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THE SIMPLE VS. REFORMED CONDITIONAL ANALYSIS OF DISPOSITIONS

ABSTRACT. Lewis claims that Martin's cases indeed refute the simple conditional analysis of dispositions and proposes the reformed conditional analysis that is purported to overcome them. In this paper I will first argue that Lewis's defense of the reformed analysis can be understood to invoke the concepts of disposition-specific stimulus and manifestation. I will go on to argue that advocates of the simple analysis, just like Lewis, can also defend their analysis from alleged counterexamples including Martin's cases by invoking the concepts of disposition-specific stimulus and manifestation. This means that Lewis's own necessary defense of the reformed analysis invalidates his motivation of it. Finally, I will argue that we have a good reason to favor the simple analysis over Lewis's analysis.

1. THE SIMPLE CONDITIONAL ANALYSIS OF DISPOSITIONS

According to the simple conditional analysis of dispositions, a disposition is analyzed into a counterfactual conditional (Prior et al. 1982). For example,

(1) Something x is fragile at time t

is analyzed into

(2) If x were to be struck at t, then it would break.

As well known, Martin (1994) offers his electro-fink counterexamples against the simple conditional analysis. A variant of one of them due to Lewis (1997, 138) – call it "Martin's first case" – goes as follows: a fragile glass G_1 is struck but does not break because it is protected by a sorcerer who detects when G_1 is about to be struck and reacts by instantaneously casting a spell that renders G_1 no longer fragile, and thereby aborts the process of breaking. In this case, (1) is satisfied but (2) is not satisfied. This means that (2) is not a necessary condition for (1). It is an easy step to make a similar counterexample to the effect that (2) is not a sufficient condition for (1), either. Suppose that a non-fragile thing R is struck and then breaks because a sorcerer casts a spell that renders R fragile shortly before R is struck – call this case "Martin's second case". In this case,

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(1) is not satisfied but (2) is satisfied. This means that (2) is not a sufficient condition for (1). Thus Martin's two cases seem to refute the simple conditional analysis.

Martin infers from this that dispositions *qua* irreducible aspects of properties cannot be analyzed by counterfactual conditionals. But, Lewis (1997) maintains that, though Martin's cases indeed refute the simple analysis, the conditional analysis can be reformed. And so Lewis proposes the reformed conditional analysis of dispositions and defends it from some alleged counterexamples. However, I will argue that Lewis's own necessary defense of the reformed analysis invalidates his motivation of it.

2. LEWIS'S REFORMED CONDITIONAL ANALYSIS OF DISPOSITIONS

Lewis's reformed analysis of dispositions goes as follows:

(RCA) 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,

where an x-complete cause is "a cause complete in so far as havings of properties intrinsic to x are concerned, though perhaps omitting some events extrinsic to x" (Lewis 1997, 149).

It is important to note that Lewis (1997, 142–146) distinguishes two different steps in providing an analysis of ordinary dispositional concept as fragility, lethality, solubility, etc. Under this two-step approach, (RCA) does not on its own provide an analysis of an ordinary dispositional concept; it analyzes only a disposition that is put into an "overtly dispositional locution" – a disposition to give a response to a stimulus – by means of a counterfactual conditional. Therefore, in order to apply (RCA) to an ordinary dispositional concept, say, fragility, we should first define fragility into the overtly dispositional locution by specifying the stimulus and the response of fragility. An off-the-cuff candidate of the definition would be:

(3) Something x is fragile at time t iff x has the disposition at t to give the response of breaking to the stimulus of being struck.

(RCA), together with (3), implies the following analysis of fragility:

(4) Something x is fragile at time t iff, for some intrinsic property B that x has at t, for some time t' after t, if x were to be struck at time t and retain property B until t', x's being struck and x's having of B would jointly be an x-complete cause of x's breaking.

Lewis's reformation lies in two important differences between (2) and the analysans of (4). The one difference is that the analysans of (4) requires but (2) does not that a putatively fragile thing x retain an intrinsic property for a sufficient time. And, the other difference is that the analysans of (4) requires but (2) does not that x's being struck and x's having of an intrinsic property are jointly an x-complete cause of x's breaking. It is clear that Lewis's reformation solves the problems posed by Martin's two cases. On the one hand, we have seen that, in Martin's first case, the glass G_1 is struck but remains unbroken because of the sorcerer's protection. Yet it would break if it were to be struck and retain the causal basis for its fragility, i.e., an intrinsic property that would join with striking to cause breaking; moreover, the striking and the causal basis would jointly be a G_1-complete cause of its breaking (Lewis 1997, 148). Therefore, the analysans of (4) for G_1's fragility is satisfied. Thus, thanks to the requirement to retain an intrinsic property, (4) delivers the right verdict that G_1 is fragile. On the other hand, we have seen that, in Martin's second case, the non-fragile thing R is struck and then breaks because the sorcerer renders it fragile. Note that the intrinsic properties that R has at a time t before it is struck make almost no causal contributions to its breaking. To be precise, R has no such intrinsic property at t that if R were to be struck and retain it, then it would join with the striking to be an R-complete cause of R's breaking. Therefore, Martin's second case can be dealt with the requirement that an intrinsic property of R and the striking be jointly an R-complete cause of R's breaking: since this requirement is not fulfilled, (4) disqualifies the non-fragile thing R from being fragile (Lewis 1997, 148–149). Thus, thanks to the two requirements constituting Lewis's reformation, (4) delivers the right verdicts in Martin's two cases. If so, Martin's two cases will give a good motivation for Lewis's reformation of the conditional analysis.

So far so good. Unfortunately, however, (4) allows some obvious counterexamples. Here is one offered by Lewis (1997, 145–146) himself. When a styrofoam dish S is struck, it makes a distinctive sound; the Hater of Styrofoam is within earshot of S; when the Hater of Styrofoam hears the distinctive sound, he comes and tears S apart by brute force. Let Bs be an intrinsic property of the styrofoam dish S that would join with striking to make the distinctive sound. It is clear that if S were to be struck and retain Bs, then the striking and Bs would jointly be an S-complete cause of S's

breaking. Hence, S comes out as being fragile by (4). But we do not want to say that S is fragile. This means that (4) does not provide a sufficient condition for fragility

Alexander Bird (1998) provides another kind of counterexamples against (4) that are concerned with dispositional "antidotes" that would frustrate the causal chain from stimulus to response. Here is one – call it "Bird's case": a glass G_2 is struck but it does not break because it is protected by a sorcerer who detects when the glass G_2 is about to be struck and reacts by instantaneously administering an antidote that cancels out the shock of the striking, and thereby aborts the process of breaking. G_2 is struck and the causal basis for its fragility remains; therefore, the antecedent of the analysans of (4) for G_2's fragility is satisfied. Yet the causal basis and the striking are not jointly a G_2-complete cause of G_2's breaking since G_2 does not break; therefore, the consequent of the analysans is not satisfied. As a result the analysans of (4) for G_2's fragility is not satisfied. Hence G_2 that is clearly fragile does not counts as such by (4). This means that (4) does not provide a necessary condition for fragility. Hence we can conclude that (4) provides neither a sufficient nor a necessary condition for fragility, and therefore that it should be rejected. But it does not immediately follow from this that (RCA) should also be rejected.

According to (RCA), the styrofoam dish S has the disposition to break in response to being struck. On Lewis's view, however, this result does not pose any threat to (RCA) because S indeed has that disposition. Under Lewis's two-step approach, this does not immediately mean that S is fragile because (3) can be denied. In fact, Lewis (1997, 145) quite plausibly argues that, contrary to (3), fragility is something like "the disposition to break through a certain direct and standard process in response to being struck" and that S is not fragile because it does not exhibit the manifestation (or response) appropriate to the concept of fragility by breaking through a certain direct and standard process when struck.[1] In Bird's case, according to (RCA), G_2 does not have the disposition to break in response to being struck. As Bird (1998, p. 230) anticipates, Lewis will say that G_2 does indeed not have the disposition in question as long as the sorcerer protects it. This does not mean that Lewis will deny that G_2 is fragile since, for him, (3) is false. Rather, he will speak of something like "the disposition to break in response to being struck in the absence of fragility-antidotes". For Lewis (1997, 145), G_2 is fragile because it would break through a certain direct and standard process if it were to undergo the stimulus appropriate to the concept of fragility, i.e., if it were to be struck in the absence of fragility-antidotes.

In short, we can say that Lewis, in the face of the two kinds of putative counterexamples, keeps (RCA) intact by replacing (3) with the following (5) under the two-step approach:

(5) Something x is fragile at time t iff x has the disposition at t to exhibit a fragility-specific manifestation in response to a fragility-specific stimulus,

where a fragility-specific stimulus is something like x's being struck in the absence of antidotes to fragility and a fragility-specific manifestation is something like x's breaking through a certain direct and standard process.

(RCA) and (5) jointly imply a new analysis of fragility:

(6) Something x is fragile at time t iff, for some intrinsic property B that x has at t, for some time t' after t, if x were to undergo a fragility-specific 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 exhibiting a fragility-specific manifestation.

It is clear that neither Lewis's case of the styrofoam dish nor Bird's case poses any threat to (6). On the one hand, S undergoes a fragility-specific stimulus and retains the causal basis for its distinctive sounds; yet it does not exhibit a fragility-specific manifestation since it does not break through a direct and standard process. Therefore, S does not count as being fragile by (6). On the other hand, G_2 does not undergo a fragility-specific stimulus because it is protected by the sorcerer. Since the antecedent of the analysans of (6) is not satisfied, (6) is not troubled with the fact that G_2 does not break. Note that if G_2 were to be struck in the absence of the sorcerer and retain the causal basis for its fragility, then it would exhibit a fragility-specific manifestation by breaking through a direct and standard process; moreover, the striking and the causal basis would be a G_2-complete cause of its exhibiting the fragility-specific manifestation. This means that (6) delivers the right verdict that G_2 is fragile.

Elsewhere I argued that the specification of a fragility-specific stimulus must include the absence of fragility-mimickers as well as the absence of fragility-antidotes or else (6) would suffer from a serious counterexample, where a fragility-mimicker is something like the Hater of Styrofoam that is extrinsic to a putatively fragile thing and would cause it to break through an indirect and non-standard process if it were to be struck (Choi, forthcoming). Lewis disqualifies the styrofoam dish S from being fragile by requiring a fragile thing to break through a certain direct and standard process. However, once a fragility-mimicker is operative, a putatively fragile thing, whether fragile or not, would not break through a direct and

standard process if struck; thereby it will be disqualified from being fragile by (6). This means that Lewis's requirement that a fragile thing should break through a direct and standard process rules out a fragile thing as well as a non-fragile thing from being fragile. Lewis, I claimed, can overcome this difficulty by ruling out fragility-mimickers from a fragility-specific stimulus.[2]

3. THE SIMPLE CONDITIONAL ANALYSIS IS DEAD?

As stated above, Lewis defends his analysis by invoking the concepts of disposition-specific stimulus and manifestation under the two-step approach. In my opinion, this strategy is also available to advocates of the simple analysis (Choi, 2003, 576–578). If I correctly understand Gundersen's (2002) view, he adopts this strategy in defending the simple analysis from a number of difficulties. The first step in doing so is to formulate the simple analysis in the following way:

(SCA) Something x has the disposition at time t to give response r to stimulus s iff, if x were to undergo s at time t, it would give response r.

Now that the simple analysis is formulated by means of (SCA), it analyzes a disposition that is put into an overtly dispositional locution in terms of a counterfactual conditional; it does not on its own provide an analysis of such an ordinary dispositional concept as fragility.

(SCA) joins with (3) to imply a conditional analysis of fragility:

(7) Something x is fragile at time t iff, if x were to be struck at t, it would break.

As we have seen in Section 1, (7) is refuted by Martin's cases. In addition, it is clear that (7) is also refuted by each of Lewis's case of the styrofoam dish and Bird's case. Accordingly, (7) should be rejected. However, under Lewis's two-step approach, it does not immediately follow from this that (SCA) should also be rejected.

Lewis defends (RCA) from the case of the styrofoam dish and Bird's case by replacing (3) with (5). It is an easy step to defend (SCA) in a similar way. (SCA) joins with (5) to imply a new conditional analysis of fragility:

(8) Something x is fragile at time t iff, if x were to undergo a fragility-specific stimulus at t, then x would exhibit a fragility-specific manifestation.

This analysis delivers the right verdict that the styrofoam dish S is not fragile since it would not break if struck in the absence of fragility-mimickers. On the other hand, G_2 in Bird's case comes out as being fragile by (8) since it would break through a direct and standard process if it were to be struck in the absence of fragility-antidotes. Thus the analysis of fragility based on the (SCA), i.e., (8) overcomes both the case of the styrofoam dish and Bird's case.

Then can (8) overcome Martin's two cases involving finkish fragility or finkish lack of fragility? Let us first consider Martin's first case. (8) can overcome Martin's first case or not, depending on whether the specification of a fragility-specific stimulus includes the absence of fragility-finks, where a fragility-fink is something like the sorcerer in Martin's first case that is extrinsic to a putatively fragile thing and would render it no longer fragile if it were to be struck. On the one hand, suppose that the specification of a fragility-specific stimulus includes the absence of fragility-finks. Then G_1 does not undergo a fragility-specific stimulus because a fragility-fink, i.e., the sorcerer is operative. Since the antecedent of the analysans of (8) is not satisfied, (8) is not troubled with the fact that G_1 does not break. It should be noted that if G_1 were to be struck in the absence of the sorcerer, then it would break through a direct and standard process. This means that if G_1 were to undergo a fragility-specific stimulus, it would exhibit a fragility-specific manifestation. Then G_1 counts as being fragile by (8). Thus, when the specification of a fragility-specific stimulus includes the absence of fragility-finks, Martin's first case poses no threat to (8). On the other hand, suppose that the specification of a fragility-specific stimulus does not include the absence of fragility-finks. Then, in Martin's first case, G_1 does undergo a fragility-specific stimulus. It follows from this that G_1, which is fragile, does not count as such by (8) since G_1 does not break. Then (8) is refuted by Martin's first case.

We can draw a similar conclusion for Martin's second case: (8) can overcome Martin's second case or not, depending on whether the specification of a fragility-specific stimulus includes the absence of lack-of-fragility-finks (for short, L(fragility)-finks), where an L(fragility)-fink is something like the sorcerer in Martin's second case that is extrinsic to a putatively fragile thing and would render it fragile if it were to be struck. On the one hand, suppose that the specification of a fragility-specific stimulus includes the absence of L(fragility)-finks. If the non-fragile thing R were to be struck in the absence of L(fragility)-finks like the sorcerer, then it would not break. This means that if R were to undergo a fragility-specific stimulus, it would not exhibit a fragility-specific manifestation. Accordingly R does not come out as being fragile by (8). On the other hand, suppose now

that the specification of a fragility-specific stimulus does not include the absence of L(fragility)-finks. In this case, *R* undergoes a fragility-specific stimulus and then breaks through a certain direct and standard process because the sorcerer renders it fragile; therefore, (8) delivers the wrong verdict that *R* is fragile.

I presume that Lewis will claim that the specification of a fragility-specific stimulus does not include the absence of fragility-finks nor the absence of L(fragility)-finks. Therefore, for Lewis, (8) should be rejected. This means that (SCA) or (5) or both are false because (SCA) and (5) jointly imply (8). Since, as we have seen in Section 2, Lewis accepts (5) as the right definition of fragility, he will conclude that (SCA) should be rejected and replaced with his own analysis of dispositions, i.e., (RCA). On Lewis's view, Martin's first case should be dealt with by the requirement to retain an intrinsic property for a sufficient time rather than the requirement to undergo a fragility-specific stimulus. Likewise, Lewis will claim that Martin's second case should be dealt with not by the requirement to undergo a fragility-specific stimulus but by the requirement that *R*'s being struck and *R*'s having of an intrinsic property should be jointly an *R*-complete cause of *R*'s breaking. We have seen that these two requirements introduced by Lewis solve the problems posed by Martin's cases. Thus, given that the absence of fragility-finks and L(fragility)-finks is excluded from the specification of a fragility-specific stimulus, Martin's cases would enable Lewis to motivate the two requirements in which his reformation of the conditional analysis lies.

However, why is the absence of fragility-finks and L(fragility)-finks to be excluded from the specification of a fragility-specific stimulus? There is no obvious answer Lewis can give. Note that fragility-finks, L(fragility)-finks, fragility-antidotes, and fragility-mimickers all are extrinsic to a putatively fragile thing; more importantly, they all would interfere the causal process from striking if the thing were to be struck; moreover, none of them operate in typical cases where things are struck and then break. Therefore, it seems more natural to suggest that the specification of a fragility-specific stimulus includes the absence of fragility-finks and L(fragility)-finks in addition to the absence of fragility-antidotes and fragility-mimickers.[3] As noted above, given that the specification of a fragility-specific stimulus includes the absence of fragility-finks and L(fragility)-finks, Martin's cases pose no threat to (8). From this we are led to the conclusion that advocates of the simple analysis can successfully defend (SCA) from Martin's cases by invoking the concept of fragility-specific stimulus under Lewis's two-step approach.

Of course, this defense will work only if it is possible to specify a fragility-specific stimulus in full such that it includes the absence of fragility-finks, L(fragility)-finks, antidotes to fragility, and fragility-mimickers. Moreover, the specification of a fragility-specific stimulus must not invoke the very dispositional concept, "fragility", or else circularity would threaten.[4]

This is a nontrivial indeed hard problem and beyond the scope of this paper. Note that Lewis who invokes the concept of fragility-specific stimulus in defending (RCA) also has a similar problem: he has to specify a fragility-specific stimulus in full such that it includes the absence of fragility-antidotes and fragility-mimickers but does not include the absence of fragility-finks and L(fragility)-finks.[5] All in all, advocates of the simple analysis can successfully defend (SCA) from Martin's cases by invoking the concept of fragility-specific stimulus and the ensuing problem, which is how to specify that concept in full, is also raised by Lewis's defense of (RCA). If so, we can say that (RCA) does not have any advantages whatsoever over (SCA) in dealing with Martin's two cases.

4. WHICH IS BETTER, THE SIMPLE ANALYSIS OR LEWIS'S ANALYSIS?

Lewis reforms the simple conditional analysis of dispositions into his analysis to overcome Martin's cases. And, this reformation is not purely verbal: unlike the simple analysis, Lewis's analysis includes the requirement to retain an intrinsic property for a sufficient time, which assumes that a disposition has an intrinsic property as its causal basis. Similarly, unlike the simple analysis, Lewis's analysis includes the requirement that an intrinsic property and stimulus s are jointly an x-complete cause of response r, which renders the concept of disposition dependent on the concept of causation. A substantial reformation like this one needs adequate motivations and so Lewis holds that Martin's cases give such motivations. In the foregoing, however, I have argued to the contrary.

Furthermore, I take it that we have a good reason to favor the simple conditional analysis over Lewis's analysis. A thing C has such an intrinsic property B that if it were to undergo a fragility-specific stimulus and retain B, then B and the striking would jointly be a C-complete cause of C's exhibiting a fragility-specific manifestation. However, if it were to be struck it would not break because another intrinsic property B^* of C would join with the striking to throw away B soon enough. It is clear that C is fragile according to Lewis's analysis of fragility, i.e., (6); yet, at the same time, C is physically strong according to (6) because if it were to be struck and retain B^*, it would remain unbroken. Lewis (1997, 150) maintains

that this is an unobjectionable consequence of his analysis. But why so? It sounds absurd that one and the same thing, at the same time, is both fragile and physically strong. It contradicts our common sense that the two opposite dispositional concepts are mutually exclusive. If so, Lewis's reformed analysis does not only lack an adequate motivation but also has an unintuitive consequence.

No such problem plagues the simple analysis of fragility, i.e., (8). According to (8), *C* is not fragile because it would not break if struck; and it is physically strong because it would remain unbroken if struck. This result is in accordance with our common sense that the two opposite dispositional concepts are mutually exclusive. To conclude, Lewis's analysis has but the simple analysis of fragility does not have a consequence that is in conflict with our common sense. This gives us a good reason to favor the simple analysis over Lewis's analysis.

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NOTES

[1] Lewis does not explicitly state that *S* is not fragile. He (1997, 145–146) says: "Are they [styrofoam dishes] fragile? To say so would be at best a misleading truth, and at worst an outright falsehood; and I have no idea which". In my opinion, however, Lewis is unnecessarily cautious here because he has every reason to say that it is an outright falsehood to say that *S* is fragile (Choi, forthcoming).

[2] On this construal, Lewis's response to the case of the styrofoam dish should be reinterpreted. For details, see Choi (forthcoming).

[3] I think it is plausible to connect the concept of fragility-specific stimulus to Stephen Mumford's concept of ideal condition or Wolfgang Malzkorn's concept of normal condition. On this view, to undergo a fragility-specific stimulus is roughly to be struck in an ideal condition relative to an ordinary context of the ascription of fragility or normal condition for fragility. Malzkorn says that a reference to normal conditions is to " "shield" the causal relation between an objects having a disposition and its being tested on the one hand and the display of the respective manifestation on the other hand from intervening events which are *extrinsic* to *x*" (Malzkorn 2001, 142; Malzkorn's italics). Similarly, Mumford (1998, 88) says that he invokes ideal conditions to exclude possible interfering background conditions. This suggests that these conditions are purported to preclude various extrinsic sundries that might interfere a causal process from striking. On this construal, fragility-finks, L(fragility)-finks, fragility-antidotes, and fragility-mimickers all should be ruled out from ideal conditions relative to an ordinary context of the ascription of fragility and normal conditions for fragility because they all are extrinsic sundries that might interfere a causal process from striking. In the present context, it is particularly important that both

fragility-finks and L(fragility)-finks are ruled out from those conditions. In fact, Mumford (1998, 90) and Malzkorn (2000, 464) explicitly state that various finks are excluded from them. Accordingly, when we plausibly connect the concept of fragility-specific stimulus to the concept of ideal or normal condition, the specification of a fragility-specific stimulus must include the absence of fragility-finks and L(fragility)-finks.

[4] The specifications might be infinite or contain an essentially indexical element. In this case (6) and (8) would no longer be a reductive analysis of dispositions.

[5] It is remarkable that Lewis refuses to specify the concepts of disposition-specific stimulus and manifestation exactly. Lewis (1997, 146) takes the detailed specifications of the disposition-specific stimulus and manifestation as affording "no lesson about dispositionality in general". As stated above, however, the plausibility of Lewis's motivation for his analysis depends crucially on exactly what are included in the specification of the disposition-specific stimulus. This suggests that, contrary to Lewis's view, the concepts of fragility-specific stimulus and manifestation need adequate specifications.

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