with our evidence that electrons are fairies with rich inner lives who like to spend their time thinking about type theories. Though logically possible, that hypothesis is implausible on abductive grounds. In order for the panpsychist view not to be similarly implausible, there must be some gap in physical theory of the sort hinted at in the formulations above. Physical theory "does not capture... the intrinsic nature of physical entities", McClelland's formulation says. Galen Strawson defends his version of Russellian Monism by offering numerous quotations from Russell and others to the effect that physical theory reveals only "abstract" and "mathematical" features of the physical world, and does not reveal its "intrinsic character" or "intrinsic

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[27] This characterization is offered by Tom McClelland on the "Russellian Monism" page of PhilPapers (http://philpapers.org/browse/russellian-monism, accessed Nov. 2, 2017).

qualities" (Strawson 2008 57-9)[28]. Physics tells us nothing about the intrinsic natures of physical things, Strawson insists. Since that is right, he also insists, it does not tell us that these intrinsic natures are *not* experiential ones (phenomenal or protophenomenal). So, panpsychism remains open for all physical theory says, Strawson thinks. Strawson and others then propose the bold hypothesis that these hidden natures are experiential.

That "broad" sort of Russellian Monism includes panpsychism. What I will call "narrow" Russellian Monism is the metaphysical/epistemic thesis that is supposed to motivate that panpsychist solution and to distinguish it from the view that electrons are fairy mathematicians. Here is how Chalmers characterizes it.

> We can understand Russellian Monism as the conjunction of broad physicalism with the denial of narrow physicalism. On this view, structural properties in physics do not constitute consciousness, but quiddities (perhaps along with structure) constitute consciousness. (Chalmers 2015 261-2)

Physicalism in general says that all facts are necessitated by base-level physical facts, and that all facts supervene on those ones. Recall that Chalmers's "narrowly physical" properties were "role properties" such as "the second-order property of having a property that plays the mass role" (2015 255), while his "broadly physical" properties were those plus the "categorical bases" of structural properties (256), which Chalmers also calls "quiddities". So, Chalmers's characterization of Russellian Monism says that all facts are necessitated by facts about the instantiations of microphysical categorical and structural properties, but not necessitated by microphysical facts involving the structural properties alone.

It is not easy for me to understand this position. I will consider three options. First, the "Identity Theory" I set out for consideration says that all scientifically interesting properties are both structural and categorical. That view threatens to make Chalmers's characterization of Russellian Monism contradictory. Russellian Monism says that not all facts supervene on the microphysical facts about structural properties, but do supervene on those together with

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[28] These claims of Strawsons's are false on the second-order account of "structure" I get from Mundy. Physical theory uses mathematical means to represent the intrinsic physical facts, but tells us quite a bit about those facts anyway. Strawson (and Russell) are apparently assuming some distinct account of "structure", or (I suspect) of what it takes to represent an "intrinsic" feature of something.

microphysical facts about categorical properties. On the Identity Theory, those are the same facts.

Obviously, Chalmers does not accept this Identity Theory; he thinks that the "structural" properties are distinct from the "categorical" "quiddities". Chalmers treats the "structural" properties as super-structural ones. I allow of course that any such properties there might be are distinct from the structural-and-categorical ones. There is an interpretive question about whether Chalmers's "categorical" properties are super-categorical ones, or are merely less-than-super-structural ones. These two answers give rise to two further interpretations of his characterization of Russellian Monism.

For a second option, suppose the "categorical" properties are the less-than-super-structural ones. Then given even the Weak version of the Identity Theory, narrow Russellian Monism becomes fairly uninteresting. The view would say that physicalism is true while the physicalist supervenience base is not exhausted by the super-structural properties postulated by Strong Structuralism. Physicalists standardly do not address issues about whether Strong Structuralism is true of fundamental physical properties. I surmise that most actual physicalists would reject this view if they were to take a stand on it. (Strong Structuralism is a minority view in general.) So, any such person would thereby count as a "Russellian Monist" on the current reading of Chalmers's characterization. So, that view is barely different from physicalism itself. In particular, it lends no support to the panpsychist conclusions of broad Russellian Monism.

For a third option, suppose the "categorical" properties are the super-categorical properties. Then narrow Russellian Monism is implausible given the Weak Identity Theory's nonsuper dispositional-and-categorical properties. By hypothesis, the nonsuper properties do not supervene on the super-dispositional ones; it seems to me that they also would not supervene on the super-categorical ones[29]; so, there is no apparent reason why they should supervene on the two classes taken together.

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[29] For example, the (alleged) super-categorical version of 1 g can "play the role" of *being fried egg*, so the nonsuper 1 g property certainly does not supervene on it. The issue becomes more complicated when one appeals to Lewisian views about lawful modality. Lewis would hold that the lawful relations among super-categorical properties supervene on their total spatiotemporal distribution, and thus that the whole pattern of super-categorical properties determines lawful relations among individual instances of these properties. That whole

None of these three readings make terribly good sense of narrow Russellian Monism. I propose as an interpretive hypothesis that the view rests on the assumption that there are no properties in the middle ground of "nonsuper" ones that I have described. That view is the third option above, plus the assumption that the troublesome nonsuper properties simply do not exist. I cannot prove this interpretive hypothesis (though I will expand on it later). My main evidence for it is that it is the only apparent way to make sense of the view. As far as I am aware, Rusellian Monists do not explicitly express this view themselves; on my understanding it is implicit in their uses of terms such as 'dispositional' and 'categorical'.

When narrow Russellian Monism is understood as including the rejection of "nonsuper" properties, the *prima facie* arguments I suggested against the two "super" views would seem to apply against it. Those arguments are plausible, I think, but they do not directly combat the motivation for Russellian Monism. I will try to further explain the relevant options in a way that does combat this motivation.

7. Against Russellian Monism.

The motivation for Russellian Monism is that physical theory necessarily leaves something hidden from us about the "intrinsic natures" of physical things. That is what makes the panpsychist view allegedly deep metaphysics rather than an implausible speculation. I will attempt to figure out what Russellian Monists think is hidden, and suggest that it does not exist.

Daniel Stoljar (2001) attempts to explain what physical theory leaves hidden.

> [T]here are two different senses in which physical theory might fail to tell us about the categorical properties of physical objects. In the first sense, physical theory fails to tell us about a property just in case no expression of the theory *refers* to that property. (Stoljar 2001 260)

Stojar rejects that: physical terms do (or can) refer to categorical properties. He continues:

> But there is also is a second sense in which physical theory might fail to tell us about categorical grounds. In this sense, physical theory fails to tell us about categorical

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pattern might then determine whether nonsuper 1 g is instantiated in a given location. I do not accept the Lewisian views of lawful modality, however, and I am pretty sure Chalmers does not either (2012 428).

grounds just in case there might be two possible worlds w and w* such that (i) they are exactly alike in terms of their distribution of dispositional properties -- in both w and w*, x has F; but (ii) they are different in terms of their categorical properties -- in w, x has G but in w*, x has a quite distinct categorical property G*; and (iii) they are from the point of view of the theory epistemically indiscernible -- the two worlds are (in Kripke's famous phrase) epistemically and qualitatively identical, though they might nevertheless be semantically different in the sense that in w, an expression of physical theory refers to G while in w* the counterpart expression refers to G*. (260)

This passage is not easy for me to understand. The case Stoljar describes is similar to one in which distinct categorical properties play the same structural roles (in different worlds). I accept that cases like that are possible (with qualifications to be lodged momentarily). But Stoljar proposes this case to illustrate what is *hidden* from physical theory. That remains entirely unexplained as far as I can see.

> *Stoljar's Premise*: It is possible for distinct categorical physical properties to play the same structural roles (in distinct worlds).

> *Conclusion*: So, physical theory does not reveal facts of type F.

What are these F-ish facts and why are they hidden? I will try to figure that out.

Strong Structuralism about physical properties would reject that Stoljar's case is possible. Weaker views can accept similar cases, though they would reject Stoljar's description. He says that the worlds in question are "qualitatively identical" (iii) and yet differ in their "categorical properties" (ii). Given that the categorical properties differ in the worlds, all of the weaker views would say the worlds have different "qualities". Related cases are possible on the weaker views, however. It seems likely that Stoljar uses 'dispositional' to mean what I mean by 'super-dispositional'. The Weak Identity theory (for example) allows that worlds w and w* could be alike with respect to super-dispositional properties while still differing on their categorical-and-dispositional ones[30]. Maybe w contains matter while w* contains anti-matter, for example. I take it that this is the sort of case we should see Stoljar as getting at.

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[30] Such worlds could also differ on their phenomenal facts if the phenomenal properties were among the dispositional-and-categorical ones, as seems plausible to me.

I will use the Weak Identity Theory to illustrate that nothing is hidden in this sort of case (though the point holds for any view). Then I will suggest an interpretive hypothesis about what Russellian Monists think is hidden.

To expand on Stoljar's case, suppose that both worlds w and w* contain both matter and anti-matter, that the nomic roles of matter and anti-matter properties are symmetrical in these worlds, and that the difference between the worlds is that the spatiotemporal distributions of these properties are swapped: wherever w has an electron, w* has an anti-electron, and vice versa. Suppose matter predominates in w while anti-matter is relatively rare; in w* matter is relatively rare. Suppose these worlds contain human-ish creatures too. In w Abbie is a brilliant physicist-cum-philosopher made of matter; in w* Abbie* is a brilliant physicist-cum-philosopher made of anti-matter. Is Abbie unable to refer to electronhood? does she not "know which property" electronhood is? Of course not. Abbie perfectly able to refer to electronhood, and she "knows which property" it is -- it is the one that satisfies numerous theoretical postulates, appears in numerous experiments, and also does mundane observable things such as making her desk support her coffee cup. It is the electron-ish property of her experience. Abbie correctly calls this property 'electronhood'. Abbie* equally knows which property anti-electronhood is -- it is the electron-ish property of her experience. Abbie* correctly calls anti-electronhood 'electronhood'[31].

Note also that Abbie's use of 'electronhood' definitely does *not* refer to the super-structural property of having some-or-other property that plays a pure electron-ish structural role. On that use, both electrons and anti-electrons would equally satisfy 'is an electron'. Abbie is perfectly aware that anti-electrons exist, however; she calls them 'anti-electrons' and accepts 'No electrons are anti-electrons'. Abbie's use of 'electronhood' refers to electronhood, and

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[31] In "Ramseyan Humility" Lewis holds "we are irremediably ignorant about the identities of the fundamental properties" (Lewis 2009 214). I suspect Lewis's motivation for this view also motivates Russellian Monists. Some treat Lewis's argument as similar to an argument for external-world skepticism (Langton 2004, Schaffer 2004). Kelly 2013 offers a deeper interpretation. On this view, Lewis holds that the partly demonstrative sort of reference I described for Abbie is not enough for her to "grasp" propositions involving electronhood (Kelly Sec. 3 esp. 718), while "grasping" a proposition is necessary for knowing it (714). I do not know what "grasping" is, but I reject that conjunction: either partly demonstrative reference allows us to "grasp" the relevant propositions, or "grasping" them is not necessary for knowing them. I say a bit more about this issue below.

Abbie*'s use of 'electronhood' refers to anti-electronhood. These uses pick up their references in part from the environments of their users.

In addition, barring epistemic bad luck, both Abbie and Abbie* are capable of knowing all the physical laws about electronhood and anti-electronhood. That would of course be difficult in practice, but I do not see how the situation described would impose any in-principle barrier to their attaining such knowledge. One might wonder how Abbie could know which structural features of electronhood are essential to it, as opposed to accidental. I do not have a detailed answer to that question to offer, though I see no grounds for thorough-going skepticism either. Surely the essential features of electronhood at least include those that appear in the most basic laws about electronhood. What those laws are is obviously an empirical question[32].

In addition, as part-time philosophers Abbie and Abbie* have occasion to think about quiddities (*not* in the sense of super-categorical properties, but in my sense of properties like *being identical to electronhood*). Abbie can refer to and think about the quiddity of electronhood; she calls it 'the quiddity of electronhood'. Since her term 'electronhood' refers to electronhood, her phrase 'the quiddity of electronhood' refers to the quiddity of electronhood. She "knows which property" that is -- it is the quiddity of that one, the electron-ish property of her experience. Her ability to refer to and think about this quiddity derives from her ability to refer to electronhood in the first place, however, rather than vice versa.

The point of this example is that on the Weak Identity Theory Stoljar's case does not seem to succeed in pointing out any facts that are hidden from us. So, what is supposed to be hidden in the case? I propose as an interpretive hypothesis that Stoljar and Chalmers (and presumably other Russellian Monists) reject my earlier suggested moral that pure essences do not individuate physical properties; they hold that pure essences do individuate the properties. I cannot prove this hypothesis, but it explains numerous otherwise puzzling features of the view. First, this hypothesis explains why Russellian Monists reject the "middle ground" properties that are neither super-dispositional nor super-categorical -- the pure essences of

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[32] One might also wonder about the example: do Abbie and Abbie* have the same phenomenal states? I do not know. In the example, some properties are common to things made of matter and anti-matter, while others differ. Which way phenomenal properties go will depend on what they are in detail.

those properties do not individuate them. Second, this hypothesis explains why they treat some physical properties as super-structural ones, despite rejecting Strong Structuralism. Russellian Monists propose, explicitly and plausibly, that physical theory correctly describes dispositional and structural essences of some physical properties; so, the hypothesis that essences individuate would require that those properties are fully individuated by those structural essences. Unlike Strong Structuralists, however, Russellian Monists hold that these structural roles do not fully determine the identities of some physical properties: "quiddities" and "categorical bases" are also needed. Third, my interpretive hypothesis explains why Russellian Monists reject that these are Lewis's bare quiddities -- bare quiddities have no pure individuating essences either. Fourth, my interpretive hypothesis explains what Russellian Monists' "hidden natures" are supposed to be: they are the pure individuating essences of the quiddities. Fifth, the view that this interpretive hypothesis yields provides at least some motivation for the broad, panpsychist version of Russellian Monism: we have no very good idea what the pure individuating essences of the quiddities might be, so maybe the hypothesis that they are phenomenal (or protophenomenal) is at least a reasonable guess.

In addition, this interpretive hypothesis explains how Stoljar's example is supposed to work as an illustration of what is hidden from physical theory.

> *Background Premise*: Physical theory reveals some essential features of some physical properties; these are structural roles, and only structural roles.

> *Stoljar's Premise*: It is possible for distinct categorical physical properties to play the same (pure) structural roles (in distinct worlds).

> *Conclusion*: So, physical theory does not reveal facts of the sort: X is a pure individuating essence of categorical physical property P.

I hope this is a reasonably accurate reconstruction of Stoljar's intentions. The part about "pure individuating essences" seems crucial to me, though Stoljar does not express it explicitly.

I myself would *accept* both the premises and the conclusion of this reconstructed argument (and that the conclusion follows): physical theory does not reveal pure individuating essences. On the Weak Identity Theory I suggested, such things do not exist. In my example,

there is no pure level-2 property or "essence" or "nature" that makes electronhood distinct from anti-electronhood; that is just a metaphysically basic fact. Since pure individuating essences do not exist in the first place, nothing is left hidden from us by virtue of physical theory's not revealing them. The Weak Identity Theory is not alone in holding this view. Moderate and Weak Structuralisms hold that the identities of physical properties are not fully determined by their essential features, and Lewis's Bare Quidditism agrees: bare quiddities are distinct from each other despite having the same empty (or nearly-empty) essences. So, with the exception of Strong Structuralism, *every* general account of the relations between physical properties and their structural roles accepts the "essences do not individuate" moral. So, every such view can accept that Stoljar's case is possible, and that nothing is hidden in it[33].

The one view that does accept that pure essences individuate physical properties is Strong Structuralism. This view rejects Stoljar's premise: it holds that his case is not possible. It also holds that physical theory reveals the pure individuating essences of physical properties. So, on Strong Structuralism too, nothing is hidden from physical theory.

Russellian Monists reject Strong Structuralism (for some physical properties), but on my interpretive hypothesis they hold on to the philosophical motivation for the view, namely the thought that pure essences must individuate physical properties. Given that the structural features revealed by physical theory do not play this individuating role, Russellian Monists propose that further hidden natures must play it. This view is philosophically incoherent, I think: it rejects a consequence of something it accepts. If one rejects Strong Structuralism on the basis of Hawthorne-style cases, or ones like Stoljar proposed, it is philosophically inevitable that one should accept that the essences of physical properties do not fully determine their identities. That consequence is common ground among Moderate and Weak Structuralisms, as well as Lewis's Bare Quidditism. So, on my interpretive hypothesis, Russellian Monists postulate hidden natures to solve a problem that does not exist given their own premises[34].

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[33] Lewis does claim in "Ramseyan Humility" (2009) that the identities of his bare quiddities are hidden from us. The metaphysical view of Bare Quidditism does not require this claim, however. On the interpretation of Kelly 2013, which I think is right (exegetically though not philosophically), Lewis's "humility" view derives from further views about concepts and reference. Those are optional, and I think should be rejected.

[34] Russellian Monists are also motivated by the idea that their hidden natures might help to solve the mind-body problem. I am skeptical that these could provide any help even if they existed, but cannot go into that issue here.

How exactly one should respond to Russellian Monism depends somewhat on which view of physical properties one accepts, but everyone has a response. Strong Structuralists deny that the Russellian Monists' "quiddities" exist. The other views hold that physical properties are not super-structural ones (commonly at least), but also deny that they have any hidden natures of the sorts that Russellian Monists postulate. I prefer that second response. The best answer, I think, is to deny the Russellian Monists' views both that some physical properties are super-structural and that others have hidden natures. The perceived need for both of these classes of properties derives (if I am right) from the implicit assumption that physical properties must be individuated by their pure essential features. Instead, I suggest, the one class of physical properties that we need is that of middle-ground, nonsuper, structural-and-categorical ones. The "essences" and "natures" of these properties are (or are among) their structural features; those are revealed by physical theory (or can be). The identities of these properties are not fully determined by their natures or essences, but those identities are known perfectly well in a partly demonstrative way[35].

Both of those responses deny the "narrow" thesis of Russellian Monism, that all facts supervene on the structural-plus-quiddistic facts but not on the structural facts alone. The Strong Structuralist view denies that anything fails to supervene on the basic structural facts. The Weak Identity Theory denies the narrow thesis on the reading that treats the "structural" facts as super-structural and the "quiddities" as having at best hidden natures. That is the

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Something must be hidden in the first place, however, in order for it to be available to play this role; so, if nothing is hidden the further issue is moot. Alyssa Ney (2015) also objects to Russellian Monism that nothing is hidden from physical theory. Ney surveys and criticizes reasons one might think something is hidden, and I am happy to accept her criticisms of those. I hope my "interpretive hypothesis" explains more deeply how Stoljar and Chalmers get the idea that something is hidden, and why that motivation is wrong.

[35] I suspect that an even more basic motivation for Russellian Monism derives from rejecting the idea that it is enough for us to know the identities of physical properties in this partly demonstrative way. This is Lewis's view in "Ramseyan Humility" on the interpretation of Kelly 2013. In order to really "grasp" physical properties, on this view, we have to be able to pick out the references of terms such as 'electronhood' across all possible worlds on qualitative grounds alone, without any "indexical reference to the actual world" (Kelly 2013 718). So, to genuinely "grasp" physical properties requires knowledge of pure individuating features of them; and Kelly takes Lewis to hold that "grasping" in this sense is necessary for knowledge (714). It seems likely to me that this is a more basic motivation for Russellian Monism, namely that to "grasp" physical properties we must know pure individuating features of them (Chalmers seems to accept this view for "thick quiddities" at 2012 350; I think one can even read Russell himself this way). I am afraid this view seems clearly wrong to me: knowledge of pure individuating features is not necessary to "know which thing" an *object* is (else I do not "know who" my spouse is), and there is no apparent reason why matters should be different for properties.

response I suggested at the end of the last section; I have tried to spell it out further here by explaining why this view leaves nothing hidden from physical theory.

In addition, if the narrow thesis of Russellian Monism is unjustified, then so is the "broad" panpsychist version. In the absence of hidden natures for physical things, the hypothesis that they have hidden phenomenal natures ought to be rejected on the same grounds as the hypothesis that electrons are fairy mathematicians.

8. Conclusion.

I suggested seeing the dispositional and structural "roles" of properties as second-order (level-2) properties. This approach sees a distinction between "role" and "realizer" properties, but sees no need to recognize distinct first-order (level-1) dispositional role and categorical realizer properties. Instead, in each case we need only a single level-1 property that realizes (has) a given level-2 dispositional role. Common uses of terms such as 'dispositional' and 'categorical' (and 'power' and 'quiddity') do not seem to tell us clearly whether such level-1 properties are dispositional, categorical, both, or neither. I suggested that the "both" answer is best for a nonideal world. That point is merely terminological. The philosophical point is that it is plausible that many (maybe even all) scientifically interesting properties fall in this middle ground, and are neither super-dispositional nor super-categorical.

I applied this approach to criticize Russellian Monism, arguing that the view depends implicitly on rejecting that any properties of interest fall in the middle ground.

More generally, I have tried to suggest that issues about the essential features of properties are analogous to issues about the essential features of objects. I suspect that most philosophers at present would reject both of the extreme views that the identities of objects are fully determined by their properties, and that their identities are entirely independent of their properties. Surely the truth lies between these extremes, commonly at least. Yet it seems unfortunately commonplace for philosophers to ignore the in-between options in the case of properties. That these options are conceptually open is a consequence of treating dispositional and structural roles as second-order properties; given that they are open, it seems nearly unavoidable (to me at least) that they are actually satisfied, often enough.

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