

Causality and Probability in David Hume: Implications for Science

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Abstract

David Hume explored the concepts of causality and probability and this had a great impact on modern science. His response to the problem of knowledge challenged the claims of science to reliable knowledge. Causality and Probability are the pillars of scientific knowledge which rely on empirical observation and testing to establish causal relationship and make probabilistic predictions. For Hume, knowledge stems from impressions and ideas. According to him, causality and probability are based on habitual association of events. This work attempts to examine Hume's criticism of causality and probability and its implication to scientific knowledge. It employs critical and analytic methods of investigation. The work concludes that empirical evidences are required for knowledge to be objective and reliable.

Keywords: Casualty, Probability, Scientific Knowledge, Hume, Empirical evidence

Introduction

Man has always sought for answers about himself and the world around him. According to Aristotle (1941 :250), "All men by nature desire to know". This inquisitive nature of seeking solutions to problems is the act of philosophy and science. Though these disciplines differ in their methods of discovery, the pursuit of truth remains constant. Eboh (2011:35-36) states that " the earliest account of ancient science and philosophy can be found in Ancient Egypt and Mesopotamia, where knowledge was birthed." The Modern period of the seventeenth century was an age that introduced yet another dramatic change to the history of Western

philosophy. It marked the advancement in scientific knowledge and rejection of skepticism. In this period, there were new scientific discoveries and methods that advanced science, the invention of machines like the telescope, microscope, thermometer and many more.

In the later part of the modern period, Rene Descartes (1596- 1652) is said to be the first to attempt establishing knowledge on a solid foundation by using mathematics to search for this certainty, he started this search through his methodic doubt, where he subjected all knowledge to doubt to arrive at the knowledge of his own existence – the knowledge of the “cogito”. Through his Methodic Doubt, Descartes posits that the mind is able to attain the knowledge of objects independent of them. His statement supports the claims of other rationalists – Spinoza and Leibniz that reason is the only means to certainty in knowledge. These rationalists argue that innate ideas can be known in the absence of empirical verification. They claim that the ultimate starting point or avenue of all human knowledge is reason. In other words, reason is the primary source of all knowledge.

While the rationalists saw reason as the only primary source of all true knowledge, the British empiricists- John Locke, George Berkeley and David Hume insist that only through sense experience can true knowledge be obtained. John Locke (1632 – 1704), the leader of the empiricists rejected the theory of innate knowledge of the rationalists and holds that sensation and reflection are the two sources of all our ideas. Locke (1974:7) in his book entitled *Essay Concerning Human Understanding* was the first to produce a full length enquiry into the scope and limits of the human mind . In the introductory section of this *Essay*, Locke tells us that “My purpose - to inquire into the original, certainty, and extent of human knowledge, together with the grounds and degrees of belief, opinion and assent.”

Locke (1974 :9) argues that the human mind at birth is like a blank piece of paper on which nothing has been written. What he refers to as a ‘tabula rasa’. According to him, all knowledge originates from experience and is limited to knowledge of ideas. Knowledge for him is all about ideas which means that we do not possess direct knowledge of things only of ideas about those things. The two sources of idea are “ sensation and reflection”. Sensations, being the ideas drawn from the

external world and reflections are from the internal operations of the mind within us. For Locke, external objects possess two qualities, primary and secondary qualities. The primary qualities, though essential but are not perceivable. While the secondary qualities are subject to the senses. As an empiricist, he strongly holds that the primary source of human knowledge cannot enable one have access to the primary qualities of things and denies that we can know an object as it is in itself, what he calls the 'substratum'. True knowledge of objects for him is known through sense experience. This position was further endorsed by Berkeley(1974:152) in his concept of *esse est percipi* which means that our knowledge of things consists in their being perceived.

David Hume's Empiricism (Analysis and critique of causality)

David Hume (1988 63-64) in his book, *An Enquiry Concerning Human Understanding*, made an analysis of the mechanics of all human thoughts and gave insights of how the mind receives its materials of thought. Hume does this by making a distinction in the contents of the human mind. He divided the contents or perceptions into two namely: Impressions and Ideas which for him were the basic elements of human thoughts. He reveals what he means by impressions and ideas:

Here therefore we may divide all the perceptions of the mind into two classes or species, which are distinguished by their different degrees of force or vivacity. The less forcible and lively are commonly denominated *Thoughts* or *Ideas*. The other species want a name in our language... and call them *Impressions*; employing that word in a sense somewhat different from the usual. By the term *impressions* then, I mean all our more lively perceptions, when we hear, or see, or feel, or love, or hate, or desire, or will. And impressions are distinguished from ideas, which are the less lively perceptions, of which we are conscious, when we reflect on any of those sensations or movements above mentioned.

Writing on Hume, Jenkins (1992:14-15) vividly asserts that:

Impressions constitute, as one might put it, the master key to Hume's empiricism. Everything else stems from them. One useful way of getting to understand precisely what Hume was referring to by the term 'impressions' is to bear in mind that Hume saw a

clear distinction between feeling and thinking. Impressions refer to feelings in a broad sense and ideas refer to thoughts.

Jenkins (1992:16) also observes that Hume's characterization of the distinctions , makes it clear that the perceptions differ in degree and not in kind. Hume as he states describes ideas as copies of impressions. Hume (1988:63) illustrates the superiority of impressions over ideas by painting a picture of when a man feels excessive heat or moderate warmth and afterwards recollects those sensations in his imagination. The faculties of memory or recollection and imagination only imitates the original sensations with less force.

Hume's main interest was to show that all human knowledge is derived from impressions and ideas. Impressions being the original perception while ideas were the reflections of the impressions. By impressions, Hume means the most forceful and active perceptions. They are the actual sensations we experience and are forceful during the moment of reception. For instance, when I perceive an elephant, I have an impression of that elephant. The other perception is less forceful and he calls it – ideas. They are the concepts formed from the impressions. For instance, the thought or recollection of the said elephant is an idea. Ideas are linked to the elements of thought. Ideas are therefore faint copies of impressions which are revealed through the faculties of memory and imagination. They are the products of impressions. Commenting on this, Hume (1988:63) writes: "When we reflect on our past sentiments and affections, our thought is a faithful mirror and copies its object truly, but the colours which it employs are faint and dull in comparison of those in which our original perceptions were clothed." Hume goes on to distinguish between simple and complex ideas. He claims that all our simple and complex ideas are derived from simple impressions which correspond to them. For example, when one sees a horse, it is a simple impression while the thought or to think of that horse is a simple idea. In his words,(1988:65) 'We may prosecute this enquiry to what length we please; where we shall always find, that every idea which we examine is copied from a similar impression'. Simple impressions act as building blocks of complex impressions. For complex impressions are made from a combination of more than one simple impression and the recollection of complex impressions are known as complex ideas. Jenkins (1992:16)expresses Hume's views when he says: "Thus, my seeing the colour blue

of a certain book, not having noticed its title or its texture, will constitute a simple impression; my view of Prince Street, with its shops, buses, cars , pedestrians etc., from Edinburgh castle will be a complex one.”

For Hume, though ideas are boundless by nature, they depend on the senses for information and this makes the senses superior to the ideas. This also means that the mind is confined within the limits of the senses. Hume further explains that ideas are products of the mind’s faculty of compounding, transposing, augmenting, or diminishing the materials afforded us by the senses and experience. In other words, without the furnishing of the senses and experience, the mind will not have the ability to form ideas. He (1988: 64) argues:

But though our thoughts seems to possess this unbounded liberty, we shall find, upon nearer examination, that it is really confined within very narrow limits, and that all this creative power of the mind amounts to no more than the faculty of compounding, transposing, augmenting, or diminishing the materials afforded us by the senses and experience.

For Hume, every idea is supposed to reflect a corresponding impression. He tells us that in some cases, this rule does not apply. For example, he claims that a golden mountain has never been seen but it could be conceived by combining two ideas , gold and mountain. This according to him, (1988:64) occurs “ when we think of a golden mountain, we only join two consistent ideas, *gold* and *mountain*, with which we were formerly acquainted”. He (1988: 65) also states that the idea of God “ arises from reflecting on the operations of our own mind, and augmenting, without limit, those qualities of goodness and wisdom”.

Hume also observes that thoughts or ideas at first glance, do not seem to have boundaries or can be referred to as limitless which is contrary to the nature of human body. The human body is not only earth-bound but is also limited. These thoughts have the amazing ability to transcend realms with the aid of our imagination. According to him, (1988: 64) ‘Nothing , at first view, may seem more unbounded than the thought of man, which not only escapes all human power and authority, but is not even restrained within the limits of nature and reality”.

Hume concludes by saying that impressions guarantee reality, for without impressions, there can be no ideas. Hence Velasquez (1997 :342)writes:

Consistent with this insight is the Humean belief that there can be no ideas without sense impressions. This follows from his contention that every idea is a faint impression. Thus, if there are no impressions, there are no ideas. However, not every idea reflects an impression. We can, after all, conceive of a golden mountain or a virtuous house, even if we've never had an impression of either.

Every idea must have an impression it emanates from or else, it should be discarded. Hume (1988:69) writes: "...we need but enquire, *from what impressions is that supposed idea derived.*

Association of ideas

In Hume's account of the Mechanics of Human Thoughts, he observes that the thought pattern of the human mind, flows smoothly in a regular sequence that suggests a connection between ideas. The relationship is what Hume (1988:69) calls a "principle of connexion". It is also referred to as an association of ideas. This association is propelled by the faculties of memory and imagination. The faculty ensures that ideas introduce each other in accordance with the laws of association. Hume(1988:69) elaborately asserts:

It is evident that there is a principle of connexion between the different thoughts or ideas of the mind and that, in their appearance to the memory or imagination, they introduce each other with a certain degree of method and regularity. In our more serious thinking or discourse this is so observable, that any particular thought, which breaks in upon the regular tract or chain of ideas, is immediately remarked and rejected...if we reflect, that the the imagination ran not altogether at adventures, but that there was still a connexion upheld among the different ideas, which succeeded each other.

Hume(1988:69) observes three principles in this association of ideas namely : Resemblance, Contiguity in time or place and Cause or Effect. He puts it thus:

... I do not find that any Philosophers has attempted to enumerate or class all the principles of association, a subject, however, that seems worthy of curiosity. To me there appear to be only three principles of connexion among ideas, namely *Resemblance*, *Contiguity* in time or place, and *Cause* or *Effect*.

In explaining this association among ideas, Hume gives a pictorial account of there relationship. In the idea of resemblance is the principle that relates something to a past experience. This occurs when one sees a person or a picture of someone who has a striking resemblance with another person. He (1988:70) says “A picture naturally leads our thoughts to the original (Resemblance)”. In the case of the idea of Contiguity, the thought of an event or object leads one to think about another relating incident or object. He remarks ... the mention of one apartment in a building naturally introduces an enquiry or discourse concerning other (Contiguity)”. Concerning the idea of Cause and Effect, He argues that this principle occurs when one observes an event, and is led to inquire into the cause of the event. For instance, at the sight of an accident, one will immediately inquire into the cause of that accident. This principle of Cause and Effect is considered by Hume to be the causal element of knowledge. It is for him, the hub of knowledge because the existence of all knowledge relies on it and it is considered to be the basis of science.

David Hume and the problem of induction (Causality and Probability)

Before Hume, a cause was regarded as leading to a certain effect and by implication having a necessary connection between that event and its cause. In other words, Event A caused Event B and this asserts a necessary connection between them. Hume challenged this notion that A causes B, where B is understood as a consequence of A. for him, A precedes B. Hume’s theory of causality started a new science of thought in the history of philosophy. He (1988:117) places emphasis on his belief that for every idea, there must be a corresponding impression and does not see the impression from which the idea of necessary connection originates. He argues:

Every Idea is copied from some preceding impression or sentiment; and where we cannot find any impression, we may be certain that there is no idea. In all single instances of the operation of bodies or minds, there is nothing that produces any impression, nor consequently can suggest any idea, of power or necessary connexion.

He(1988:103) vehemently denies the idea of necessary connection between a cause and its effect thus:

When we look about us towards external objects, and consider the operation of causes, we are never able, in a single instance, to discover any power or necessary connexion; any quality, which binds the effect to the cause, and renders the one an infallible consequence of the other. The impulse of one billard-ball is attended with motion in the second. This is the whole that appears to the *outward* senses. The mind feels no sentiment or *inward* impression from this succession of objects; consequently, there is not, in any single, particular instance of cause and effect, anything which can suggest the idea of power or necessary connexion.

Hume (1988 : 115-116) is of the view that every effect is distinct from its cause and goes on to define a cause “... therefore, we may define a cause to be *an object, followed by another, and where all the objects similar to the first one 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 .*

He(1988 :116)gives another definition of a cause as “*an object followed by another, and whose appearance always conveys the thought to that other.*” To buttress his point on how distinct a cause is from its effect, Hume states, that the mind can never possibly find the effect in the supposed cause, by the most accurate scrutiny and examination. For the effect is totally different from the cause, and consequently can never be discovered in it. Hume(1988: 75) uses an illustration to drive home his strong belief thus:

When I see, for instance, a Billiard-ball moving in a straight line towards another; even suppose motion in the second ball should by

accident be suggested to me, as the result of their contact or impulse; may I not conceive, that a hundred different events might as well follow from that cause? May not both these balls remain at absolute rest? May not the first ball return in a straight line, or leap off from the second in any line or direction? All these suppositions are consistent and conceivable .

Hume (188:113) believes that between “A” the cause and “B” the effect, there are three relations namely: contiguity, succession and constant conjunction. He states it thus “ All events seem entirely loose and separate. One event follows another; but we never can observe any tie between them. They seem *conjoined*, but never *connected*. And as we have no idea of anything which never appeared to our outward sense or inward sentiment, the necessary conclusion *seems* to be that we have no idea of connexion or power at all,...

Hume’s analysis of causality depends on the above mentioned elements. Arguing from the point of view of contiguity, he observes that certain events occur simultaneously in space and time. These contiguous events or simultaneous occurrence of events, when having been experienced overtime, conditions the mind to associate or link them together. Here He is pointing out that what we often observe is always just a sequence of events and just because in the past, we have always observed one event preceding another, does not mean that it will always do so in the future. He (1988 :94) writes:

It is certain that distance diminishes the force of every idea, and that, upon our approach to any object; though it does not discover itself to our senses; it operates upon the mind with an influence, which imitates an immediate impression. The thinking on any object readily transports the mind to what is contiguous; but it only the actual presence of an object, that transport it with a superior vivacity.

Hume’s argument on succession is based on the belief that the cause of an event comes before its effect. He is of the opinion that the mind has the ability to remember frequent occurrences and out of custom or habit relates them after each

other. This is mainly due to the regularities of these successions. He (1988:96) states:

Here, then is a kind of pre-established harmony between the course of nature 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. Custom is that principle, by which this correspondence has been effected; so necessary to the subsistence of our species, and the regulation of our conduct, in every circumstance and occurrence of human life.

According to Hume, when we experience constant conjunction of events in the past, we naturally presume that the future will resemble the past and when this happens often, we tend to consider them as causally related. He seems to identify causality strictly with constant conjunction and is of the view that experience furnishes us with the awareness of the ideas occurring together. For this reason, when we experience one of the events, we immediately expect the other. This for him, has its source from experience and is empirically observed. Hume(1988 : 78) asserts:

As to past *experience*, it can be allowed to give *direct* and *certain* information of these precise objects only, and that precise period of time, which fell under its cognizance: but why this experience should be extended to future times and to other object, which for aught we know, may be only in appearance similar, this is the main question on which I would insist.

It is pertinent to note that Hume did not find an impression corresponding to the idea of causality from which such an idea originates. All he observes is a uniformity as an event brings with it the idea of the other. Causality is therefore, a habitual association of the mind and this is as a result of regularly observing antecedents and expecting consequences. This principle of causality has become deeply embedded in the human mind and closely linked to the problem of induction.

For Hume, induction which is the process of employing present or past observation to infer the nature of the future . This is as a result of repeated observations made in the past. He (1988:81) states:

For all inferences from experience suppose, as their foundation, that the future will resemble the past, and that similar powers will be conjoined with similar sensible qualities. If there be any suspicion that the course of nature may change, and that the past may be no rule for the future, all experience becomes useless and can give rise to no inference or conclusion.

Hume states that induction is based on probability which occurs when there is a likelihood of frequent occurrences which would lead to subjective perspectives. Probability could be said to be based on habit that are formed over a period of time. He (1988 :98) says:

There is certainly a probability, which arises from a superiority of chances on any side; and according as this superiority encreases, and surpasses the opposite chances, the probability receives a proportionable encrease, and begets still a higher degree of belief or assent to that side, in which we discover the superiority.

Hume (1988:99) holds that there are no chances in the world but repeated events that condition the mind to have “ the sentiment of belief, and gives that event the advantage over its antagonists, which is supported by a smaller number of views... ” In order words, the mind uses the faculty of imagination to observe definite chances that occur regularly.

Implications of Hume’s critique of causality and Probability for Scientific Knowledge

In the eighteenth century, Hume became associated with the problem of induction as the first philosopher to criticize the certainty of scientific knowledge that applied the principles of induction. The inductive principle is known for drawing conclusions concerning a whole based on few elements of that class. It gives only probabilities and not certainty. Consider for example, that every cow we have ever

seen or observed is white. We still cannot conclude (like the inductive principle) that all cows are white because we have not seen all the cows in the world. Hume believes that there is no logical foundation in the assumption that if in the past, every event has had a cause, this will also be the case in the future.

As a strict empiricist, Hume holds strongly to the belief that knowledge could only come from experience and had the intention to extend the methods of Newtonian style science to human nature. He was very skeptical about scientific knowledge and this brought about destructive doubt to the sciences. The validity of scientific knowledge was challenged especially as all science depend on observation of the world for its knowledge. This search for causes propelled science as causality became the basic assumption of science and science supposes that all laws must be framed in causal form. It is important to note that the law of cause and effect states that every material effect must have an antecedent or cause. For Hume, all inductive procedure work by employing present or past observations to infer the nature of the future. What he is seeking therefore, is the foundation in our reasoning for this supposition that nature is sufficiently uniform.

This belief that the future will resemble the past is in conformity with common sense, by which through repeated observations of the past, we believe that the sun will rise tomorrow because it had done so in the past. Induction includes this belief that the future will resemble the past and to this, Hume classifies the fate of induction with the fate of science. This is so because the general principles of science and the belief that every event must have a cause, are dependent upon induction, as are the beliefs of daily life.

Hume's challenge leads to further general questions about the nature of empirical prediction to the role of scientific theories in it and of the relation between scientific theories and experience. According to Hume, induction cannot be established as certain or as probable in anyway. First, no such condition can be demonstrated by reasoning alone, since they are all conclusions about matters of fact and since it is the case that the denial of any assertion of a matter of fact is not self-contradictory. In this regard, he (1988: 79) says:

There are no demonstrative arguments in the case seems evident, since it implies no contradiction that the course of nature may change, and that an object also like those we have experience, may be attended with different or contrary effects... Now whatever is intelligible and can be distinctly conceived, implies no contradiction and can never be proved false by any demonstrative argument...

According to Hume (1988: 80), no statement about future matter of fact can be established by observation because future things cannot be observed in the present. Any event or state of affairs which can be observed is by definition not in the future. He states:

In reality, all arguments from experience are founded on the similarity which we discover among natural objects, and by which we are induced to expect effects similar to those which we have found to follow from such objects... From causes which appear similar we expect similar effects. This is the sum of all our experimental conclusions.

For Hume, the claims of science which is founded on principles of causality and inductive principles have shown that cause and effect cannot be demonstrated by reason. This has bad implications for science, whose validity and status, as source of certain knowledge and sure predictions for the future has now had its reliability questioned. However, the destruction of necessary causal relations, has reduced scientific explanation to mere prediction and tells us nothing about the validity of the predicting theory. They are based at best on probability.

Conclusion

In this work, we set out to examine causality and probability in Hume and show the implications of this examination for scientific knowledge. Hume as we have seen has told us that the main stream of knowledge stems from perceptions or experience. Perception was a term he used to describe the mental contents of a human mind. These perceptions he divided into two mainly: Impressions and Ideas. Impressions were the immediate or direct experience one gets with

something or a situation while Ideas were the faint images of impressions. It was this logical movement from impressions to ideas that Hume called causality. As we have seen, his critique of causality and probability tends to destroy the supposed claims of science to give us objective knowledge of reality. Objective knowledge of reality would require empirical verification and theoretical evidence.

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