Dispositions and objects' changing properties

Julian Hauser

Abstract

Analyses of dispositions share the following formal structure: *O* has disposition *D* if *O* fulfils modal conditions *C*. This simple structure hides a difficult question: what is the relation between *O* in the *analysandum* and *O* in the *analysans*? Clearly, they must be numerically identical – and just as clearly, this is insufficient. Whether a thirty-year-old is disposed to wake up early is unaffected by their night owl teenage years. What, then, is an appropriate additional constraint? This paper argues that no suitable constraint has so far been advanced and that finding one presents important difficulties. We might think that the objects need to share all intrinsic properties – but that renders dispositions largely useless in explanation and prediction. As most objects change over time, we cannot, for instance, use our knowledge of someone being an early riser to infer that they will get up early tomorrow. We might, in contrast, think that the objects need to share only some of their intrinsic properties. This approach is more promising but requires explaining which properties need to be shared. I develop a constraint according to which the objects need to share the *causal basis* (inspired by Lewis's *reformed conditional analysis*), but ultimately find it wanting. Finally, I argue that the puzzle of the relation between *O* in the *analysandum* and *O* in the *analysans* can help motivate some re-evaluation of how dispositions are affected by objects' dynamic natures.

Keywords: dispositions, property changes, reformed conditional analysis, modal conditions, finks

Wordcount: 7957

Introduction

Although analyses of dispositions come in a variety of hues, they (almost) all share the following structure: object *O* has disposition *D* if *O* fulfils modal condition *C*. I argue that this seemingly simple structure hides a difficult question: what is the relation between the object exemplifying the disposition *D* (*O* in the *analysandum*) and the

object fulfilling conditions *C* (*O* in the *analysans*)? While it's clear that the relevant relation is one of identity, mere numerical identity is – as I'll show – insufficient. We need an additional constraint, and that constraint should be such that only objects that are sufficiently similar to the actual object are relevant to determining its disposition. The question then arises: what constitutes sufficient similarity? As we'll see below, existing accounts fail to discuss this issue explicitly, and the constraints they imply come with serious problems.

> **Sorcerer's apprentice:** Puabi's been an early riser for most of her life. She's asleep now and, if everything were to go as usual, she'd wake up at 7 am. However, a sorcerer zaps her, and her intrinsic properties are changed such that she would sleep in late instead (both today and in the future). However, the sorcerer, having not yet mastered his trade, casts a spell whose effect only lasts for a split second (extinguishing before 7 am).

Is Puabi an early riser during the split second in which the spell is effective? If we answer this question negatively and say that Puabi is a late riser, we seem to be guided by the idea that her disposition changes because her intrinsic properties change (in a relevant way) while she's under the spell's effect. Here, whether an object exemplifies a disposition seems to depend entirely on whether the object, *as it is actually constituted*, fulfils conditions *C*. The constraint on the relation between the objects seems to be defined by numerical identity complemented by the object in the *analysans* exemplifying all and only those intrinsic properties that the object in the *analysandum* actually exemplifies.

Such an approach incurs important costs as it sharply limits the link between dispositions and counterfactual conditionals. None of the conditionals generally thought to be entailed by the exemplification of the disposition of *being a late riser* come out true: Puabi wouldn't, for instance, wake up, were it 7 am (because some of her intrinsic properties will invariably have changed by then). Consequently, there will be a very large range of cases in which the exemplification of a disposition cannot be used to explain past events or predict future events.

To retain something of disposition ascriptions' usefulness, we might want to say that Puabi remains an early riser while under the spell's short-lived effect. According to this view, what determines her dispositions aren't just her actual properties but also (some of) the properties she possibly exemplifies (in particular those that she will exemplify once the spell loses its effect). Allowing for variances in the intrinsic properties of the objects in the *analysandum* and *analysans* is necessary here. What Puabi would do were she not under the spell's influence helps determine whether she's an early riser (even when under the spell's effect). With such an approach, dispositions entail a broader range of counterfactual conditionals. However, we must then explain

how similar the object in the *analysans* must be for it to help determine the dispositions of the object in the *analysandum*.

> **Collapsible mug:** Yauhen's looking for a mug to take along on his camping trips. One mug in particular catches his fancy: it looks like a flat disk, but as a salesperson assures him, it can unfold into a standard full-sized mug. While out on his first camping trip, Yauhen unfolds his mug but promptly and clumsily drops it. It breaks. He is rather upset as he distinctly recalls the salesperson telling him that the mug's sturdy. The mug wouldn't have broken had it been dropped in its collapsed state.

Is Yauhen's upset warranted? I think most of us would say it is. When the mug is advertised as sturdy, we don't just take that to mean that the mug as it is actually constituted (that is, collapsed) wouldn't break if dropped, but that this is so even if the mug's intrinsic properties were changed in certain ways (that is, if it were unfolded). Given that the mug breaks when unfolded, we think the mug is fragile rather than sturdy. The mug's fragility is (partially) determined by merely possible intrinsic states of the object, namely its unfolded state.

When presented with the question regarding the relation between the objects in the *analysandum* and *analysans*, we are facing a difficult choice. On the one hand, we can demand that the object in the *analysans* shares all intrinsic properties with those actually exemplified by the object in the *analysandum*. We then face the problem of a very strictly constrained range of entailed counterfactual conditionals. On the other hand, we can allow for some of the intrinsic properties to diverge between the objects – and incur an obligation to say just how much they may diverge. While this second path is more promising, it is rocky and not well-travelled.

This paper only argues that the literature fails to discuss an important puzzle. I don't provide an account of an appropriate constraint on the relation between the objects in the *analysandum* and *analysans*. What this paper *does* provide is an account with which we may evaluate potential solutions, a study of the reasons why existing approaches fail, and some notes on what we might learn from these failures.

Existing accounts

Many analyses of dispositions have been proposed over the years, but none explicitly discusses the question of the appropriate constraint between the objects in the *analysandum* and *analysans*. When we dig a little deeper and look at the constraints that might be *implied*, we uncover, as we'll see shortly, two general views: either the objects need to share all intrinsic properties or they need to share some of their intrinsic properties.

While the classical *simple conditional analysis* (SCA) (Goodman, 1983; Quine, 2013; Ryle, 2009) isn't espoused by many today, it's relatively simple and makes for a good

starting point. According to the SCA, an object exemplifies a disposition just when certain counterfactual conditionals come out true.

SCA: *O* is disposed to *M* when *S* iff *O* would *M* if *S* were the case.[1]

According to the SCA, an object (*O*) is disposed to exhibit a characteristic manifestation (*M*) when exposed to a characteristic stimulus (*S*) if and only if it would exhibit a characteristic manifestation were it exposed to such a stimulus. Thus, a mug is fragile if it would break were it struck (with sufficient force).

What I want to highlight is the general structure of this analysis. As mentioned before, the *analysandum* – '*O* is disposed to *M* when *S*' – and the *analysans* – '*O* would *M* if it were the case that *S*' – both refer to an object. In fact, they (obviously) refer to the same object. Thus, the relation that obtains between the objects in the *analysandum* and the *analysans* is one of identity. In the following, I focus on two questions regarding this relation: Can we say more about the *kind* of identity at play here? And does the SCA justify the appropriateness of the relevant identity relation?

The objects in the *analysans* and the *analysandum* must be *numerically* identical. Quite obviously, if counterfactual conditionals determine a mug's dispositions, it must be counterfactual conditionals involving *this very same* mug. Conditionals sporting other mugs (even qualitatively identical ones) do not determine *this* mug's dispositions. Likewise, if Yauhen continues sleeping after his alarm rings at 7 am, this has no bearing on whether Puabi is an early riser.

However, an object isn't relevant to determining another's dispositions just because it is numerically identical with it. Puabi the teenage slacker is numerically identical with Puabi the workaholic thirty-year-old even though the former likes to sleep in and the latter wakes up early. When figuring out whether Puabi is an early riser, we look at what *today's* Puabi would do were she exposed to a characteristic stimulus. Similarly with mugs: I enlist the help of my friendly neighbourhood sorcerer who changes my mug's properties so that it would no longer break when dropped, smashed, thrown, and so on. My mug's dispositions aren't determined by how it would have behaved before its transformation.

Unfortunately, proponents of the SCA say very little about the additional constraints on the relation between the objects in the *analysans* and *analysandum*. In fact, they do not in general say anything about the intrinsic state of the object *O* that would manifest *D* if *S* were to obtain.

We can find a little more when we look at the examples with which the SCA is motivated. These indicate that we should allow for at least some change in intrinsic properties. Ryle (2009), for instance, writes:

> 'My being an habitual smoker does not entail that I am at this or that moment smoking; it is my permanent proneness to smoke when I am

[1] This formulation of SCA is adapted from Choi and Fara (2018).

not eating, sleeping, lecturing or attending funerals, and have not quite recently been smoking.' (p. 31)

Ryle implies that past and future versions of an object help determine whether the object has a certain disposition in the present. Given that objects' intrinsic properties typically change over time, this entails that merely possible versions of the object – with possibly different intrinsic properties – may help determine an object's actual dispositions. What is missing, however, is an explicit discussion of the criteria that determine the relevant range of intrinsic make-ups.

The SCA isn't the only account of dispositions that fails to specify the kind of identity relation that obtains between the objects in the *analysandum* and *analysans*. Here, for instance, is Lewis' *reformed conditional analysis* (RCA):

RCA: *O* is disposed to *M* when *S* iff *O* has an intrinsic property *B* such that, if it were the case that *S*, and if *O* were to retain *B* for a sufficient time, then *S* and *B* would jointly cause *O* to *M*.[2]

Lewis complements the SCA with the criterion that some of the object's intrinsic properties (*B*) remain unchanged for some time after a characteristic stimulus occurs. Thus, Lewis may seem to demand that the object in the *analysans* share those intrinsic properties with the actual object, which, in conjunction with a characteristic stimulus, cause the manifestation of the disposition (that is, the objects should share the disposition's *causal basis*).

However, a closer look at the RCA reveals that Lewis's account is also compatible with a constraint that demands that more properties than just *B* are shared. After all, the RCA posits that *B* should be retained for some sufficient period after the occurrence of *S*, which is compatible with a view on which more than just *B* is shared when *S* occurs. Thus, Lewis could, for instance, also have had in mind a constraint according to which *all* intrinsic properties are shared between the objects in the *analysandum* and *analysans*. Just like the SCA, the RCA turns out to be ambiguous regarding the relevant relation.

Another account that doesn't stray far from the SCA is Mumford's (2003), which focuses on ideal conditions. He argues that an object exemplifies a given disposition when it exhibits a characteristic manifestation in *ideal* conditions:

MUM: *O* is disposed to *M* when *S* iff in ideal conditions, *O* would *M* if it were the case that *S*.[3]

[2] This simplified version of Lewis's account is adapted from Choi and Fara (2018).

[3] This formulation is adapted from Mumford (2003), who writes that when ascribing a disposition, the following conditional is invoked: 'if C_i, then (if Fx, then Gx)' (p. 88; C_i are ideal conditions, F is the stimulus, and G is the characteristic manifestation).

Where the RCA requires retention of a certain intrinsic property *B* for a sufficient amount of time, MUM posits that the relevant situation must constitute ideal conditions. By ideal conditions, Mumford seems to understand properties *extrinsic* to the object in question. This means that MUM is an account that doesn't say anything explicit about the relation between the objects in the *analysans* and *analysandum*. The account's only constraint concerns the features of objects *other than* the one whose disposition is analysed. It's the *situation* in which the object finds itself that must constitute ideal conditions.[4]

Manley and Wasserman (2007, 2008) dispose of the idea that there's a specific case – the stimulus condition – in which the object would need to exhibit the required behaviour. Instead, they propose to speak of sets of these:

M&W: *O* is disposed to *M* when *S* iff *O* would *M* in some suitable proportion of *S*-cases.[5]

M&W doesn't address the question of the appropriate constraint on the relation between the objects in the *analysandum* and *analysans*. The issue is that S-cases – also called stimulus condition cases – are specifications of only the properties extrinsic to the object. Thus, M&W is similar to MUM insofar as it only provides constraints on the situation in which the object is exposed to a characteristic stimulus (and not the object's intrinsic properties).

Finally, I want to take a quick look at an account proposed by Vetter (2014), where we can find an admirably explicit – even if underdeveloped – proposal for a relevant constraint. In her view, dispositions should be analysed in terms of *possibilia*. Thus, roughly speaking, a mug is fragile if it *can* break.

VET: *O* is disposed to *M* iff *O* can *M*.[6]

Vetter then provides a treatment in terms of possible worlds and argues that:

> 'into the conditions for a world to count as relevant we build, among other things, the condition that the intrinsic constitution of the [object] itself, or even only parts of that intrinsic constitution (the disposition's physical base), is held fixed.' (Vetter, 2014, p. 136)

[4] Choi (2008) defends an account that is structurally similar to Mumford's, but replaces the concept of *ideal conditions* with *ordinary conditions*. Choi is explicit about ordinary conditions being extrinsic properties of the object and thus the same considerations apply as in MUM.

[5] The above formulation is slightly changed from the original to bring it in line with how I have presented the other accounts. Manley and Wasserman (2008) phrase it as follows: '*N* is disposed to *M* when *C* if and only if *N* would *M* in some suitable proportion of *C*-cases' (p. 76).

[6] Vetter characterises the modal nature of dispositions by '*x* can *M*' (2014, p. 135).

We thus find two general types of view regarding the constraint that needs to complement the requirement of numerical identity. A first type of constraint posits that the objects in the *analysandum* and *analysans* share all intrinsic properties. A second type of constraint is weaker and only demands that the objects must not diverge *too much* with regard to their intrinsic properties. Here, we must specify what 'too much' is, and the one option we have encountered argues that a change is too much when it affects the disposition's causal basis.

Sketching an alternative account of dispositions

As we've seen, standard analyses of dispositions fail to explicitly treat the problem I want to discuss. In fact, the accounts I have discussed do not, for the most part, even acknowledge the existence of a problem. While I've managed to tease out two types of constraint, we lack a theoretical framework with which to evaluate them.

To remedy this, I sketch an alternative account that distinguishes between two conceptual steps in the analysis of dispositions. The first consists in answering the question of what it is that, say, fragile things do. Here, we want an account of what kinds of object in what kinds of intrinsic states and (extrinsic) situations are poised to break, shatter, and be smashed to smithereens and what these objects do when they do break, shatter, or are smashed to smithereens. In the second step, we turn our attention to a particular object. What determines whether *this mug here* is fragile? Answering this question requires constraining the set of all object-situation pairs arrived at in the first step to those that are relevant to determining *this* mug's fragility.[7]

The first stage begins with *worlds poised for disposition-characteristic state transitions* (which I often simply call *relevantly poised worlds*). For every disposition, there exists a set of centred possible worlds for which it is true that if they evolved in a certain way, the state transition of the object at the centre would be characteristic of the disposition in question. For example, for the disposition of *fragility*, the relevant set includes possible worlds centred on a mug which has just slipped from my fingers, a window about to be struck by a wayward stone, a clay pot that has just been toppled over by a clumsy cat, and so forth.

Among the worlds included in a set of relevantly poised worlds, some will transition in a disposition-characteristic way and some will not. In one world, the mug will come to rest on the floor unscathed and in another, it will shatter. In one world, the window will burst into pieces and in another, the stone will bounce off harmlessly. The set of those worlds in which the state transition is characteristic of the disposition captures how any object whatsoever could manifest the disposition. This gives us an account of the state transitions that are characteristic of a disposition.

[7] Note that these steps are *not* related to Lewis's two-step approach to the analysis of dispositions (Lewis, 1997).

State transitions *characteristic of* a disposition do not necessarily *manifest* that disposition. For an object to manifest a disposition, it needs to exemplify it. And exemplification of a disposition implies that certain modal conditions obtain. Just because a mug breaks (that is, undergoes a disposition-characteristic transition), it needn't manifest fragility.

In the second step, we need to give an account of when *a particular object* has some given disposition. It should be clear that given only information about the set of relevantly poised possible worlds, it's impossible to infer whether some particular object has a given disposition. Relevantly poised possible worlds may tell us about objects that are in situations in which they could manifest a disposition-characteristic state transition, but, as mentioned earlier, that in itself doesn't tell us whether such transitions manifest the disposition.

For some object to exemplify a disposition, the object needs to transition in a disposition-characteristic way in *a subset of* the relevantly poised worlds (for a similar approach, see Manley and Wasserman (2007)). This means we need to winnow down the set of relevantly poised possible worlds to arrive at those that determine a particular object's dispositions. The resulting set contains the possible worlds *pertinent to a case*.

Manley and Wasserman posit that an object manifests a disposition if it undergoes a characteristic manifestation in a sufficiently large proportion of all stimulus-cases (or *S*-cases). These *S*-cases 'are to be understood [...] roughly as *centred* worlds, with the relevant object at the centre being subjected to some specific stimulus conditions' (Manley & Wasserman, 2007, p. 72, emphasis in original). For instance, we might say that a mug is fragile if it shatters in a majority of *S*-cases. According to this account, the main task remaining at this stage is determining the appropriate proportion. To illustrate, note how we might want the proportion of *S*-cases that exemplify disposition-characteristic state transitions to be higher for something to be fragile rather than merely breakable.

However – and here we're getting to the crux of the matter – there's a second task awaiting those trying to determine the relevantly poised worlds pertinent to a case: we need to limit the set of worlds to those which are centred on the right objects. Quite obviously, those worlds in which Yauhen's mug doesn't exist shouldn't have any bearing on whether it is fragile. This is an application of the requirement, discussed in the previous section, that the object in the *analysans* needs to be numerically identical to the one in the *analysandum*.

However, as we've seen previously, such a constraint isn't sufficient, and the question arises whether and to what extent we should allow, among the possible worlds pertinent to a case, worlds centred on objects with intrinsic properties that are (somewhat) different from those of the actual object. For the mug to be fragile, does it matter whether it'd shatter in the possible world where it is unfolded? Where one of its constituting atoms has moved ever so slightly? Where a magician has turned it into

metal?

As we've seen when discussing previous approaches, explicit answers to these questions are largely absent. I have, however, managed to identify two overall kinds of constraint: absolute qualitative identity in intrinsic properties (relevantly poised worlds pertinent to a case include only those centred on objects with the same intrinsic properties) and partial qualitative identity in intrinsic properties (relevantly poised possible worlds pertinent to a case may be centred on objects with somewhat different intrinsic properties). It's to evaluating these options that I now turn.

Absolute qualitative identity in intrinsic properties

We might think that an object exemplifies a disposition just in case some possible object (or objects), all of whose intrinsic properties are shared with the actual object, fulfils certain conditions. A mug is fragile if it were to break in (a sufficient subset of) those relevantly poised possible worlds in which it's constituted exactly as it is in actuality.

Absolute qualitative identity (AQI): A possible object O_{pos} in a relevantly poised possible world W_{pos} is pertinent (that is, helps determine the disposition D an actual object O_{act} exemplifies at W_{act}) iff all of the following conditions are fulfilled:

(a) O_{pos} is numerically identical with (or a counterpart of)[8] O_{act};
(b) O_{pos} exemplifies (at its world) all and only the intrinsic properties that O_{act} exemplifies at W_{act}.

Two things to note about this presentation of the view: First, my focus in this section is on (b). Second, what I mean by *qualitative identity* is somewhat different from its usual meaning. In the literature, it is generally posited that '[n]umerical identity requires absolute, or total, qualitative identity' (Noonan & Curtis, 2018). This means that Puabi the thirty-year-old and Puabi the teenager exemplify the same properties. Puabi exemplifies the property of *being a late riser at fifteen years* and *being an early riser at thirty*, and she exemplifies these properties independently of her actual age. What matters for my purposes is different: when I speak of qualitative identity, I mean that the properties *actually* exemplified by O_{act} are also exemplified by O_{pos} at W_{pos}.

If AQI is on the right track, then many of the dispositions we seemingly ascribe to objects turn out not to be ascriptions of dispositions after all (or, at least, they aren't the disposition ascriptions we generally take them to be). Consider, for instance, the mug

[8] A debate in metaphysics revolves around the question of whether an object can be numerically identical with an object in another possible world or whether such objects are (non-identical) counterparts (for an overview, see Mackie & Jago (2023)). Either position will do fine here.

that wouldn't break if dropped while collapsed, but would break if unfolded. I take it that we'd side with Yauhen in his disapproval of it being advertised as sturdy (even if it's sold in its collapsed state). According to AQI, our upset would be unwarranted: after all, if we hold the mug's actual intrinsic properties fixed in the relevantly poised worlds, it really won't break if dropped. What the mug would do were it unfolded cannot have a bearing on the matter as such a mug exemplifies different properties. According to the AQI, the mug is sturdy (and, in fact, it is just as sturdy as a mug that doesn't break if unfolded).

Similar considerations apply to the dispositions exemplified by persons. Puabi, according to AQI, stops being a morning person for the split second during which she is under the spell's effect. The fact that she has been waking up early for many years, and will be waking up early for many years, has no bearing on the disposition she exemplifies. This, I think, is in tension with the intuition that such personal-level dispositions should be relatively stable.

Now, to rely on intuitions in such a manner is risky business, as others might see much less pull in the cases I've presented. For this reason, I change tack here to argue for the following claim: if we hold that dispositions need to abide by AQI, then we endanger the explanatory and descriptive roles dispositions are usually taken to fulfil.

Mumford, echoing a controversial but common idea, writes that '[d]ispositions are posited as explanations of past events and grounds for the prediction of future events' (Mumford, 2003, p. 11). We use our knowledge of dispositions to explain why things have happened – *the mug broke because it's fragile* – and to predict what will happen in the future – *Puabi will get up early in the morning because she's an early riser*. However, if AQI obtains, then dispositions (in most cases) cannot be used to explain and predict in this manner. After all, almost all objects' intrinsic properties will change in some minute fashion as time passes. According to AQI, when an object exemplifies a disposition, this only entails that it fulfils certain conditions given its current intrinsic make-up. Therefore, exemplification of a disposition doesn't, as such, entail anything about how the object would behave were it constituted differently.

We might think that dispositions' explanatory and predictive roles can be safeguarded by positing that everyday disposition ascriptions (e.g. 'This mug is fragile') come with a tacit second-order disposition to retain said disposition (e.g. 'This mug is disposed to retain its fragility'). On this view, it turns out that the properties we thought were individual dispositions are in fact conglomerates of two dispositions.

However, this approach runs into trouble just a little further down the road. After all, the second disposition (that is, the disposition to retain the disposition) would need to also be retained across changes in intrinsic properties – otherwise, it couldn't explain why a slightly different object would retain the disposition in question. And postulating yet another disposition to retain *that* disposition is only the next step in an infinite regress.

Alternatively, we might think that the properties ascribed in *Collapsible mug* and

Sorcerer's apprentice are sets consisting of (a) a range of possible intrinsic make-ups and (b) a disposition. Thus, when we say that Puabi is an early riser, we really mean that for a range of possible intrinsic make-ups, Puabi is an early riser. Explaining and predicting events involving Puabi with changed properties (for instance, with a new haircut or tattoo) is possible because, when we ascribe the (pseudo-dispositional) property of being an early riser to her, we ascribe a (real) disposition to a range of possible versions of Puabi.

Of course, a new question then arises: what is an appropriate constraint on the range of possible objects such that when an actual object exemplifies a pseudo-disposition, these possible objects exemplify the relevant (real) disposition. What appears here, outsourced as a problem concerning pseudo-dispositions, is the need for an account of sufficient *partial* qualitative identity. I don't think anything of value is gained by the detour, and I propose instead to develop an account of partial qualitative identity for dispositions.

Partial qualitative identity in intrinsic properties

If we want to allow everyday disposition ascriptions to refer to genuine dispositions and if we want to safeguard the use of disposition concepts in explanation and prediction, then we need a constraint that isn't based on absolute qualitative identity in intrinsic properties – but rather on partial qualitative identity.

Partial qualitative identity (PQI): A possible object O_{pos} in a relevantly poised possible world W_{pos} is pertinent (that is, helps determine the disposition D an actual object O_{act} exemplifies at W_{act}) iff all of the following conditions are fulfilled:

(a) O_{pos} is numerically identical with (or a counterpart of) O_{act};
(b) O_{pos} exemplifies (at its world) some adequate subset of the intrinsic properties that O_{act} exemplifies at W_{act}.

When is an adequate range of intrinsic properties shared? If we say that Puabi is an early riser, then we're obviously not talking about what she would do were she fifteen years old or had she suffered brain damage in a horrific car accident. But we do want to say something about what she would do tomorrow or the day after (even if she were to get a new haircut or tattoo). Likewise, when we say that a mug is fragile, we do not mean to imply that, were it somehow transformed into steel, it would still tend to shatter if dropped. However, we might be saying something about how it would behave after writing our name on it.

As so often, the challenge consists in making this precise. We have seen one suggestion to this effect in a possible interpretation of Lewis' (1997) reformed conditional analysis (RCA), which inspired (but doesn't entail) what I call *the Lewis-style*

constraint: all and only those relevantly poised possible worlds are pertinent to a case which are such that the disposition's causal basis is exemplified by O_{pos} at W_{pos} and by O_{act} at W_{act}.

Note how such a constraint bolsters the range of counterfactual conditionals entailed by the exemplification of a disposition: If my mug is fragile, it would shatter when dropped even if some of its atoms were to move ever so slightly (as long as these changes don't affect the causal basis). However, if a magician turns my mug into metal, then its having been fragile in the past doesn't entail that it's fragile now (as the causal basis hasn't been retained).

The difficulties for the Lewis-style constraint lie elsewhere. The RCA's insistence on holding the causal basis fixed for some short period of time after the object is exposed to a characteristic stimulus is meant to account for finkish dispositions (more on these in a moment). Whether it does so adequately doesn't concern us here. However, what *does* concern us is that the Lewis-style constraint ends up treating cases such as *Sorcerer's apprentice* and *Collapsible mug* as analogous to finks. This is, as I will argue, a mistake.

Finkish dispositions are such that the object in question acquires or loses a disposition in exactly those situations which constitute characteristic stimulus conditions. Think, for instance, of a glass mug that is protected by a sorcerer who magically renders it unbreakable whenever it is about to shatter. According to the simple conditional analysis (SCA), such a mug isn't fragile as it wouldn't break were it struck, dropped, and so forth. However, most authors insist that it *is* fragile, and the RCA is meant to provide an analysis that is in line with these intuitions. By adding the condition that objects retain their causal basis for some time after a characteristic stimulus obtains, Lewis ensures that finks cannot change the relevant causal bases in the counterfactual states of affair. The mug breaks if it were dropped as the sorcerer cannot render the mug unbreakable. And thus we may conclude that the mug is fragile after all.

Preventing finks from unduly affecting counterfactual conditionals is importantly similar to excluding from the possible worlds pertinent to a case those where the object has become too dissimilar. In both instances, we aim to exclude from the range of possible worlds those in which the object has changed in ways that affect the relevant disposition. And by retaining the causal basis – which by definition entails retention of the relevant disposition – we may hope to exclude finks *and* obtain a constraint suitable for our purposes.

Unfortunately, these hopes turn out to be short-lived. Let's begin by looking at how the Lewis-style constraint deals with *Sorcerer's apprentice*. Here, we first need to disambiguate the case: as I have presented it so far, I have been equivocal between an intrinsic and extrinsic interpretation, and for the Lewis-style constraint, this difference matters. On the one hand, when the apprentice attempts to turn Puabi into a late riser, this spell might have the side-effect of changing her intrinsic properties

such that the spell's main effect is soon undone. Here, a property intrinsic to Puabi is responsible for the spell's premature demise. On the other hand, the spell may instantiate, in addition to the main intrinsic change, an aura of interference magic that undoes the main effect after a certain amount of time. Here, an extrinsic property – the aura – causes the spell to fizzle out.

If we go with the extrinsic interpretation, then the Lewis-style constraint – telling us to constrain the relevantly poised possible worlds to those in which the mug exemplifies the causal basis for being a late riser – entails a range of pertinent worlds that includes worlds with and without interference magic auras. Assuming that there are more worlds where the aura is absent than where it is present, Puabi will fail to get up early in most of the relevantly poised possible worlds pertinent to her case. Puabi is thus a late riser.

The intrinsic case is less clear-cut. First, we might, just as in the extrinsic case, constrain the range of possible worlds to those in which Puabi exemplifies the causal basis for being a late riser. To the extent that extrinsic and intrinsic spell-countering properties are absent in most of these worlds, we conclude that Puabi is a late riser. So far, so good. Unfortunately, we could also – and just as justifiably – consider a causal basis that includes the counter-spell property. If we take this to be the relevant causal basis, then in all relevantly poised possible worlds pertinent to her case, Puabi does get up early (because the counter-spell property undoes the spell's main effect). Puabi is, we conclude, an early riser.

Taking these two results together, we are driven to the conclusion that Puabi is an early riser *and* a late riser, which is in line with what Lewis (1997) concluded when he applied the RCA to finks (see also Choi, 2019). What we see now is that the possibility of an object exemplifying opposite dispositions (at a single moment in time) isn't unique to the RCA and also arises when we analyse dispositions with the help of the Lewis-style constraint. This in itself might be reason enough for some to be suspicious of such a constraint – but I'll leave this to the side here.[9]

It's no surprise that the Lewis-style constraint comes to the same conclusions in *Sorcerer's apprentice* as in the case of finkish dispositions. Finkish dispositions are such that the causal basis for a disposition is changed into its opposite in stimulus conditions. In cases such as *Sorcerer's apprentice*, a causal basis is turned into its opposite no matter whether the object is exposed to a characteristic stimulus or not. Thus, the property changes entailed by *Sorcerer's apprentice* necessarily include, as a subset, property changes in the relevant stimulus conditions. Thus, in stimulus conditions – which are what determine whether an object exemplifies a disposition – both kinds of case operate in the same way; and in both cases, the Lewis-style constraint will come to the same conclusion regarding disposition exemplification.

[9] In addition, some authors (Choi (2012), Handfield (2008), Handfield & Bird (2008)) argue that intrinsic dispositions are impossible. If that is the case, this constitutes another reason to object to the Lewis-style constraint.

An analysis of dispositions mustn't treat cases such as *Sorcerer's apprentice* in the same way as finkish dispositions. Consider the following spin on the case: instead of losing effect after a split second, the spell's effect only becomes undone after ten minutes. For additional clarity of exposition, let's consider the disposition to wake up at 7 am (recall, Puabi tends to wake up at 7 am, which means she's disposed to wake up at that time). Now, what are the relevantly poised possible worlds in this case? Intuitively, they are the possible worlds centred on someone asleep as the clock is about to strike seven. According to the Lewis-style constraint, the worlds pertinent to the present case are those that are (a) centred on Puabi and (b) where Puabi exemplifies the same causal basis as in actuality. In this case, there exists no intrinsic property that could function as a causal basis for being disposed to wake up at 7 am. Even the spell-countering property cannot fulfil this function; it would be too slow to take effect, leading to 7 am already having passed once Puabi wakes up. Therefore, Puabi isn't disposed to wake up at 7 am in this case.

The Lewis-style constraint entails that Puabi is disposed to wake up at 7 am when the spell's effect lasts for a split second but not when it lasts for ten minutes. What I want to focus on here isn't so much that this reversal is unexpected (which I think it is), but rather that the reversal is due to reasons of the wrong kind.

The reversal is entirely due to the fact that the time it takes for the causal basis to be changed becomes longer than the time between the onset of the characteristic stimulus and the moment in which the causal basis causes the object to manifest the disposition. This difference in duration isn't the kind of feature that should impact whether an object exemplifies a disposition. In the case of finks, it's reasonable that the fink – being triggered by a characteristic stimulus – needs to have sufficient time to cause changes in the intrinsic properties. Otherwise, the fink couldn't change the relevant properties in time for them to affect the manifestation of the disposition. But in the cases I've introduced, the relevant change in intrinsic properties isn't caused by the characteristic stimulus: in *Sorcerer's apprentice*, the causal chain that will issue in the spell's undoing has already been started and is thus pegged, as it were, to actuality rather than merely possible situations. This is why, I submit, it's arbitrary that the time between the onset of the stimulus and the eventual manifestation of the disposition should be the deciding factor. And this is also why I think it's a mistake to deal with my cases as we deal with finks.

When we look at *Collapsible mug*, we see that the above problem isn't the only one facing the Lewis-style constraint. Applying the constraint to this case is straightforward: the mug, in its current collapsed state, doesn't exemplify an intrinsic property that is a causal basis for fragility (neither a standard one nor one that works by changing the mug's intrinsic properties when exposed to the relevant stimulus). Therefore, there isn't a property that we can hold fixed across possible worlds and that entails that the mug won't break in them. We conclude that the mug is sturdy. The case is in effect analogous to the extrinsic version of *Sorcerer's apprentice*. Just as we were led

to judge Puabi to be a late riser (because she doesn't exemplify an intrinsic property that would undo the causal basis for getting up late), we judge the mug to be sturdy (because it doesn't exemplify an intrinsic property that would undo the causal basis for being sturdy).

Again, I think the Lewis-style constraint treats cases analogously that differ in relevant regards. In this instance, it glosses over important differences between *Sorcerer's apprentice* and *Collapsible mug*. Notice how the relevant change in intrinsic properties in *Sorcerer's apprentice* is a one-off, whereas in *Collapsible mug*, it's a regular occurrence. It is this difference that may be behind my intuition that it's wrong to label a mug sturdy just because it wouldn't break in its collapsed state (if it'd break when dropped while unfolded). With Puabi, things are different: she only spends a very short period of time in the highly atypical state of being under the spell's effect, and therefore this should count less towards her dispositions.

This difference is brought out more clearly if we compare two cases of the same kind. Imagine a sorcerer casting a spell that changes Fadime's intrinsic properties such that she would no longer wake up were it early in the morning. This sorcerer has mastered her craft and the spell doesn't undo itself; in fact, it even comes with a fail-safe such that its power is restored every night, should it have become undone in some fashion. However, Fadime has strong intrinsic anti-magical abilities that undo all magic after a short while.

Now, compare Fadime and Puabi. According to the Lewis-style constraint, they are both disposed to rise early *and* late (in the fashion discussed above). The disposition to rise early – which is the one that reveals a disanalogy – depends on constraining the relevantly poised possible worlds to those where Fadime and Puabi's respective spell-undoing properties are exemplified. When we hold Puabi's spell-undoing property fixed in relevantly poised possible worlds, it will cause her intrinsic properties to change such that she wakes up early. When we hold Fadime's spell-undoing property fixed, the same happens.

Note that Puabi's spell-undoing property works just as well as Fadime's, even though it can only be triggered once. As we hold the property fixed, it will in effect always be the first time the spell-undoing property is activated. As the effects of Fadime's and Puabi's spell-undoing properties only diverge *after* the first triggering, there are no relevant differences across pertinent possible worlds. This is problematic: Fadime wakes up early much more reliably, and that should count for something.

Overall, the Lewis-style constraint on the relevantly poised worlds thus faces several important difficulties that stem from dealing with my cases as if they were cases of finkish dispositions. I conclude that we need another constraint. While providing such a constraint isn't the topic of this paper, I do want to dedicate the remaining few paragraphs to the instructive lessons we can draw from how the Lewis-style constraint fails.

The Lewis-style constraint gets an important thing right: when we attribute dis-

positions to objects, we aren't only saying something about the object as it is actually constituted. Rather, we are referring to the object as it is relevant in our everyday life where properties change from moment to moment.

What is missing from the constraint, however, is an appreciation of the fact that some property changes are typical of an object whereas others are highly unusual. Puabi may remain an early riser while under a short-lived spell as this state is highly atypical, and Yauhen's mug was (somewhat) fragile even when he first encountered it in its collapsed state (as it will typically be unfolded).[10]

The connection between dispositions and conditionals has been a recurring (if controversial) feature in the literature on dispositions, and I believe that taking this idea seriously means recognising the temporal situatedness of the relevant counterfactual states of affair. A disposition is about – or at least entails – what an object would do in certain situations, and these situations may be at some temporal remove from the present. If Puabi – deep asleep in her bed – is an early riser, then she would wake up were a couple of hours to pass and the clock to strike seven. Between now and the clock striking seven certain events will occur, and these may change Puabi's intrinsic properties.

An alternative analysis of dispositions should see such typical changes as relevant to the exemplification of dispositions. We might, for instance, start our analysis by considering the kinds of intrinsic changes that an object typically undergoes on its trajectory to the relevant stimulus conditions. While on her trajectory from being under the spell's effect in the middle of the night to the next morning at 7 am, Puabi will typically undo that spell's effect. And thus, when the clock strikes, she would wake up. The mug, on its way to the various situations in which it may be dropped, smacked, and so forth, will typically find itself unfolded (but, just as typically, will remain collapsed). Thus, for it, both kinds of intrinsic states matter when determining whether it's currently fragile.

Much – and that is an understatement! – remains to be said to show that such an approach is viable. It is, for instance, unclear whether there is a threshold of typicality that needs to be reached for a relevantly poised possible world to count as pertinent or whether we weigh relevantly poised worlds differentially depending on their degree of typicality. The very notion of typicality needs working out, too: what is the relevant type? What is the appropriate level of abstraction? We might also – if we are convinced that dispositions are intrinsic properties – think that only typical changes caused by an object's intrinsic properties should have an impact on the relevantly poised worlds deemed pertinent to a case. Finally, it may be the case that certain dispositions do require absolute qualitative identity whereas others do not, and we'd need an account of when either is the case.

[10] Note that such an approach requires going beyond PQI. PQI doesn't say anything about the properties O_{act} and O_{pos} do *not* share and therefore cannot be used to require that these diverge only in typical ways.

If such an account proves workable, it could introduce a second dimension along which dispositions can be graded. The first dimension of gradedness is well-known: a mug may be more or less fragile depending on whether it is likely to break in a more or less constrained range of (extrinsic) circumstances (see, for instance, Manley & Wasserman, 2007). The second, novel, dimension is different: an object could exemplify a given disposition more or less strongly depending on whether it would undergo the relevant state transition across a more or less constrained range of intrinsic changes. Yauhen has all reason to prefer a mug that is *sturdier* than his, one that wouldn't break if dropped no matter whether it is collapsed or unfolded.

Conclusion

To analyse dispositions, we need an appropriate constraint on the relation between the (numerically) identical objects in the *analysandum* and *analysans*. A constraint based on absolute qualitative identity in intrinsic properties struggles to explain how we use dispositions in explanations and predictions. The alternative, a constraint based on partial qualitative identity, can help preserve this – but it necessitates an account of precisely when such partial identity is adequate.

While the Lewis-style constraint (which requires that the objects share those properties that constitute the disposition's causal basis) seemed initially promising, it failed – or so I argued – to appropriately deal with cases such as *Sorcerer's apprentice* and *Collapsible mug*. I argued that we at least sometimes attribute dispositions to say something about what an object would do across a range of its typical intrinsic make-ups – and these do not always preserve causal bases.

Some philosophers – especially those whose intuitions differ from mine – will resist the conclusion. They will hopefully walk away from this paper with a better appreciation of the subtleties involved in finding an appropriate constraint and a settled conviction that the Lewis-style constraint provides what we need. A more adventurous philosopher – who feels the pull of my cases – might go further and take the discussion to indicate that we need to re-evaluate some of our deeply rooted assumptions around dispositions.

Bibliography

Choi, Sungho. (2008). Dispositional properties and counterfactual conditionals. *Mind*, *117*, 795–841. http://dx.doi.org/10.1093/mind/fzn054

Choi, Sungho. (2012). Intrinsic finks and dispositional/categorical distinction. *Noûs*, *46*, 289–325. http://dx.doi.org/10.1111/j.1468-0068.2010.00789.x

Choi, Sungho. (2019). Reverse-cycle intrinsic finks. *Dialectica*, *73*, 429–455. http://dx.doi.org/10.1111/1746-8361.12278

Choi, Sungho, & Fara, Michael. (2018). Dispositions. In Edward N. Zalta (Ed.), *The stanford encyclopedia of philosophy* (Fall 2018). Metaphysics Research Lab, Stanford University. https://plato.stanford.edu/archives/fall2018/entries/dispositions/

Goodman, Nelson. (1983). *Fact, fiction, and forecast*.

Handfield, Toby. (2008). Unfinkable dispositions. *Synthese*, *160*, 297–308. http://dx.doi.org/10.1007/s11229-006-9148-3

Handfield, Toby, & Bird, Alexander. (2008). Dispositions, rules, and finks. *Philosophical Studies*, *140*, 285–298. http://dx.doi.org/10.1007/s11098-007-9148-2

Lewis, David K. (1997). Finkish dispositions. *Philosophical Quarterly*, *47*(187), 143–158.

Mackie, Penelope, & Jago, Mark. (2023). Transworld identity. In Edward N. Zalta & Uri Nodelman (Eds.), *The stanford encyclopedia of philosophy* (Winter 2022). https://plato.stanford.edu/archives/win2022/entries/identity-transworld/

Manley, David, & Wasserman, Ryan. (2007). A gradable approach to dispositions. *Philosophical Quarterly*, *57*(226), 68–75.

Manley, David, & Wasserman, Ryan. (2008). On linking dispositions and conditionals. *Mind*, *117*(465), 59–84.

Mumford, Stephen. (2003). *Dispositions*. Oxford University Press, USA.

Noonan, Harold, & Curtis, Ben. (2018). Identity. In Edward N. Zalta (Ed.), *The stanford encyclopedia of philosophy* (Summer 2018). https://plato.stanford.edu/archives/sum2018/entries/identity/; Metaphysics Research Lab, Stanford University.

Quine, Willard Van Orman. (2013). *Word and object*.

Ryle, Gilbert. (2009). *The concept of mind*. Routledge.

Vetter, Barbara. (2014). Dispositions without conditionals. *Mind*, *123*, 129–156. http://dx.doi.org/10.1093/mind/fzu032