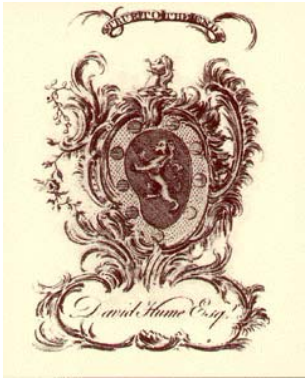

Hume and Causal Inference

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HUME AND CAUSAL INFERENCE

Hume held that any time we reach by inference a belief about the existence or qualities of some object or event that we have not actually perceived, the inference is grounded in beliefs about causal relations holding between the object of belief and some other object or objects that have actually been experienced. I will examine here Hume's account of such causal inferences. There are many places in the Treatise of Human Nature[1] at which Hume seems to claim that causal inferences take place when and only when the percipient has had an extensive previous experience of objects of the respective types as regularly conjoined in relations of contiguity and temporal priority. It seems to me that reliance on these passages alone gives a distorted view of Hume's theory of causal inference. Contrary to appearances, Hume did not hold that extensive previous experiences of objects of the same types as properly conjoined is either necessary or sufficient for causal inference. Hume's view is more subtle and complicated, and there are important considerations of coherence and holism present in it. Getting Hume's view on this matter clear is important because it shows how he can escape some of the objections that have been laid against his theory, and it makes possible a reading of Hume as a causal realist. Hume's theory of inference provides the resources for drawing a distinction between accidental and genuine causal regularities and it is compatible with the view that causal relations (and not mere de facto regularities) hold among events in the world independently of their being perceived.

The examination begins by looking at a different, but related, issue. Why does Hume think

that of the three types of association, only cause and effect association is capable of producing belief? Hume puts the question in the form of a possible objection to his account.

> For it may be said, that if all the parts of that hypothesis be true, viz. that these three species of relation are deriv'd from the same principles; that their effects in inforcing and inlivening our ideas are the same; and that belief is nothing but a more forcible and vivid conception of an idea; it shou'd follow, that that action of the mind may not only be deriv'd from the relation of cause and effect, but also from those of contiguity and resemblance. But as we find by experience, that belief arises only from causation, and that we can draw no inference from one object to another, except they be connected by this relation, we may conclude, that there is some error in that reasoning, which leads us into such difficulties. (T 107)

It is important to note that Hume is talking here only about beliefs about the existence or situations of objects that have not been intuited or experienced. Beliefs about relations of ideas (e.g., that 2 + 2 = 4) are intuitions (or perhaps memories of intuitions).[2] Beliefs in the existence of things as experienced or in the previous existence of things as previously experienced automatically have the vivacity of impressions or memory ideas.[3] What Hume takes himself to need to explain is why cause and effect association allows for a transfer of this vivacity to an idea of an object or situation that has not itself been intuited or experienced and why resemblance and contiguity association do not.[4] If I see a green ball next to a red sweater, then I will normally subsequently believe that the green ball existed next to the red sweater at that time (at

least until my memories begin to lose vivacity). This is purely a matter of sense experience and memory. Now if I subsequently see a different red sweater (or the same sweater in a different location), I may be led to think of a green ball existing next to it purely through contiguity and resemblance association. But presumably I would not believe that a green ball existed next to the currently perceived red sweater unless I currently perceived a green ball or my belief was based on some form of causal inference.[5]

In response to this objection we may expect Hume to say that it is the prior repeated experiences of similar cases necessary to produce cause and effect association that makes the difference. Somehow the repetition allows for a greater transfer of force and vivacity than does simple resemblance or contiguity. It is surprising, therefore, to find Hume giving a different sort of answer.

> 'Tis evident, that whatever is present to the memory, striking upon the mind with a vivacity, which resembles an immediate impression, must become of considerable moment in all the operations of the mind, and must easily distinguish itself above the mere fictions of the imagination. Of these impressions or ideas of the memory we form a kind of system, comprehending whatever we remember to have been present, either to our internal perception or sense; and every particular of that system join'd, to the present impressions, we are pleas'd to call a reality. But the mind stops not here. For finding, that with this system of perceptions, there is another connected by custom, or if you will, by the relation of cause and effect, it proceeds to the consideration of their ideas; and as it feels that 'tis in a manner necessarily determin'd to view these particular ideas,

> and that the custom or relation, by which it is determin'd, admits not of the least change, it forms them into a new system, which it likewise dignifies with the title of realities. (T 107-8)

The part of this explanation that Hume tends to emphasize in the subsequent text (T 109-10) is the part that says that ideas brought about by cause and effect association differ from those brought about by resemblance or contiguity in two ways: (1) the mind is determined to have the former whereas there is a higher degree of choice or caprice with respect to the latter, and (2) the mind is always moved to have the same ideas on subsequent occasions with the other relations. It is not clear, however, how these purported facts are supposed to answer the objection. For neither of these facts seem to explain why on each particular occasion of association more force and vivacity is transmitted by cause and effect than by the others. The two facts seem to be just as much in need of explanation as the original explicandum.

Of course, prior repeated experiences of resembling cases may provide a basis for explaining all three alleged facts. The repetition of resembling cases in the past leads to the formation of a habit or disposition which makes the association in the current case more forceful, less subject to choice, and such that the same object will always be associated with the triggering impression in the future. It is surprising, however, that Hume does not introduce this further explanation at this time. What we find instead is that Hume characterizes the ideas produced by cause and effect association as producing a system of perceptions that intertwines with the system of ideas of memory to produce the percipient's internal representation of reality.

Hume says that by means of cause and effect association "I paint the universe in my imagination." (T 108) He also says that it is in part the "settled order" of ideas produced by cause and effect association that distinguishes them from the other ideas of the imagination. (T 108) It is thus characteristic of an idea produced by cause and effect association that it fits into and coheres with an entire system of ideas representing causal relations present in the world of reality. It is in part the fact that the idea finds a comfortable place in this representation of the causal nexus that allows it to have the vivacity and influence of a belief.

This suggests that repetition of resembling cases, while an important factor and necessary to the original construction of the inner system of ideas, is neither necessary nor sufficient for any particular causal inference. Cases in which objects have been constantly conjoined in past experience may fail to produce cause and effect association in the percipient if the respective perceptions do not cohere properly with the inwardly represented causal nexus. On the other hand, cases in which there is only a single experienced instance of conjunction may produce belief through causal inference provided that the relevant perceptions fit well into the inner representation of reality. Before we explore the significance of these findings for Hume's account, let me provide additional textual evidence to show that Hume's reference here to an inner system of ideas whose relations model those of objects in the external world is not an isolated or accidental item.

In An Enquiry Concerning Human Understanding[6] Hume provides another clear reference to this notion.

In talking of cause and effect association there, he says:

> Here, then, is a kind of pre-established harmony between the course of nature and the succession of our ideas; and though the powers and forces, by which the former is governed, be wholly unknown to us; yet our thoughts and conceptions have still, we find, gone on in the same train with the other works of nature. (E 54-5, my emphasis)

and:

> ...nature has ... implanted in us an instinct, which carries forward the thought in a correspondent course to that which she has established among external objects; ... (E 55, my emphasis)

There are other passages to show that Hume thinks that the systematic relations among the ideas of memory and those produced by cause and effect reasoning are important for producing the force and vivacity required for belief. He notes that tragedians often borrow some characters or events from known history in order that their stories may cohere well with our inner systematic representation of reality and gain from that coherence additional impact on our imaginations. (T 122) Likewise poets attempt to create a "poetical system" (T 121) of things in order to have increased impact on the fancy and produce "counterfeit belief" (T 123). Poetry fails ultimately to produce belief, not because it fails to enliven the spirits, but because it fails to have substantial connections with the system of reality.

> ...the great difference in their feeling [beliefs vs. poetical fictions] proceeds in some measure from reflexion and general rules. We observe, that the vigour of conception, which fictions receive from poetry and eloquence, is a

> circumstance merely accidental, of which every idea is equally susceptible; and that such fictions are connected with nothing that is real. (T 631, my brackets)

It is also clear that Hume thinks that a single experience of conjunction can provide the basis for causal inference. (T 104; cf. T 131, E 107fn.) But his explanation of how this is possible seems incomplete. He says that we have had "millions" of experiments to convince us of the principle "that like objects, plac'd in like circumstances, will always produce like effects" and it is the custom or habit representing this principle that carries the inference in the case in which there is but a single experience of conjunction. (T 105) This explanation is incomplete because it does not explain why we do not apply this principle to each and every case of conjunction that we experience.

Now Hume has qualified his claim by saying that an inference based on a single experience is possible provided that the experiment is carefully designed so as to eliminate all foreign and superfluous circumstances (T 104), but he has not given an explanation in terms of his theory of why removal of such circumstances is important to the inference's going through or how such circumstances are to be identified. I suggest that in the background of Hume's thought here is the notion that it is features of the total internal representative system, one's general view about how features of the world causally relate to one another, that determine what are and are not taken to be causally superfluous circumstances and that determine whether or not the single experiment will produce a disposition to make a causal inference in subsequent cases.

Further support for this view can be had by looking carefully at what Hume has to say about the probability of causes. He says that one possible source of a causal inference not having the strength of a proof is that there have not been sufficient previous experiences to strengthen the habit to the point of producing full assurance. (T 130) But he immediately downplays the importance of this form of causal probability. He says, "...no one, who is arriv'd at the age of maturity, can any longer be acquainted with it." (T 131) Apparently Hume believes that an extensive experience of resembling cases of conjunctions of events is needed in order to produce the habits and determinations of thought that underlie causal inferences, but that once a network of such habits is developed, and this happens fairly early in cognitive development, previous experience of the particular conjunction is not very important in determining whether causal inferences are made in these cases. Far more important is the question of whether there has been contrariety or analogous cases in previous experience. (T 131-42) In terms of the interpretation offered above, we can say that what generally determines whether a causal inference goes through in a particular case is how well that case fits into the total previous experience of the percipient as that experience is represented in the individual's internal mapping of the causal nexus of reality. There is an element of holism present in Hume's account of causal inference that is not often recognized.

Further evidence for this reading of Hume can be provided. In the Enquiry Hume says, "There is no man so young and unexperienced, as not to have formed, from observation, many general and just maxims concerning human affairs and the conduct of

life" (E 45, no. 1); and he goes on to make clear that these general maxims play a central role in inference. In the Treatise, after his discussion of the idea of necessary connection, Hume says, "...when by any clear experiment we have discover'd the causes or effects of any phaenomenon, we immediately extend our observation to every pheanomenon of the same kind, without waiting for that constant repetition, from which the first idea of this relation is deriv'd." (T 173-4, my emphasis) He goes on in this section to emphasize the importance of general rules in drawing causal inferences.

It seems to me that there is adequate textual evidence to support the following summary account of Hume's theory of causal inference. The habits and dispositions of thought that are involved in causal inference (and the idea of necessary connection that is derived from them) must originate from repeated cases of conjunctions of events in experience. Once these habits have been formed, however, they combine with the percipient's memories to constitute a dispositional network that represents the percipient's view of reality as a whole. In advantageous circumstances the connections among the dispositions and ideas in this network accurately map the causal connections among objects and events in the world. Whether a causal inference results from a particular case of experienced conjunction of events subsequently will depend primarily on how well that case fits into the overall internal system. If it fits well, then a single experience of conjunction can produce a causal inferential disposition (a tendency for an impression or memory idea of either of the pair of conjoined events to produce an idea of the other of the pair and transmit to it sufficient force and vivacity to have it constitute a belief).

If it doesn't fit well, then, even if there has been an extensive experience of conjunction of resembling events, the case will have basically the same status as the cases of mere resemblance and contiguity discussed earlier. The mind will have some tendency to think of the related idea upon having an impression or memory idea of the other of the pair, but there will not be sufficient transmission of force and vivacity to give this idea the strength of a belief rather than that of a mere conception.

The theses of note which this interpretation attributes to Hume are: (1) our inferential dispositions form a system, which, under favorable conditions, mirrors the system of causal relations in the world; (2) it is how well a new experience of conjunction coheres with the total inferential system that determines whether it will ground a new inferential disposition; and (3) previous experience of resembling cases is neither necessary nor sufficient to produce an inferential disposition.

Now it is time to assess the significance of this interpretation of Hume's view of causal inference. For one thing, it seems clear that it allows for a response to certain traditional objections to Hume's account. For example, there are the familiar objections of C.J. Ducasse that Hume's account is both too strong and too weak to give a correct analysis of causation. It is too strong because there are cases of causation that do not satisfy Hume's analysis, and it is too weak because there are cases that satisfy the analysis but which are not cases of causation.[7]

For an example of the first kind of case, Ducasse tells of an experiment that he occasionally performed. He would bring a wrapped parcel into the lecture hall and place it on the desk in front of the

class. He would then place his hand on the parcel and the end of the parcel facing the students would begin to glow. Questioning the students showed that they identified his placing his hand on the parcel as the cause of the parcel's beginning to glow.[8] This is supposed to present a problem for Hume's view because it is implausible to think that the students have extensive previous experiences of conjunctions of these particular events. But of course it is reasonable to think that the students did have extensive previous experience of things that begin to glow (flashlights, lamps, etc.), that they are aware that such things are often caused to glow by switches which are flipped or depressed by hand movements, and that a parcel is the kind of thing that might well contain a lightable device like these. This is the kind of background knowledge of the world that, on my interpretation of Hume, represents the person's internal representation of reality and plays a decisive role in whether the person makes a causal inference in any particular case. So Hume can easily explain the fact that the students made the inference they did.[9]

The second kind of alleged problem for Hume is presented by the following case. Suppose that Lefty, a baseball player, is impressed by the fact that every time he has worn a particular pair of socks, his team has won the game. Given this regular conjunction of events it may be supposed that Hume is committed to the claim that we will infer that Lefty's wearing his lucky socks is the cause of his team's winning. But clearly, on my interpretation, Hume is not committed to this claim. Whether or not we make this inference will depend on how well this particular conjunction of events fits into our total background picture of how things hang together in the

world causally. Now there are ways with which we are familiar that a person's wearing a particular item of clothing might have some effect on the nature of some competitive group activity involving that person. It might affect the performance of the person wearing the clothing or the performance of others by affecting their attitudes or beliefs. In this way it may be that the wearing of the lucky socks has some effect on the outcome of the game. We can test for such influence, however, and if it is not present in this case, then it will be hard to come up with any way of making this case cohere with the causal mechanisms with which we are familiar and we will be likely not to make the causal inference.

Now it might be claimed that I have missed the point, or at least part of the point, of Ducasse's objections. Ducasse is primarily attacking Hume's analysis of causation, not his account of causal inference. There is nothing in Hume's definition of cause that makes reference to coherence with the background system of other presumed causal relations. The definition makes reference only to the regularity of conjunctions of events. So at best my defense is partial.

To evaluate this objection we need to remind ourselves of Hume's official definition of cause. Hume offers, in effect, two definitions in both the Treatise and the Enquiry. The Treatise definitions are:

> T1) [A cause is an] object precedent and contiguous to another, and where all the objects resembling the former are plac'd in like relations of precedency and contiguity to those objects, that resemble the latter.
>
> T2) A cause is an object precedent and contiguous to another, and so united with it,

> that the idea of the one determines the mind to form the idea of the other, and the impression of the one to form a more lively idea of the other. (T 170)

The Enquiry definitions are:

> E1) [A cause is] an object followed by another, and where all the objects similar to the first are followed by objects similar to the second. Or in other words, where, if the first object had not been, the second never had existed. (E 76)
>
> E2) [A cause is] an object followed by another, and whose appearance always conveys the thought to that other. (E 77)

If we consider definitions T2 and E2, we can see that the objection raised above on behalf of Ducasse is not legitimate. For both T2 and E2 define what it is to be a cause in terms of being the kind of event the perception of which results in a causal inference. Since whether a case results in a causal inference or not depends upon how that case fits into the entire background of causal beliefs, it turns out that whether or not an event is a cause does depend on the coherence of the case with the background system of other presumed causal relations.

If we consider definitions T1 and E1, on the other hand, it seems that the objection is legitimate. But there is room to suggest that this may be only an appearance. For it is open to one perhaps to interpret Hume as implicitly requiring that the objects be similar in all causally relevant respects. This, of course, introduces circularity into the definition, but Hume did not set great store on the value of these statements as definitions anyway.[10] Moreover, the circularity is not complete circularity. What counts as a causally relevant

feature is determined by the entire background of causal beliefs, and this system of beliefs originated from cases of pure regularity and repetition. The system adjusts as new presumed causal relations are added, and it may even be that some of the cases of regularity that originally give rise to the system are now rejected because they do not cohere well enough with other features of the system as it has developed.

This interpretation would help to explain Hume's claim that the second half of E1 is merely a restatement of the first half. If the first half is read as merely requiring regular conjunction in fact, then it is hard to see how it can have the counterfactual force of Hume's purported restatement of it, as many commentators have noted. But if we read the first half as requiring similarity in all causally relevant respects, then its having counterfactual force can be explained. Not all cases in which we are inclined to say that the same events have always been conjoined will be cases in which same events of causally relevant types have been conjoined. What will count as a causally relevant type of event will be determined by our current best picture of how things in the world hang together causally, and on this basis it is doubtful that, for example, the circumstance of wearing a certain pair of socks relative to the winning of a game will be considered a causally relevant type of event. Only certain regularities in fact will pass this test, and it is reasonable to suppose that those will support counterfactuals.[11]

There are additional items of significance supported by this interpretation of Hume's theory of causal inference. First, under this interpretation, Hume's account is perfectly capable of distinguishing

between accidental and truly causal regularities. In general, only genuine causal regularities will be such as to bring about causal inferences in the mature, reasonable, and temperate perceiver. Merely accidental regularities (even on the cosmic scale) will not have such an effect. This is because the mature perceiver will have built up a complex inner network of mental dispositions that mirror causal relations in reality and, being also reasonable and temperate, will restrain his impulse to make rash judgments and will allow his inferences to work through the entire internal network and be guided by the general rules informed by it.[12]

Second, this interpretation enables Hume to be a causal realist - to hold that causal relations exist among objects and events in the world independently of their being perceived or known. Hume does claim vehemently, of course, that we can have no knowledge of what causal powers are intrinsically or how genuine causal relations differ intrinsically from cases of accidental conjunction. But this is compatible with the existence of such powers and differences. Our epistemic access to causal relations comes through that instinct implanted by nature (E 55) which results, under favorable conditions, in our causal inferential dispositions among perceptions matching or mirroring the causal relations among things in the world. The only way that we can recognize errors in our causal beliefs is on the basis of a rift developing between those beliefs and some range of our other causal beliefs about the world. This all allows, however, that the causal relations among things in the world is one thing and the inferential structure in our minds another.

Is Hume, in fact, a causal realist? Giving adequate treatment to this question would be a large project involving among other things working through in detail the labyrinth of Hume's discussion of skepticism regarding the senses (T 187ff.). (If there isn't an external world, there isn't an external world with causal relations in it.) I am inclined, however, to think that the answer is "Yes." Let me close by mentioning what I take to be one of the most important considerations in favor of viewing Hume as a causal realist. Causal realism is the view of common sense, and it is recognized by Hume as such (T 167-8). I think that Hume would view it as among those beliefs (like the belief in the existence of body (T 187)) that we cannot help but have. If Hume cannot help but have the belief, he has it; and he is a causal realist. Of course, Hume believes that there are false elements in the common sense belief. We spread on external objects that sensible idea of causal power that we derive from our internal feelings of determination (T 167), and this is a mistake. But the mistake is to suppose that we have some positive idea of what a causal power is, not that there are causal powers (T 168). But, then, isn't talk about causal powers without a positive idea to back it up meaningless? There is certainly at least an apparent tension here with Hume's idea theory of meaning.[13] But there is a precedent in Hume for his holding that a quality of which we cannot adequately conceive might actually exist in the world. In his argument against a vacuum (T 53ff.), Hume claims that we can have no positive idea of empty extension. Yet he allows that the world itself might contain invisible and intangible "distance" and moreover that he is inclined to think that it does because such a view accords with common

sense and a right understanding of Newtonian philosophy (T 639).[14]

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1. References to A Treatise of Human Nature will be to the L.A. Selby-Bigge, 2nd. ed., revised by P.H. Nidditch, (Oxford: Clarendon Press, 1978) and will be cited as 'T' followed by the relevant page number(s). Among the places at which Hume seems to commit himself to the view that inference requires extensive previous experience of the same species of events are T 87, 93, 102, 163.

2. It is not clear what vivacity or liveliness intuitions have. Perhaps they merely are perfect transmitters of whatever vivacity exists in ideas inferentially connected to them. If I believe that I have two dollars in my right pocket and I believe that I have two dollars in my left pocket, I will believe (via the intuition that 2 + 2 = 4) that there are four dollars in my two pockets.

3. "...the belief or assent, which always attends the memory and senses, is nothing but the vivacity of those perceptions they present;...." (T 86)

4. When he is being careful, Hume allows for other sources of vivacity and belief. For example, he describes madness as a state in which the animal spirits have been so aroused that "every loose fiction or idea, having the same influence as the impressions of the memory, or the conclusions of the judgment, is receiv'd on the same footing, and operates with equal force on the passions. A present impression and a customary transition are now no longer necessary to inliven our ideas." (T 123)

5. Suppose that at some later time I see the same red sweater in the same spot as I earlier experienced it, but that I am seeing it from an angle that would block the view of the spot in which the green ball previously existed. I may, nonetheless, believe that the green ball now

exists at that spot. Here, though, Hume would claim that my belief is based on causal inference as well as memory. Memory would supply the belief that the ball was previously at that spot, but causal inference would be required to produce the belief that it is now there. Hume would say that even the belief that it is the same sweater is based on causal inference. See T 74 and Hume's extended discussion of continued existence in Part IV, Section II.

6. References to the Enquiry will be to the L.A. Selby-Bigge, 3rd. ed. in Enquiries Concerning Human Understanding and Concerning the Principles of Morals, with text revised and notes by P.H. Nidditch (Oxford: Clarendon Press, 1975) and will be cited as 'E' followed by the relevant page number(s).

7. C.J. Ducasse, Nature, Mind and Death (La Salle, Ill.: Open Court Publishing Co., 1951), chap. 7, pp. 91-100.

8. Ducasse, p. 95.

9. Cf. T. Beauchamp and A. Rosenberg, Hume and the Problem of Causation (New York: Oxford University Press, 1981), pp. 105-15.

10. Hume says, "...so imperfect are the ideas which we form concerning it, that it is impossible to give any just definition of cause, except what is drawn from something extraneous and foreign to it." (E 76; cf. T 170)

11. For an extensive discussion of Hume's two definitions and the literature on them see Beauchamp and Rosenberg, chap. 1.

12. Cf. Beauchamp and Rosenberg, pp. 122-157. They claim that Hume can draw a distinction between accidental and lawlike regularities on the basis of greater inductive support and predictive confidence with respect to the latter. My account offers an explanation for the greater inductive support and predictive confidence in terms of coherence and holism and claims that the basis for this explanation lies in the passages from Hume quoted earlier.

13. See, however, Donald Livingston, Hume's Philosophy of Common Life (Chicago: University of Chicago Press, 1984), especially ch. 3, for an argument that what Hume has to say about the

meaning of terms in Book III of the Treatise and elsewhere should make us reject the view that Hume holds an idea theory of meaning.

14. I am indebted to Alex Rosenberg, Ferdy Schoeman, and referees of this journal for helpful comments on an earlier version of this paper.