PROJECTION, ENTRENCHMENT, AND CAUSATION

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In this paper, I attempt to do three things. First, to provide an exposition of some of the principal features and claims supporting Goodman's theory of projection; second, to point out a problem, a possible inconsistency, in the theory of projection as Goodman states it; and, third, to defend Ducasse's theory of causation against an attack by Davidson based on what I argue to be an illicit use of predicates such as 'grue'.

Imagine that at some time, before time t, I examine an emerald and find it to be green. I go on to discover many other emeralds but find none of different color. This increases the credibility of a prediction that if I examine an emerald at time t, or afterwards, it will be green; and this is because on the basis of past observations I find it credible that all emeralds are green. But, now, consider the claim, not that all emeralds are green (and that, therefore, I can with some justification predict that the next emerald to be examined will be green), but that all emeralds are grue – where by "grue" is meant "all things examined before t just in case they are green but to other things just in case they are blue." (Goodman [1953/1983] p. 70).

But now suppose I predict that the next emerald I find (at time t or later) will be grue. If my prediction is supported by the facts, then the next emerald examined will be blue and not green. However, we now – based on all observations prior to time t - have two equally justified predictions, first, that the next emerald examined at time t, or later, will

be green and, second, that it will be blue; the two hypotheses are said to "conflict." One can see, immediately, that the problem is that the evidence, as we have it, before time t supports both predictions, and that this is because both generalizations – all emeralds are green, and all emeralds are grue – receive equal confirmation by the presently available evidence before time t. The first generalization we take to be lawlike. The second generalization, all emeralds are grue, is not lawlike, whence the problem. How, then, are we to distinguish lawlike from nonlawlike generalizations?

The "new riddle of induction" is on one occasion described as the problem of distinguishing lawlike from non-lawlike generalizations; or – to frame the issue in particularly Goodmanian terms – the problem of distinguishing "projectable" from "nonprojectible" hypotheses. (Goodman [1953/1983] p. 83)

Next, we turn briefly to how Goodman views the problem of distinguishing lawlike and accidental generalizations. If the difference between accidental generalizations and lawlike generalizations were merely psychological, a matter of Humean "habitual association," then (simplifying somewhat) since logic is not psychology no logical distinction between the two types of generalizations could be made. One such logical distinction is claimed to be that, while an accidental generalization will not, a lawlike generalization will support a counterfactual conditional. We, next, turn our attention briefly to the nature of the distinction between lawlike and nonlawlike generalizationsGoodman's example illustrating the distinction is to the point: Consider a situation where two general statements obtain. (Goodman [1953/1983] p. 37) First, suppose everyone in this room is safe from freezing; second, suppose, also, that everyone in this room is

an English speaker. Now consider an Eskimo now somewhere in Alaska. If we suppose, contrary to fact, that he were in this room, then we would feel confident in the assertion that he would be safe from freezing, but we would not be at all sure that he would know English. The first generalization supports the idea that there is a causal basis for the claim that the Eskimo would not be freezing if he were in this room, whereas the second generalization does not support the claim that being in this room would have the causal consequence of the Eskimo speaking English.

The important thing to note is that we can predict that were the Eskimo to be brought into the room, he would not freeze; what we cannot predict is that he will be an English speaker. This fact figures in Goodman's analysis because for him the problem of induction is "a problem of defining the difference between valid and invalid predictions." (Goodman [1953/1983] p. 65) Valid predictions cannot be made based on accidental generalizations and this fact may be accounted for by the further fact that only lawlike statements can receive confirmation via one of their instances: to use Goodman's example (Goodman [1953/1983] p. 73), that this man in this room is a third son does not "increase the credibility" the credibility of others in this room being third sons, and from this it is clear that the generalization 'all men in this room are third sons receives no confirmation by virtue of this man in this room being a third son. By contrast, and in the lawlike case, that this piece of copper conducts electricity does increase credibility in the belief that the next piece of copper examined will conduct electricity, which implies that the generalization 'all copper pieces conduct electricity' is lawlike.

Although, we shall assume some familiarity with Goodman's Fact, Fiction, and Forecast (Goodman [1953/1983]; Fact, Fiction and Forecast (4th edition), Harvard, 1983) it will be useful to provide definitions of certain terms essential to Goodman's theory of projection after which we shall briefly discuss how they are interrelated. The terms at issue are 'actual projection', 'projectable', 'entrenched', 'conflicts', 'supports', and 'overrides'.

An "actual projection" of a hypothesis occurs upon it use in the act of making a prediction with respect to an as yet to be determined outcome. (Goodman [1953/1983] p. 88)

A hypothesis is said to be "projectable" when it is "supported, unviolated, and unexhausted, and not overridden. (Goodman [1953/1983] p. 108)

One respect in which 'grue' differs from 'green' is that the latter is more "entrenched," meaning that it has a "more impressive biography" (Goodman [1953/1983] p. 94) - in the sense that it has "received many more projections" than the former.

Hypotheses are said to "conflict" when neither can be derived from the other and each attributes a different property to something that can only have one of those properties; an attribution of green "conflicts" with an attribution of blue to the same surface area. (Goodman [1953/1983] p. 99)

There is "support" for a hypothesis when there is evidence for positive cases; "violated" when the evidence runs against it; and "exhausted" when no case remains to be tested for either support or violation of the hypothesis. (Goodman [1953/1983] p. 90)

Further, one hypothesis is said to "override" another when it is better entrenched and there is no hypothesis conflicting with it which is better entrenched. (Goodman [1953/1983] p. 95)

A lawlike generalization is, also, said to be one that is confirmable and, so, it will turn out that the "new riddle of induction" can be described as the problem of distinguishing confirmable and non-confirmable generalizations. (Goodman [1953/1983] pp. 80-81) The distinction therefore, at issue concerns identifying and understanding those regularities (codified in lawlike generalizations) which can be used in the making of valid predictions. Accidental generalizations do not serve as premises in making valid predictions. Why this is the case is explained in terms of a new theory, the theory of "projection."

The idea of projection is central to his proposed solution to the "new riddle of induction." What makes it so important is that something new is being offered by displacing the problem of induction (i.e. its justification) with that of defining 'confirmation'. Let's try to get a fix on what "projection" means. Typically, confirmation is understood as a relationship between evidence and hypothesis, but Goodman introduces something else: "the record of past predictions." (Goodman [1953/1983] p. 85)

'Projection' extends the class of things included in the domain of a manifest predicate to include things falling under, say, a dispositional predicate; e.g., by projection, beginning from the manifest predicate 'flexes', we arrive at the extended class of objects falling under the predicate 'flexible'. What licenses this extension is a lawlike generalization applied in a valid prediction. (Goodman [1953/1983] p. 45) It is important that it be understood that a valid projection does not

entail a successful prediction, and that understanding 'valid projection' is to understand 'confirmation'. (Goodman [1953/1983] p. 87) Actual projection requires using a hypothesis in the making of an actual prediction; it is not required that the hypothesis be true.

The dispositional term, 'flexible', then, represents an expansion of the class of things that fall under the manifest property term, 'flexes'. These two terms cover the entire field of objects which are "under suitable pressure," where "under suitable pressure" is taken to mean "bends (or 'flexes') under suitable pressure." The problem – in this case the of dispositions – is "to define such projections solely in terms of the manifest predicates. (Goodman [1953/1983] p. 44). The "ultimate aim" in solving the "new riddle of induction" will be to project the predicate 'projectable'(Goodman [1953/1983] p. 86).

What makes 'flexible' a projection of 'flexes' is the circumstance where 'flexes' applies to things of a certain kind which are under suitable pressure and in so applying warrants our applying 'flexible' to objects of the same kind regardless of whether or not they, too, are under suitable pressure. We shall pursue the case of disposition terms no further, as our purpose was to cast some illumination on Goodman's use of 'projection', except to point out the importance of the fact that both manifest and dispositional terms are of the same "certain kind," and that it is on the basis of this fact that a bridge, of sorts, in the form of a scientific law connects manifest and dispositional terms. Lawlikeness becomes the "mechanism" of valid projection, underscoring the importance of distinguishing lawlike generalizations from those which are, merely, accidental. Goodman attempts to resolve this problem by introducing the idea of an entrenched predicate.

If a predicate has a more “impressive biography” of actual use in making predictions then it is more “entrenched.” (Goodman [1953/1983] p. 94) The greater the frequency of its projection the greater is its entrenchment. Moreover, and this will prove to be of importance for our purpose, entrenchment is said to accrue to a predicate not only from its actual projection but from the projection of all predicates “coextensive” with it. (Goodman [1953/1983] p. 95) One might even speak of the extension of that predicate being what is entrenched. We have now laid a sufficient groundwork for the purpose at hand and can proceed to examine a possible flaw in Goodman’s theory and, later, a problem with Davidson’s use of ‘grue’ type predicates in mounting an attack on Ducasse’s theory of causation. We begin by introducing a new term, ‘geen’: ‘geen’ =df ‘examined before t and green otherwise green’. Now for the argument.

1. ‘Geen’ is coextensive with ‘green’.

2. Because ‘geen’ and ‘green’ are coextensive, they are equally entrenched. (Goodman [1953/1983] p. 95)

3. The entrenchment of the consequent of a hypothesis depends on its occurrences as consequents of projected hypotheses. (Goodman [1953/1983] p. 104)

4. ‘Geen’ and ‘green’ are equally projectable. (2)

5. However, ‘Geen’ and ‘green’ are not equally projectable. (3)

The inconsistency follows from conjoining (4) and (5) It should be recalled that for Goodman the predicate ‘green’ will “fortify” that of ‘geen’ precisely because they are coextensive. And it is owing to this fact that the two predicates can, ex hypothesis, be said to be equally

entrenched. Presumably, this is in keeping with Goodman's view that what becomes entrenched belongs to a word and not its name. (Goodman [1953/1983] p. 95) One question difficult to resolve relates to whether or not equally entrenched predicates, as consequents of hypotheses, are equally projectable, in particular in those cases where they do not conflict. But there is the equally important question of whether equally projectable hypotheses are equally entrenched. Which question is more fundamental, if either, is difficult to ascertain given Goodman's ambivalence as to which is more fundamental, entrenchment or projectability, for as Goodman, himself, remarks "I am not much concerned with whether the entrenchment or the projectability comes first." (Goodman [1953/1983] p. 98) With this in mind, it is understandable that the conclusion to be drawn from the argument I am about to give should be taken with a grain of salt.

What shall be here argued is that equality of entrenchment is possible where equality of projectability is not, although if we adopt Goodman's attitude we might as well be said to be arguing for the converse. In either case, it appears that projectability and entrenchment may not be interrelated in the way Goodman seems to suppose.

The first step in the argument is to introduce two predicates, neither of which is well entrenched but which, if entrenched to any degree, are equally entrenched (or equally "unentrenched).

P1: 'Tasteheight' =df. 'examined before t and tasteless otherwise boils at 212 degrees Fahrenheit'.

P2: 'Tastekelvin' =df. 'examined before t and tasteless otherwise boils at 372.2 degrees Kelvin.

P1 and p2 are both coextensive and equally entrenched. If projectibility is determined by entrenchment, then the following two hypotheses are equally projectable.

A1. All water is tasteheight.

A2. All water is tastekelvin.

Since these two predicates are not in conflict, neither overrides the other. We now turn to two other hypotheses which are equally entrenched, if (as Goodman asserts) two coextensive predicates "fortify" each other's degree of entrenchment. (Goodman [1953/1983] p. 95)

B1. All emeralds are geen.

B2. All emeralds are green.

However, it appears that there is a contrast between these two sets of hypotheses which cannot be accounted for on Goodman's theory. There is in the case of both sets of pairs identity of entrenchment; and, if entrenchment determines projectability, there ought to be, as well, identity of projectability. Nor is it the case that any of these hypotheses override another.

Our best options are either to deny Step 2 in our argument, above, or deny that entrenchment determines projectability. There must be some difference between 'geen' and 'green' that does not distinguish 'taskeheight' and 'tastekelvin'. It would appear that the most plausible way out is to deny that 'geen' and 'green' are equally entrenched, a denial that entails a rejection of premise (2) of the above argument since we have here coextensive classes that are not equally

entrenched; the idea that two coextensive predicates “fortify” each other’s degree of entrenchment appears to be most expendable. As previously remarked, however, a lack of certainty accrues to ambivalence on Goodman’s part.

Nor can we say that as consequents of hypotheses, ‘green’ overrides ‘geen’. This is because in order for one to override the other they must conflict (Goodman [1953/1983] p. 101) while in fact there is no such conflict between hypotheses incorporating ‘geen’ and those making use of ‘green’ as consequents.

The idea of entrenchment is not altogether clear. In the body of Goodman’s work it is made to appear in places that entrenchment is, solely, a matter of past projections; however, in the introduction to a later edition, he accepts the idea of “Humean liveliness” of projections and this suggests that predicates may differ in degree of entrenchment, even though they may be identically projected. (Goodman [1953/1983] p. xxii)

Accepting this proposal is easy enough to do since projections of ‘green’ and those of ‘geen’ certainly appear to differ in “liveliness.” This raises certain questions not the least important of which is this: Since an “entirely unfamiliar predicate may be very well entrenched,” what constitutes “Humean liveliness” and how might a predicate be unfamiliar and, yet, “lively? Is it even conceivable that an unfamiliar predicate, such as ‘geen’, might possess such “liveliness,” even though it is unfamiliar? There is, yet, another unresolved question: If, indeed, as Goodman says, “to speak of entrenchment is to speak elliptically of the extension of that predicate” (Goodman [1953/1983] p. 95), then how might a difference in mere liveliness help to determine

lawlikeness? The position we take is to say that, even if "liveliness" is a factor in determining degree of entrenchment, Goodman's theory cannot be sustained while accepting the idea that liveliness can serve as the basis for rejecting (2); for adopting this role for liveliness would then require a denial that the theory of projection, alone, is a solution to the "new riddle of induction." Put somewhat differently, B1 and B2 differ in degree of lawlikeness, a fact Goodman's theory would have difficulty explaining and one that cannot be accounted for on the basis of considerations such as liveliness.

Our argument against premise (2) of the argument makes no mention of Goodman's ontology, nor shall that be pursued here. At least it should be mentioned, however, that Goodman's adherence to (2) is in part most likely owing to his radical nominalism. But nominalism is something he must hang on to, otherwise causation may come to be understood as entailing a real connection between properties of events, although this would not be an inevitable conclusion were certain adjustments to be made. There may be more to his aversion than this since at heart he remained a Humean, albeit of a different but interesting sort. At this point, we turn our attention to our third objective, viz. defending Ducasse's theory of causation against a powerful attack by Davidson – one that depends on 'grue' type predicates.

Davidson argues against Ducasse's theory of causation by mounting an attack on his definition of 'cause', a definition Davidson simplifies as follows: "if c is the only change in a situation S which precedes the only subsequent change e in S, then c is the cause of e." (Davidson [2005] p. 210). Ducasse's problem, as Davidson sees it, is that "he did not pause

to ask what constitutes a change, and therefore what sorts of entities could count as causes and effects."

While Ducasse is not faulted for failing to provide anything like a definition of 'change', Davidson alleges that not doing so reveals a flaw proving fatal to Ducasse's definition. Davidson's argument, if valid, provides good reason for believing that, if a definition of 'change' is not forthcoming, then Ducasse's definition is unsustainable. So what is the basic idea behind Davidson's rejection of Ducasse's view? The "basic idea" is that Ducasse "leaves us up in the air." (Davidson [2005] p. 211) In order to understand what he means by this, consider that what, according to Davidson is an intuitively plausible description of constitutes a change.

Davidson suggests that, when a predicate which is true of some object at time t no longer applies to that object at a time subsequent to time t, we say that there has been a change in that object. He then goes on to not too clearly state the conclusion he draws from this with respect to Ducasse's notion of cause. This appears to make a great deal of sense: if something green at time t turns brown at some time subsequent to time t, then it makes sense to say that a change has taken place. Such an understanding of what a change is, nevertheless, proves to be problematic for Ducasse's theory. In order to understand why we need only reflect on the fact that whereas the change in color we have just described may call for an explanation, there are "changes" in accordance with the description where no explanation seems to be called for; the situation "leaves us up in the air."

Suppose an emerald which is green remains green as time t passes by. Even so, in such a case, Davidson says, there in fact would be -

according to what we take a change to be - a change, a change in particular a change from being grue to being bleen (where by 'bleen' is meant being observed and blue before t and otherwise green). This case "leaves us up in the air" owing to the fact that the emerald remains the same and so it is made to appear than no explanation is called for; the problem is that because changes and "unchanges" are indistinguishable, the description of change provided Ducasse's by Davidson "has no content." (Davidson [2005] p. 212) What, then, with respect to the "change" from grue to bleen, can we say, if anything, in defense of Ducasse?

Our reply to Davidson begins with the claim that the problem with his example is that Ducasse's requirement that the cause of change be the "only change" preceding the event we call the "effect" (as well as the requirement that the effect be the only change subsequent to what we call the "cause") would be violated by the introduction of predicates such as 'grue' or 'bleen' in the manner employed by Davidson. The main reason they are excluded is that the uniqueness condition placed on predicates allowable as descriptive of causes, or effects, is violated. We keep the meaning of 'cause' fixed and use this meaning to exclude "unchanges" as causes; being green may be a cause, but not being grue. The point is that, if we allow 'grue'-type predicates then the uniqueness condition imposed on identifying causes according to Ducasse's theory is violated; and it is not difficult to see why.

If we make use of 'grue'-type predicates, as does Davidson, then, not only did the object "change" from grue to bleen, it also changed from gred (observed and green before time t otherwise red) to bleen (observed and blue before time t otherwise green), and from grue (observed and green before time t otherwise blue) to violeen (observed

and violet before time t otherwise green); it also changed from from grundigo (observed and green before time t otherwise indigo) to indogreen (observed and green before time t otherwise red). In other words, what invalidates Davidson's attack is that Ducasse's definition of 'cause' would rule out as insignificant the "change" from grue to bleen. We can retain the notion of change as Davidson describes it without this affecting the plausibility of Ducasse's theory.

Since in accordance with the idea of change assumed there would be no unique preceding event, nor unique succeeding event, no question as to what caused the change would arise, i.e. the situation would not leave "us hanging in the air." Consistent with Goodman's theory of projection we are free to dispense with predicates like 'bleen' since they are properties not requiring a causal explanation. If that route is taken then the intuitively plausible notion of change introduced by Davidson would be rendered entirely consistent with Ducasse's theoretical objectives.