

CAN DISPOSITIONS HAVE INTRINSIC FINKS AND ANTIDOTES?

Abstract

version dated 16.08.09 One might suppose that dispositions cannot have intrinsic finks and antidotes (masks). For what would then be the difference between having a disposition that for intrinsic reasons does not yield its manifestation, and not having that disposition at all? If that is right, then standard answers to certain important problems fail, for example the dispositional accounts of rule following or of intentional action, which require intrinsic finks or antidotes to respond to standard objections. In this paper I examine whether the dismissal of intrinsic finks and antidotes just given stands up, and if not, what does make the difference between possessing such a disposition and not possessing it. I suggest that there is a difference, and that there can be intrinsic interference with a disposition when that interference does not originate in a design feature (artificial entities) or a natural function (natural entities).

1 Introduction—dispositions and their interferers

Propositions ascribing dispositions would be equivalent to subjunctive or counterfactual conditionals, were it not for finks and antidotes. Consider a disposition $D_{(S,M)}$ with stimulus S and manifestation M ; predicating that disposition of some object x ought to be equivalent to a conditional thus:

$$(CA) \quad D_{(S,M)}x \leftrightarrow Sx \square \rightarrow Mx$$

(CA), the (simple) conditional analysis of dispositions, is however false. A finkish disposition is one whose context is such that although it exists at the time it receives its stimulus, it ceases to exist soon thereafter, sufficiently swiftly that the manifestation fails to come about (Martin 1994). Normally dispositions need to remain in place in order that a process of interaction between them and their stimuli can occur that will lead to the manifestation. If the disposition is caused to go out of existence too soon, the process leading to the manifestation might be cut short and the manifestation will not occur at all. The cause of the disposition's disappearance might well be its own stimulus Sx (although it need not be), operating via a secondary mechanism, independent of the disposition's own mechanism. An antidote (or mask) operates differently (Johnston 1992, Bird 1998). It interferes not with the disposition itself but with the environmental conditions normally required for the disposition to manifest itself. The process mentioned whereby the disposition and stimulus interact in

order to produce the manifestation may extend beyond the causal basis of the disposition. And if the process is interfered with in that part that does go beyond the causal basis, then the manifestation might be thwarted but without removing the disposition. This is an antidote to the disposition.

While the objections raised above are to the left-to-right implication of (CA)—(CA→), finkish and mimicking cases can be constructed that also refute the right-to-left implication—(CA←). Just as a disposition can disappear shortly after receiving its stimulus, a disposition can come into existence shortly after the occurrence of an event that is its stimulus, sufficiently soon for that stimulus to cause it to yield its manifestation. In a reversal of the antidote case, extrinsic events can mimic a disposition—the stimulus event Sx may cause the manifestation event Mx but not via the disposition $D_{(S,M)}$, which may not exist, but rather via some chain of events extrinsic to x .

One might wonder whether the alleged failures of (CA→) are really ones where there is a disposition but a false conditional. Why should we not regard them as cases where there is no disposition of the sort alleged? Why is the finkish case not just a fancy way of not having a disposition at all? And likewise for the antidote case? (*Mutatis mutandis*, why do not the alleged counterexamples to (CA←) show that there *is* a disposition of the relevant sort in play?)

For the case of dispositions that are intrinsic to their bearers, an answer is available. In such cases there are intrinsic duplicates of bearers of these finkish and antidoted dispositions that unquestionably possess the dispositions in question (Choi 2003). Since the dispositions are intrinsic properties and the intrinsic duplicates possess them, then so do the finkish and antidoted originals. Likewise, there are intrinsic duplicates of the entities in the counterexamples to (CA←) that unquestionably do not have the intrinsic dispositions at issue.

Note, however, that the response of the previous paragraph does not work if the finks and antidotes are themselves intrinsic. For then the intrinsic duplicates will possess them also, and it will not be unquestionable that the intrinsic duplicates genuinely possess the dispositions in question. Hence it looks as if the mechanisms of finks and antidotes cannot be intrinsic features of the bearers of the disposition. Intrinsic finks and antidotes, it seems, are not possible.

The question of the possibility of intrinsic finks and antidotes is significant not in its own right but also because it has implications for the prospects for a dispositional account of mind. I shall illustrate this issue by brief reference to certain topics in the philosophy of mind. The issue is this. In order to save the dispositional view of mind from counterexamples and objections, we need to advert to the fact that dispositions can have finks and antidotes. However, the finks and antidotes in question are ones that are typically intrinsic. So the possibility of a dispositional account of mind seems to require that there can be intrinsic finks and antidotes, despite the *prima facie* argument given against them above.

2 The dispositional account of mind—objections and defences

What makes it the case that someone understands the word “plus” as referring to the normal additional function, plus, when they hear “18 plus 37” or mean that function when uttering the same expression? The dispositional response to this question says that it is the disposition of the individual that fixes what they understand or mean. The fact that they answer “55” in response to this question does not suffice to fix the function they understand by “plus” as addition, since that answer is consistent with their understanding quite different functions by “plus”, including Kripke’s quaddition, the function whose value is the sum of the arguments when both are less than 57 and whose value is 5 otherwise (Kripke 1982). The advantage of the dispositional account of rule-following is that the one (multi-track) disposition can have a set of determinate potential manifestations in response to determinate potential stimuli, even if those stimuli and manifestations are never manifested. This correlation between potential stimuli and manifestations is part of the nature of the disposition even if never actualised. My bathroom scales have a disposition to have its pointer go to ‘35’ when someone or something weighing 35kg is placed upon it. But nothing of that mass has even been placed on the scales and might never be. Nonetheless, that disposition is part of the nature of the scales. Likewise, in hearing the word “plus” in the query “what is 18 plus 37?” our subject will have that disposition whose actual manifestation in response to that actual question is “55” *and* whose (non-actual) possible manifestation in response to the (non-actual) possible stimulus “what is 68 plus 57?” is “127”. So that disposition distinguishes our subject from the subject whose overt behaviour is the same (i.e. responding “55” to “what is 18 plus 37?”) but who in fact understands quaddition by “plus” rather than addition.

As is well known, (Kripke 1982) raises problems for the dispositional account of rule-following. The first concerns the possibility of error. We think that it is possible for someone to understand addition when hearing “68 plus 57” yet err, giving the answer “123”. But if they give the answer “123”, they were disposed to give that answer, in which case, according to the dispositional account of rule-following, they did not understand addition by “plus” but some other function whose value is 123 for the arguments 68 and 57. The second problem is a different expression of the same point. Rules are normative, determining what we ought to do, whereas dispositions are not normative. They determine what we in fact do, which (as the error example shows) might be quite different from what we ought to do. The third problem points out that our dispositions are finitely bounded whereas the functions in question are not. Even though a subject is disposed to answer “125” to “what is 68 plus 57?” there are addition sums to which she is not disposed to give the right answer simply because the arguments are too large for her even to contemplate let alone add.

A sophisticated dispositional account of mind can take these objections in its stride. Kripke’s objections implicitly assume (CA). Concerning the error point, the objection can be reconstructed: (i) N. answers “123” to “what is 68 plus 57?”; therefore (ii) N. would answer “123” to “what is 68 plus 57?”; therefore (iii) N. is disposed

to answer “123” to “what is 68 plus 57?”; therefore (iv) N. is not disposed to answer “125” to “what is 68 plus 57?”; therefore (v) N. does not understand addition by “plus”. An alternative reconstruction is: (vi) N. does not answer “123” to “what is 68 plus 57?”; therefore (vii) N. would not answer “125” to “what is 68 plus 57?”; therefore (viii) N. is not disposed to answer “125” to “what is 68 plus 57?”; therefore (ix) N. does not understand addition by “plus”. While both trains of reasoning might be disputed at more than one point, the relevant steps for current consideration are those from (ii) to (iii) and from (vii) to (viii). The inference from (ii) to (iii) is an instance of (CA \leftarrow), while the inference from (vii) to (viii) is the contrapositive of an instance of (CA \rightarrow). But, as we saw in the introduction, (CA) is false in both directions.

The defender (e.g. Martin and Heil 1998) of the dispositional account of rule-following can therefore argue that where there is a divergence between what a subject ought to do and what they in fact do, there is a fink or antidote at work. In such cases the subject is disposed to give the right answer, but something interferes to prevent them from so doing. *Pace* Kripke a subject can be disposed to do something although they don’t do it, even in the presence of the appropriate stimulus. And this seems a plausible diagnosis. Suppose someone is asked, “what is 68 plus 57?”. In the middle of his calculations a fly lands on the subject’s ear, momentarily distracting him. He answers “123”. In this case we may be able to say that our subject was disposed to answer “125”, and indeed would have given that answer were it not for the lapse of concentration induced by the fly. That distraction acts as an antidote, or perhaps a fink (depending on the details of the operation of the mechanism for adding), to the underlying disposition.

3 The problem of intrinsic finks and antidotes

The various dispositional accounts of mind can be defended against counterexamples by appealing to the possibility of finks and antidotes. However, the finks and antidotes in question are in many instances *intrinsic* properties of the bearer of the disposition. For example, in following the plus-rule I may make a mistake by misremembering the results of an earlier stage in the calculation. The incorrect result is not a counterexample to the dispositional account of rule-following so long as my memory failure can count as a fink or antidote to my adding disposition. (In this case, the memory-failure will be an antidote since we do not suppose that I lose my adding disposition. We can imagine other cases where the disposition is intrinsically finked: a sudden seizure during an addition calculation might rob me of the disposition I had when I started the calculation.) My memory failure is intrinsic to me, as is my seizure; a duplicate of me would have had the same memory failure. or seizure. As Handfield and Bird (2008) argue, the case for defending the dispositional account of rule-following presented by Martin and Heil against Kripke, is only as strong as the case for intrinsic interferers. But this case, as we shall see, is problematic.

Similar problems arise in other areas of the philosophy of mind. For example, Frankfurt (1969)’s famous cases show that a subject can be morally responsible for Φ even though one could not have done otherwise than Φ . In the example, Black wishes to ensure that Jones does Φ , by implanting in Jones’s brain a device controlled

by Black that would prevent Jones from not Φ ing, should Jones show any sign of do otherwise than Φ ing. As it happens, Jones does Φ without any need for Black to interfere. However, as Michael Smith (1997) argues, it might be true that Black could not have done otherwise, but it might also be true that he was *able* to do otherwise. According to Smith, moral responsibility is a matter of two capacities, the capacity to make correct judgments and the capacity to act as one judges. We may think of these capacities as dispositions (but see below). Although Smith does not give an explicit characterization, the essence of the issue can be seen if we choose to regard the capacity to Ψ as being the disposition to Ψ should one so choose. Assuming that Jones had the capacity to judge that not Φ ing was the right thing to do, did he also have the capacity to not Φ ? That is, was he disposed not to Ψ had he chosen not to Ψ ? If (CA) were true, then we must deny this disposition, because he would still have Ψ ed, whatever he chose, thanks to Black's device. But we can resist this conclusion by pointing to the falsity of (CA). Black's potential interference is naturally seen conceived of as a fink or antidote that would remove or interfere with Jones's disposition.

So far so good. But as Cohen and Handfield (2006) point out, this approach faces problems with other cases, most notably the willing addict. In this story the addict would experience an irresistible craving were he to go without his drugs for an extended period. But he never goes without drugs for that long because he is entirely happy to take the drugs and has a ready supply of them. So it is the ordinary desire for the pleasure of the drugs that drives his regular ingestion of them, not the addition, of which he may not even be aware. Given that fact, one ought to be willing to say that the addict is responsible for those acts of ingestion. On the other hand, it is not true that he could have not ingested them, for had he chosen not to, the addiction would have kicked in. It looks as if the case is analogous to the case of Jones and Black's device. Even though the counterfactual 'had he chosen to not ingest the drugs, he would not have ingested them' is false, the falsity of (CA) permits the truth of 'he was disposed not to ingest the drugs if he chose not to'. Cohen and Handfield argue that this case is importantly different from the case of Jones and Black's device, because in this case the interference with the supposed disposition is intrinsic to the addict (something to do with glutamate or dopamine receptors in the subject's brain). If intrinsic finks and antidotes are not possible, then this defence of the claim that the willing addict is responsible for his actions fails.

Another case is Armstrong's dispositional account of perceptual experience: to have the perceptual experience that p requires being disposed to believe that p (plus other conditions) (Armstrong 1961; cf. Ashwell 2009). But in the case of well-known illusions we don't have the disposition: on measuring the Müller-Lyer lines we do not believe they are different lengths although they still appear that way (similarly with the bent spoon in the glass of water, mirrors and so on). It seems that the disposition must be held in check, that is, it is an antidote (or mask) is in operation. The antidote is intrinsic—it is one's state of knowledge that prevents the illusion leading to belief. Again, if intrinsic antidotes are impossible, then this defence of the dispositional account of perception is illegitimate.

A final case concerns character traits. Traits we may regard as behavioural dispositions. However, some authors have denied the psychological reality of traits.

Our behaviour is too variable and context dependent to permit any useful explanation in terms of a relatively long-standing behavioural disposition. One possible line of response is to hold that the traits do exist but can have their normal manifestations masked by an antidote, and that changing contexts can supply such antidotes. While in many such cases it will be appropriate to think of those antidotes as being extrinsic, in many other the antidotes are intrinsic. Consider the notorious Millgram experiment. Does it show that there is no trait of compassion? Or does it show that such traits can be masked by a stronger disposition to obedience to authority? But if the latter, the mask is intrinsic to the subject.

So several different dispositional approaches to mental phenomena require the possibility of an intrinsic antidote or fink. However, as we saw in Section 1 there is at least *prima facie* reason to doubt the possibility of finks and antidotes that are intrinsic to the bearers of the disposition in question. The classic test for a disposition is counterfactual, as given in (CA). But we can say that the test is not definitive. We can find cases of two objects **a** and **b** where the following hold (i) **a** and **b** are intrinsically identical; (ii) **a** has an intrinsic disposition $D_{(S,M)}$; (iii) it is not true (thanks to interference by fink or antidote) of **b** that were **b** to undergo S, **b** would undergo M. From (i) and (ii) we infer (iv) **b** also has the disposition $D_{(S,M)}$. (iii) and (iv) constitute the counterexample to (CA)—it is not always the case that the presence of a disposition is revealed by the truth of the corresponding counterfactual. Premise (ii) can be rendered dialectically unobjectionable by ensuring that the counterfactual is true of **a**. Thus we can cast the argument against (CA) as a *reductio*.

- (CA) $\forall x(D_{(S,M)}x \leftrightarrow Sx \square \rightarrow Mx)$
- (i) **a** and **b** are intrinsically identical
- (iia) $Sa \square \rightarrow Ma$
- (iib) $D_{(S,M)}a$ (from (CA) and (iia))
- (iii) $\neg(Sb \square \rightarrow Mb)$ (thanks to a fink or antidote)
- (iv) $D_{(S,M)}b$ (from (i) and (iib))
- (v) $\neg(D_{(S,M)}b \leftrightarrow Sb \square \rightarrow Mb)$ (from (iii) and (iv))
- (vi) $\neg \forall x(D_{(S,M)}x \leftrightarrow Sx \square \rightarrow Mx)$ (from (v))
- (vii) $(CA) \rightarrow \neg(CA)$ (from (CA) and (vi))

It should be clear that this argument depends upon the finks and antidotes in question being extrinsic. For if not, then the intrinsic fink or antidote that ensures that (iii) is true, i.e. that the counterfactual does not hold of **b**, will also be a property of **a**, thanks to (i). In that case, since **a** has the fink or antidote, the counterfactual will not hold of it either, and (iia) will be false and the *reductio* will fail.

Our problem is this: the dispositional account of mind depends on (CA) being false; the argument for the falsity of (CA) depends on the relevant finks and antidotes being extrinsic, not intrinsic; but the relevant problem cases for the dispositional account of mind, those requiring us to reject (CA), include cases where the fink or antidote must be intrinsic.

It is important to see what has and has not been established at this point. The preceding discussion does not show that there *cannot* be intrinsic finks and antidotes. Not has it shown that a dispositional account of mind is deeply flawed. What it does show, however, is that if we are to contemplate intrinsic finks and antidotes, regard-

ing the relevant cases in the theory of mind in particular, we need to be able to establish the truth of (iv) in the above argument via some other route. We need to find some principled way of establishing the presence of a disposition that does not depend on the truth of a counterfactual (since we need (CA) to be false) and does not depend on ‘inheriting’ the disposition from an intrinsic duplicate (since any intrinsic duplicate will share the fink or antidote and so will be no clearer an example of the disposition).

The strategy below will be to look at certain cases in order to see whether they are plausible instances of intrinsic finks and antidotes and, if so, to see whether any principled method can be found for distinguishing cases of (a) objects with the disposition to M when S that have an intrinsic antidote or fink from cases of (b) objects that have no disposition to M when S.

4 Some cases—shy chameleon and strong man

Let us now consider examples that might suggest that there are intrinsic finks or antidotes (Johnston 1992; Clarke 2007). Mark Johnston discusses the following case:

Shy Chameleon is green but turns red as soon as he is about to be seen.

According to Randolph Clarke this chameleon has the disposition to appear green when viewed, even though it is the case that were he to be viewed he would appear red. Clarke also mentions a second example:

Strong Man possesses the power to lift heavy objects. But he has an intrinsic property such that whenever he touches a heavy object his strength is sapped and he cannot lift the objects.

Clarke reinforces the intuitive power of this example by adding that this man can prevent the strength-sapping property from acting by wearing gloves. Clarke says that the gloves do not make the man strong, but rather they prevent the manifestation of an intrinsic fink.

Clarke’s use of Johnston’s *Shy Chameleon* is not convincing. As he anticipates, a natural response is to deny that being green entails being disposed to appear green. And there is good reason to give this response. How should we describe the chameleon’s shyness? One way is to say the the chameleon is disposed to appear red when viewed. On the assumption that an object cannot have both of two dispositions with the same stimulus but incompatible manifestations, this description rules out the claim that the chameleon is disposed to appear green when viewed.¹ So being green and being disposed to look green are different things. What then is the relationship between them? It is that green things possess certain surface reflectance properties that do in fact normally dispose their possessors to look green when viewed. Normal

¹Note, however, that Lewis (1997: 157) does allow that things may be oppositely disposed. But this depends on the correctness of his reformed conditional analysis of dispositions. As I explain in Section 5, Lewis’s analysis fails precisely in respect of the feature of his analysis that appears to licence simultaneous possession of opposite dispositions.

objects that are green (i.e. normal objects with these surface reflectance properties) are disposed to look green.

Clarke's *Strong Man* is potentially more promising as an example of an intrinsic fink. Yet it is impossible to judge without more information as to how the 'strength-sapping' operates. Consider the following case:

Muscly Animal An ancestor of this creature developed an impressive musculature in order to give it the strength to fight off predators. In fact much of the selective advantage of these muscles was provided by their appearance, which frightened off potential aggressors. A later advantageous mutation led to the development of a much bigger brain. However, this development had a disadvantage. If a typical member of the species exerted its strength to the fullest degree, it would have a fatal haemorrhage. One further variant avoided this by having a smaller musculature: but those animals were much more susceptible to predation because of their less impressive appearance. Another variant was selectively much more successful. This creature developed a gland such that whenever its muscles are stressed beyond a certain degree a fluid is released into the muscles that paralyses them. Consequently this final adaptation, *Muscly Animal* can never exert too much muscle power. But it retains much of the benefit provided by having big muscles, because the majority of predators are still scared away.

Muscly Animal has evolved from a strong animal to a less strong animal. Having big muscles does not suffice for a creature's being strong, although they may be necessary. Evolution has found a way of making this creature weak (a good thing, in order to avoid haemorrhage) while retaining its big muscles.

Clarke's description of *Strong Man* is consistent with *Strong Man's* being very much like *Muscly Animal*, with the exception of the additional remark about the gloves. If that is right, then one might wonder whether *Strong Man* really is strong, as Clarke declares.

However, if one takes *Strong Man* to be disanalogous (say because the strength sapping mechanism is the result of a temporary illness), then that might appear to assist Clarke. The man is strong, but counterfactuals such as 'were he to attempt to lift this 130kg weight, he would succeed' are false. Clarke maintains that this shows that his strength is finkish. Note that for this to follow, it might be the case that '*x* is strong' entails '*x* is disposed to succeed in lifting this 130kg weight, should *x* attempt to lift it'. However, we can already see that this entailment does not hold, thanks to the following examples:

Trapped Nerve Arnulf Strumpenegger is a very strong man, but he temporarily has a trapped nerve which means that putting any strain in his back leads to an intense pain, preventing him from lifting any but the lightest weights. A day's rest will cure the trapped nerve and he will be back to pumping iron.

Tired Muscles Barnowl Schwarzenblogger has been competing in the world's strongest man competition. He has just lifted 130 kg fifteen times

in succession, but barely succeeded with the last lift. The lactic acid build up in his muscles leads to what is familiar to all sportswomen and men—that repeated or prolonged exercise of the muscle reduces their capacity to exert force.

Is Mr Schwarzenblogger, whose last lift earned him the title ‘the world’s strongest man’, in fact no longer strong? Of course he is strong—he’s the world’s strongest man! Likewise, Mr Strumpenegger’s trapped nerve does not remove his strength. However, it does not seem true that either man is disposed to succeed in lifting this 130 kg weight should he attempt it. It is not simply that if either attempted the lift, he would fail. Rather in their current state neither *can* succeed and both *must* fail.

Once we see the latter, we could respond to Clarke as follows, in a manner similar to our response to *Shy Chameleon*. *Strong Man* may be strong, but he does not have the capacity to lift heavy weights. It is not that the capacity to lift heavy weights is there but is finkishly removed. Thanks to the strange intrinsic property that Clarke attributes but does not describe, *Strong Man* just does not have (at this moment) the capacity to lift heavy weights, just as Messrs Strumpenegger and Schwarzenblogger cannot lift heavy weights right now.

Expressions such as ‘*x* is disposed to *M* when *S*’ are overt dispositional predicates. Both these cases suggest that one can conjure up apparent finks by paying insufficient attention to the relationship between everyday predicates and overt dispositional predicates. In the case of ‘green’ it is not even clear that this is a dispositional predicate at all. But if it is, it is not straightforwardly equivalent to ‘disposed to appear green when viewed’. Similarly, if ‘strong’ is a dispositional predicate, it is not equivalent to, nor even entails, the overt dispositional locution ‘disposed to succeed in lifting a heavy weight, when attempting to do so’.

A further, related problem with Clarke’s *Strong Man* is the fact that on closer consideration strength does not obviously seem to be a disposition at all: it is a capacity or ability. Capacities and abilities are related to dispositions and some of the lessons for dispositions may well be applicable to capacities and abilities. The brief discussion above of freedom and the capacity to do otherwise trades on there being such a relation. On the other hand, cases involving capacities and abilities may be misleading when it comes to assisting us with the details of the analysis of disposition terms. For our willingness to ascribe abilities is notoriously variable and context sensitive. The question, “Are you able to play tennis?” might be taken in a number of ways. If we are looking for tennis partners, it may be a question about whether one has learned the basic skills of tennis playing. In a slightly different context, it might be a question about one’s availability to play tennis. Or a question about one’s physical fitness (when addressed to a good tennis player who is overcoming a wrist injury). And so forth. It may thus be difficult to disentangle the grounds for ascribing or withholding an ability ascription, and so to be sure that our intuitions are tracking differences in the presence or otherwise of one and the same ability as opposed to a shift in context. I shall return to abilities and capacities at the end of this paper.

5 Lewis and Clarke on intrinsic finks

David Lewis's (1997: 157) 'reformed' conditional analysis of dispositions is the following:

Something x is disposed at time t to give response r to stimulus s iff, for some intrinsic property B that x has at t , for some time t' after t , if x were to undergo stimulus s at time t and retain property B until t' , s and x 's having of B would jointly be an x -complete cause of x 's giving response r .

The idea is that a fink works by removing the disposition's causal basis before the manifestation can occur. Correspondingly, the above analysis identifies such a basis as being that intrinsic property which would cause the response (manifestation) r , in conjunction with the stimulus s were it to remain for long enough (an x -complete cause of r encompasses all the causal factors relevant to the production of r intrinsic to x).

As Clarke points out, this analysis permits intrinsic finks. Let B be the intrinsic causal basis for $D_{(S,M)}$. Let F be another intrinsic property of x such that x has B and F together and were x to undergo stimulus S , then S and F would together cause the removal of B before M could occur. What would happen under the counterfactual supposition that S occurs but B remains? For one thing, presumably either F does not remain or is interfered with. But either way, one would expect S plus B together to produce M . So we can say that x does in fact have the disposition $D_{(S,M)}$, even though it also has the property F that is a fink for $D_{(S,M)}$.

Clarke thinks that Lewis's analysis provides a reason for accepting the possibility of intrinsic finks even though that analysis suffers from the masking (antidote) examples discussed in (Bird 1998). But as I also point out, the analysis suffers from being excessively liberal with its attributions of dispositions. Many systems, natural and man-made, are homeostatic. For example, such a system may act so as to keep the value of some parameter within certain bounds *most* of the time. I say 'most' of the time, because such a system might operate such that when the value of the parameter goes outside its bounds, a subsystem is brought into play that shifts the parameter back to its permitted range. A common example might be a temperature regulation system with a thermostat, when the temperature falls below a certain level, the heating system will fire up until the temperature rises into the permitted range. If it rises beyond its upper limit, the air-conditioning will be activated until the temperature falls back into the allowed range. Such a system will thus allow temperatures outside the permitted range albeit briefly.

Sweaty Betty The human body has a temperature regulation system centred on the hypothalamus that operates similarly, keeping temperatures between 36.0°C and 37.5°C. The bounds are such that if exceeded for a sufficiently long period, some unfortunate outcome would occur. For example, should the body remain above 37.5°C for too long, that person will suffer from heatstroke. However, in a normal body, with fully functioning thermoregulation, the body is always cooled by perspiration, vasodilation, and other means well before heatstroke could occur. Betty is

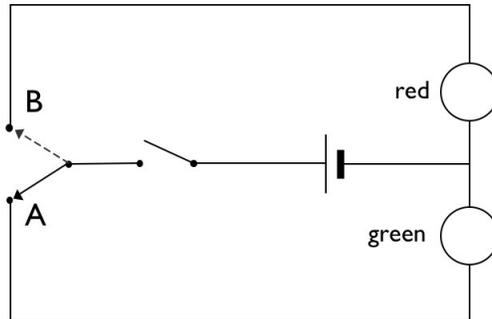


Figure 1: *Two-Colour Lamp*

a fit and healthy individual. At time t her temperature has been raised to 38.0°C , as a result running to catch a bus in hot weather. Betty's temperature regulation system kicks in, and her temperature falls shortly after t to 37.0°C . It is true that had Betty's temperature remained at 38.0°C for long enough, she would have suffered from heatstroke and its associated symptoms (hypotension, tachycardia). But such things would not happen because of properly functioning thermoregulation.

According to the Lewis and Clarke view, we have to say that at time t Betty was disposed to suffer from heatstroke, hypotension, and tachycardia; correspondingly, we must regard thermoregulation as an intrinsic fink. On the face of it, that is an excessive claim. If we consider Betty in the round, we can see that at no point was she disposed towards heatstroke—she has a well-functioning system precisely to prevent heatstroke. Now, this is not to say that there is *no* finking going on here. If we consider Betty-minus-her-hypothalamus, we can say of this object, that it was disposed to the ill-effects if high temperature, and that thermoregulation acted as a fink to this disposition of this object. Note that in this case the fink is extrinsic. And attributing dispositions and finks to a part of some object (in this case, Betty-minus-her-hypothalamus) does not legitimise attributing to the whole (Betty).

Two-Colour Lamp This device that sometimes shines red and sometimes green, thanks to the following design. There are two circuits, the red circuit and the green circuit, which share one on-off switch and a toggle. When the toggle is in position A, the green circuit is completed and if the switch is on, the device shines green; when the toggle is in position B, the red circuit is completed and if the switch is on, the device shines red. Let us designate the property of having a green circuit with toggle in position A by 'G' and the property of having a red circuit with toggle in position B by 'R'. Clearly this device cannot shine both red and green at the same time. (Furthermore I'll assume that nothing can be red and green at the same time). Let the toggle be in position A. The

device thus (i) is disposed to shine green when I throw the switch to 'on' and (ii) is G.

Modified Lamp Now let us imagine that I decide that I want the device only ever to shine red (when on) and never to shine green. So I modify the device by connecting the switch and the toggle: when I throw the switch, the toggle very quickly moves from A to B, before the current can light up the device. What disposition does the device have? For one thing, it is clearly disposed to shine red when I flick the switch. I've designed it precisely so that it will do this. On the other hand, before I throw the switch, the device has the G property, and it is true that were it to retain the G property and I throw the switch, the device would light green as a result.

Thanks to the final line of *Modified Lamp*, Lewis and Clarke must say that the modified device is disposed to shine green when the switch is on (a disposition which suffers from an intrinsic fink). So the device is both disposed to shine green (when the switch is on) and is disposed to shine red when the switch is on. This is at the very least an uncomfortable result. Note, furthermore, that in coming to the conclusion that the device is disposed to shine green, we asked counterfactually: what would happen if the device retained its G property while the switch is thrown? But to make such a counterfactual presumption is precisely to presume that the switch and toggle are not coupled. Thus in coming to the conclusion that the device is disposed to shine green, we have in effect to ignore the very modification that was put in place to prevent the device from shining green. That, I suggest, is clearly an illegitimate way of arguing that the modified device is still disposed to shine green.

What these cases show is that Clarke can use Lewis's reformed conditional analysis for the intended purpose of showing the possibility of intrinsic finks only by exploiting a feature of that analysis that in fact should be taken to show its falsity. Clarke takes the analysis to allow a disposition to remain despite an intrinsic fink, because holding fixed the unfinkish aspect of the causal basis will lead to the normal dispositional manifestation. But we can do this for *any* actual aspect of the causal basis and its effects, leading to such effects being classed as manifestations of a disposition. Here is an example. A fragile glass is struck forcibly and breaks. Let us call the microstructure of the unstruck class 'U'. U includes the fact that the glass is not broken. Now consider the counterfactual condition in which the glass is struck and U remains. It is difficult to say quite what would happen in the nearest possible world where the fragile glass is struck forcefully but retains its unbroken microstructure. But one thing is clear, it doesn't break. Perhaps there is some miraculous absorption of the energy of the striking and the glass just vibrates a bit. Now consider Lewis's analysis. We substitute U for the intrinsic property *B* in the analysis. That analysis gives the result that the fragile glass also has the disposition to vibrate a little and remain unbroken in response to being struck forcefully. That is clearly incorrect, and a defence of intrinsic finks that relies in this aspect of Lewis's revised conditional account of dispositions is not legitimate.

6 Parts and wholes—Ashwell on intrinsic antidotes

Indigestible Berry has a poisonous flesh but will not poison one who eats it because of its indigestible skin.

Is such a berry poisonous, as Lauren Ashwell (2009) suggests? The case seems similar to the shy chameleon and the strong man, except that the skin acts as an antidote rather than as a fink.

The verdict on those cases can be reinforced by considering the case of the nuclear reactor.

Nuclear Reactor consists of a uranium pile, boron moderating rods, and a failsafe system. The pile is disposed to chain react explosively when its mass is raised above critical. However, the failsafe mechanism detects any rising of radiation levels and lowers the moderating rods into the pile where they absorb the neutrons, preventing any explosive chain reaction.

Nuclear Reactor is of course another homeostatic mechanism. Let us consider a situation where boron rods are raised (out of the pile) and the pile's mass has been raised to above critical. Is the reactor disposed to explode? I say no, for the reasons give already, the mechanism is designed precisely to avoid such an outcome, and is working as designed. However, it is true that the *pile* is disposed to chain react explosively. That disposition is masked by the failsafe mechanism and the boron rods. A part of a complex system can have a disposition, and that disposition can be finked or masked by some other part of the system. But the possession of D by some part of a system does not mean that the whole system possess that disposition. That is of course obvious. Nonetheless, the temptation remains to make that transition. The berry is a case in point. The flesh of the berry is certainly poisonous. But does that make the berry poisonous? Normally it would, because those who ingest the berry will be poisoned by digesting its flesh. But if that is impossible, because of the indigestible (and presumably unchewable) skin, then we should deny that the berry is poisonous. In this case, the skin acts like the boron rods and failsafe mechanism of the reactor. It may be that in some cases, the disposition of some key part does transfer to the whole, but a crucial question will then be: what principles governs such cases that distinguishes them from mundane cases where dispositions do not transfer from part to whole.

Ashwell anticipates that one might make the part-whole response to the berry case and others. She notes that the physical part-whole distinction is not the same as the relation between one of the properties of a thing and the thing itself, and remarks, "for the Part/Whole objection to save [the thesis that there are no intrinsic finks and antidotes], it has to be a plausible error theory for *all* cases of apparent intrinsic finks or masks." I think it is a suitable response to some examples, but not to others. Others, such as *Magic Wrap*, which we come to in the next section, are liable to different responses. One can see that the Part/Whole objection might be an appropriate response for some cases as follows. Let us take a case where object X has a disposition D, and a non-overlapping object Y possesses an extrinsic antidote,

A, to X's disposition D. Now consider the object X+Y, that is the fusion of X and Y. If one were correctly to ascribe D to X+Y, then A is now an *intrinsic* antidote to that disposition. That form of argument would establish the possibility of intrinsic antidotes, if sound. But it is not in general sound, being usually invalid; it is usually invalid to infer from D's being a disposition of X to D's being a disposition of X+Y. In general properties of parts are not properties of wholes, and dispositions are no exception to this. My brain weighs 1.4kg, but I do not. Nonetheless, I suggest that in *some* arguments for intrinsic finks and antidotes, it is very tempting to make such a transition, and that *Indigestible Berry* and even *Nuclear Reactor* are cases in point. We saw in the discussion of Clarke's use of Lewis's analysis, that, in effect, a disposition is attributed to the whole on the basis of its being attributed to a part, because Lewis's analysis implies that we should ignore any changes brought about to that part by some other part.

Nonetheless, one might think that the temptation that we feel in some cases to transfer the disposition of the part to the whole, may suggest that such an inference is valid *in some particular cases*. Let us return to the rule-following case, where a subject's manifestations of the addition rule are constrained by a finite memory. In that case it is tempting to think of the subject in a modular sort of way. There is a module that understands and implements the addition rule; and there is a memory module for storing data. In performing some actual sum, the addition module needs to make use of the memory module. But the mathematics, so to speak, really happens only in the addition module. One might think of a calculator or computer being built like this, with clearly distinct parts for performing the addition and for storing data. The constraints on the actual performance of large sums can be adjusted by adding more memory. Such changes don't affect any mathematical disposition, the latter being contained in the distinct addition module. With such a picture in mind it is very tempting to say that the subject had a perfect understanding of the plus rule. Her constrained performance is not due to any failure of understanding but simply due to the limited size of a non-mathematical component, her memory.

Such a move may well be legitimate in some cases. But in order to justify such a move, we must distinguish the legitimate instances from illegitimate inferences from properties of parts to properties of wholes. Such a distinction would appeal to some principle that tells us which cases are such that we can privilege a disposition of a part so that it is also a disposition of the whole (as, perhaps, in the addition disposition case), while other cases are such that we do not privilege the dispositions of the parts in such a way (as in *Sweaty Betty*). This is what Handfield and Bird (2008) call the *Privileging Problem*.

7 A further alleged intrinsic antidote

In Lewis's example, a sorcerer protects a fragile glass with an extrinsic enchantment which would remove the glass's causal basis for fragility were it struck. Why should we regard the glass as fragile in this case—as opposed to being non-fragile in a fancy sort of way? The principle reason is that the glass is intrinsically identical to an unarguably fragile glass, and fragility is an intrinsic property. Perhaps fragility is not an

intrinsic property after all? If it were an extrinsic property, then we could say the it is removed by the spell, yet intrinsically identically to the (unprotected) fragile second glass. I have suggested that our intuitions are that fragility is intrinsic and that it contrasts with Jennifer McKittrick's (McKittrick 2003) example of an extrinsic disposition, *vulnerability*. That extrinsic disposition is removed by the spell. After all, I remarked, it is natural to say that the sorcerer is concerned to protect his glass *because it is so fragile* (Bird 2007: 30).

Ashwell (2009) argues this kind of argument must work equally well for intrinsic masks (or equally well). In contrast to Lewis's extrinsic enchantment, Ashwell invites us to consider a case of intrinsic enchantment.

Magic Wrap A sorcerer protects a glass by enchanting it in such a way that its its suddenly covered in bubble-wrap if it is struck, preventing breakage. The enchantment is an intrinsic property of the glass.

That the enchantment is an *intrinsic* property of the glass is Ashwell's stipulation. She maintains that this glass is still fragile. One reason is that one can argue, just as in the case of extrinsic enchantment, that the sorcerer cast the enchantment *because his glass is fragile*. If, on the other hand, one is inclined to deny that the intrinsically masked *Magic Wrap* glass is fragile, one must then explain the sorcerer's enchantment as being due to the fact that *were not enchanted, it would be fragile*. If that is a satisfactory explanation, then so is a parallel explanation in the case of the glass protected by Lewis's extrinsic enchantment: that too is non-fragile; it is enchanted because it would be fragile without the enchantment.

So it looks as my case for the fragility in Lewis's case being (a) intrinsic, and (b) persistent through the extrinsic enchantment is no better or worse than an analogous case for the fragility in *Magic Wrap* being (a) intrinsic, and (b) persistent through the intrinsic enchantment.

The remark to the effect that the extrinsically enchanted glass is protected because it is fragile was intended to be a (small) piece of abductive evidence. Abductive support is contextual. The fragility explanation in the case of the unenchanted glass is a simpler explanation than the would-be fragility explanation; our intuitions are strongly that it is fragile (boxes of such glasses, even well-protected by extrinsic antidotes, say 'fragile' on them; they don't say 'beware: contents liable to be fragile if unwrapped or not handled gently'); the glasses are intrinsically identical to unwrapped, unenchanted glasses, which are paradigmatically fragile. Now consider the analogous explanation in the case of the enchanted *Magic Wrap* glasses. It is true that the fragility explanation here is also simpler than the would-be fragility explanation. But the context is different. Our intuitions are certainly not unequivocally that these glasses are fragile; they could equally be regarded as glasses that are in some ways like unenchanted glasses but in fact have a very unusual kind of robustness. And they are not intrinsically like any paradigmatically fragile glasses. Far from it, they are intrinsically enchanted.

While some hold that the contrived nature of the sorcerer examples deprives them of any evidential force, I regard them as shortcuts that save us the work of devising complex physical mechanisms that would do the same work (but with more distractions). In the case of extrinsic finks and antidotes, the difference between

magical and physical mechanisms makes no difference to our intuitions. However, when it comes to the intrinsic enchantment, we need to be rather more careful. An enchantment is an intangible sort of thing. It is tempting to think that adding an enchantment to something, even when it is stipulated that the enchantment is intrinsic, will merely add to the object's intrinsic properties. The enchanted object is just like the unenchanted object, except that it *also* has the enchantment in addition to its previous properties. This, I suspect, makes it tempting to agree that since an unenchanted glass is fragile, then so is the enchanted glass.

Such temptations must be resisted. Adding an intrinsic property *P* *always* removes another, the intrinsic property of lacking *P*. (A moment's reflection shows that the complement of an intrinsic property is also an intrinsic property.) So it is *not* the case that the enchanted glass has all the intrinsic properties of the unenchanted glass, plus the enchantment property. And so there is no straightforward inference from the fragility of the unenchanted glass to the enchanted glass being fragile. Still, the intangibility of the enchantment might persuade us that the enchanted glass possesses all the substantive intrinsic properties of the unenchanted glass, such as fragility. But in the absence of a general principle, such an inference needs a specific argument in its favour. Reflect that some physical process must occur. Perhaps bubble wrap sprouts from the surface of the glass like a car's airbags inflating. Just as adding the airbag facility to a car changes its substantive intrinsic properties, removing the property of being highly dangerous and adding that of being fairly safe, adding the enchantment to the glass changes its substantive properties, removing fragility and adding robustness. That this were the case would be immediately clear, I suggest, if instead of an enchantment we had nano-technological airbag devices impregnating the surface of the glass. Since the structural intrinsic properties of such a glass are different, one might well imagine that the dispositional intrinsic properties are different too. And that verdict should be one made with any less confidence just because we have employed the device of a sorcerer's enchantment.

8 Intrinsic interference after all?

Having suggested that the cases and arguments considered so far in favour of intrinsic finks and antidotes fail to make their case, I will now argue that certain cases *do* permit such intrinsic interference after all. As we shall see, I think that those who want to argue for their possibility have been in the wrong place.

Broken Two Colour Lamp This lamp is like that in *Two Colour Lamp* except that it is broken. A small piece of interior mechanism has broken off and accidentally hooked up the on-off switch and the red-green toggle, with the same effect as in *Modified Lamp*.

The difference between *Broken Two Colour Lamp* and *Modified Lamp* is that whereas both lamps shine red when switched on, even when the toggle is set to green, that is a deliberate function in the case of *Modified Lamp* but is an accident, a malfunction in the case of *Broken Two Colour Lamp*. Nonetheless, I think that it

is very tempting, in the case of *Broken Two Colour Lamp*, to regard the lamp as disposed to shine green when it has the toggle in that position. The lamp is designed to shine green in that position, and indeed there is nothing wrong with the relevant parts of the lamp that would shine green (the bulb, the circuit, the position of the toggle). When I find that the lamp shines red, I regard that as a malfunction. A malfunction is not the same as lacking a function. On the contrary, if x malfunctions in respect of function F , then x still possesses function F , only the function is not manifesting itself properly. Furthermore, imagine that the accidental linking of the switch and toggle had occurred as a result of some extrinsic accident—a paperclip gets into the mechanism by chance. When the accidental linking occurs extrinsically, we have no hesitation in thinking that the lamp is disposed to shine green, but has this disposition finkishly. I don't think that the fact that the linking comes about intrinsically or extrinsically makes a difference to the truth of that ascription. As I shall suggest, it is the fact that it occurs accidentally that is significant.

To see that there may be intrinsic antidotes to dispositions, we will consider several biomedical cases.

PKU Patients suffering from Phenylketonuria (PKU) are unable to metabolize the amino acid phenylalanine, which can lead to severe cerebral and other disorders. This is because they have a mutation for the gene that produces the enzyme phenylalanine hydroxylase. Consequently they do not produce that enzyme and phenylalanine is not metabolized but builds up. People with the normal gene can also fail to metabolize phenylalanine, if their phenylalanine hydroxylase is inhibited, for example by the presence of alpha-methyl-(DL)-tryptophan.

PKU sufferers are not disposed to metabolize phenylalanine, since they do not have the crucial enzyme. But someone without PKU who fails to metabolize phenylalanine because the action of the enzyme is inhibited is in a different position. They are indeed disposed to metabolize phenylalanine, but this disposition is masked by the inhibitor. If the inhibitor is administered by an external source, then we might regard it as an extrinsic mask. But if the inhibitor were produced as the side-effect of some illness, then its presence would be intrinsic. It would nonetheless be a mask to the enzyme and the patient's disposition to metabolize phenylalanine. In general, cases where an enzyme action is prevented by the presence of an inhibitor may be regarded as those where the subject has a masked disposition. More generally still, we can detect masked dispositions in many biomedical cases where the normal function of some process or organ is prevented from occurring not by major failure of that process or organ, but by the failure of some other system or by the introduction of some antagonist (an antagonist is an agent that blocks some process or action). Here is another example of masking by an antagonist:

Diabetes Normal mammals are disposed to metabolize glucose thanks to their bodies' production of insulin. Diabetics are unable to produce insulin and so are not so disposed. A normal subject can fail to metabolize glucose if the synalbumin insulin antagonist is present.

The normal patient who does not metabolize glucose because of the synalbumin insulin antagonist is disposed to metabolize glucose, but has this disposition masked, unlike the diabetic who does not have that disposition. The latter verdict will hold both when the synalbumin insulin antagonist is administered externally or is produced internally, for example in the blood of a diseased subject. More generally, interference with the otherwise normal organ or process by some accidental interference or malfunctioning of some other system can produce intrinsic finks, for example:

Anhydrosis The medical condition anhydrosis occurs when a patient is unable to sweat. Normal people perspire when hot, but those suffering from anhydrosis do not. This may occur due to the failure of the sweat glands themselves, or to other causes, such as dehydration—the body fails to sweat because there is insufficient water in the system.

Since the sweat glands are working normally, it would be natural to say that the anhydrosis sufferer is, in this case, disposition to sweat when hot but that the manifestation, sweating, is prevented from occurring because of the lack of fluids.

As mentioned, Handfield and Bird (2008) have noted that it might sometimes seem appropriate to ascribe a disposition to a whole on the basis of the properties of some proper part, even if other parts are relevant to the manifestation of the dispositions of the part. But if we are to endorse this and permit intrinsic antidotes, then we must say when it is possible to do this and need to identify the principles on which we divide up a whole into the relevant parts—how to do this is the Privileging Problem. Sometimes, as in *Sprint Champion*, *Dead Batteries*, and so forth, we feel that we can regard the whole as having a disposition on the basis of the functioning of some part, such that the disposition can be intrinsically finked or masked. Sometimes, as in *Sweaty Betty*, *Modified Lamp*, and *Nuclear Reactor*, we deny that the disposition of the part extends to the whole, and so we do not say that the whole has a finked or masked disposition.

A sketch of the answer to the Privileging Problem is as follows. First, we distinguish the relevant parts by their function, which may be natural or artificial, depending on the kind of case. Identifying artificial functions should not present too much of a problem, and devising the right naturalistic account of natural function, in particular in terms of fitness an evolution, is work that is well advanced (even if the details are much debated). Given parts and subsystems thus identified, we distinguish between those cases (i) where the disposition of the part manifests itself unproblematically in the behaviour of the whole; (ii) where the disposition of the part is prevented from being manifested in the behaviour of the whole by the interference of transient or accidental factors, or by the malfunctioning of other subsystems; and (iii) where the disposition of the part is prevented from being manifested in the behaviour of the whole by the interference of subsystems which are functioning normally. Cases of (i) are cases where the whole has the disposition of the part, and manifests that disposition, and include *Two-Colour Lamp*. I am disposed to digest food because my stomach and gut are disposed to digest food, and these operate normally. Cases of (ii) are cases where the whole has the disposition but that disposition is masked or finked. Such cases include *Dead Batteries* and *Finite Tape*.

They also include *Sprint Champion* on a bad day (he isn't focussed because he has just received bad news), and arguably they also include *Trapped Nerve* and *Tired Muscles*; they might include *Strong Man*, depending on the way the case is spelled out. Cases of (iii) are cases where the whole does not have the disposition of the part at all, and include *Muscly Creature*, *Modified Lamp*, *Sweaty Betty*, *Nuclear Reactor*; they also include *Shy Chameleon* and *Magic Wrap*. The distinction between (ii) and (iii) is captured by the software developer's old defence, 'it's not a bug, it's a feature'. There is indeed a difference between a bug and a feature. If bug prevents some rubroutine performing a function, then that function is masked (or maybe finked). But if that function is deliberately disabled, then the programme does not possess that function at all.

The reason why the intended examples of intrinsic interference fail to make the case clearly is that they are cases where the interference is a design feature (*Magic Wrap*) or natural function (*Shy Chameleon*). *Strong Man* is unclear, because we are not told how and why the intrinsic interferer works, and this information we need in order to be able to assess the case.

9 Capacities and abilities

I suggested that *Trapped Nerve* and *Tired Muscles* showed that a strong man could lack the ability to lift a heavy weight right now. On the other hand, it would be quite normal to say that these men are able to lift weights that I can scarcely budge, even though they cannot do more than me right now. Is the concept of ability ambiguous? I don't think so. Rather there are two different abilities with the same manifestation and stimulus conditions. One is a more general, long term ability, and the other is a more specific, short term ability. For example, a strong man does have the general, long term ability to lift heavy weights, but does not at all times have the more specific, short-term ability to lift heavy weights right now. He may lack the specific ability if he is tired. Equally, he might possess the specific ability, thanks to performance enhancing drugs that he does not usually take, but lack the general ability.

In other cases too, the general, long-term ability to Φ does not entail the specific ability to Φ right now.

Sprint Champion Usain Bolt can run 100m in under 9.70 seconds, which he proved by doing so at the Beijing Olympics. But clearly Bolt does not have, at every moment, the ability to run this fast at that moment. He cannot do it just after waking up in the morning. He cannot even do it in every race. But running that fast is something he is able to do and few if any other people are able to do.

It may seem puzzling that someone is able to Φ but rarely achieves Φ ing, but that is what the *Sprint Champion* tells us. The diagnosis is this. To run 100m in under 9.70 seconds on any occasion requires getting one's body into the right physical shape, and to some extent, training one's kind also. Bolt has that physical and mental shape. Bolt's rivals, Maurice Greene and Asafa Powell don't have it (quite). Why doesn't Bolt run 100m in under 9.70 every time he runs a race? A lot of things are required to

allow one's physical and mental powers to be exerted to their fullest: the needle of the competitors, the atmosphere of the big event, not having over-trained, feeling good on the day, and so forth.

The suggestion I make in the case of *Sprint Champion* is that there is a set of primary intrinsic characteristics upon which we base our ascription of ability—principally his physique and mental attitude. In order for this ability to be manifested, additional factors must be suitable. Some of these are extrinsic to the competitor, but some are intrinsic; let us call the latter, the secondary intrinsic factors. If the extrinsic and secondary intrinsic factors are not all right, they can mask the ability that the athlete has in virtue of his physique. Since the failure of secondary intrinsic factors to be suitable can mask the ability ascribed on the basis of the primary intrinsic factors, we have the possibility of an *intrinsic* mask. That possibility is what is marked by the distinction between the long-term, general ability to Φ and the specific ability to Φ right now.

Now consider a set of quite different cases:

Simple Calculator is a calculator that has only the basic arithmetical functions.

Dead Batteries is an advanced calculator that has an exponential key. But when I press the keys nothing happens—the batteries are dead.

Broken Display is an advanced calculator that has an exponential key. But when I calculate an exponential, the display doesn't give the correct readout, since one of the LEDs is malfunctioning.

Finite Tape A Turing Machine can be designed to calculate the exponential function. Finite Tape is an exact physical instantiation of a Turing Machine for exponentiation. Where the Turing Machine has a notional or abstract infinite tape on which the input and output are written, *Finite Tape* has a real, physical tape. But the tape is finite, allowing for a maximum size of output.

Clearly, *Simple Calculator* cannot calculate the exponential function. But it would be natural to say that *Dead Batteries* is a calculator that can calculate the exponential function. Likewise, a car does not lose its horsepower just because it has an empty fuel tank. The verdict in the case of *Broken Display* is less clear, but still, it would not be unnatural to say that this calculator can calculate the exponential function, and that it needs to have its display fixed in order to show this.

A limitation on all calculators is that fact that they have finite displays or printouts. Does that mean that we are not being strictly accurate when we say that they can calculate the exponential function? Consider *Finite Tape*; I think it would be acceptable to say that this machine does calculate the exponential function. The finite tape does not mean that the capacity is only a limited one. Rather, I suggest, the it has an unlimited capacity and the finite tape limits the expression of that capacity.

In these cases I suggest we identify a primary intrinsic component of subsystem that is responsible for the capacity to calculate the exponential function. *Simple*

Calculator lacks this component, but all the others possess it. The manifestation of this capacity requires further intrinsic factors to be propitious, which they are not in *Dead Batteries* and *Broken Display* and are limited in *Finite Tape*. If so, *Dead Batteries*, *Broken Display*, and *Finite Tape* suffer from intrinsic antidotes.

10 Conclusion

There can be intrinsic finks and antidotes. But identifying such cases involves identifying functions that can transfer from a part to the whole, and such cases are those where they are not interfered with by some other properly functioning part. Such dispositions can be finked and masked by intrinsic, secondary features of the subject, such as some other part malfunctioning, or a temporary or accidental change to some other intrinsic part. The next task is to show that these type (ii) cases are what we find in those cases where the dispositional theory of mind requires us to attribute intrinsic antidotes and finks.

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