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## UNIT 4 THEORIES OF CAUSATION\*

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### 4.0 OBJECTIVES

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The Law of Causation or the Principle of Causality states that whatever happens (action) or whatever is (being) must have a cause, of which that happening or being is the effect. Philosophers from ancient times have argued that in Nature there is nothing which does not have a cause for its being or existence. In the light of these suggestions the present unit will acquaint the learner with the following;

- The ideas of Causation and the Law of Causation
- Theory of Causation Given by Aristotle, Thomas Aquinas, and Spinoza respectively.
- The critical assessment by David Hume of the idea of Causation.

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- An alternative interpretation of causation as presented in the form of the Chaos Theory.

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## 4.1 INTRODUCTION

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Causation or Causality is an integral concept and event that is regarded as being a fact about Nature and the Universe at large. It is immensely significant as almost all knowledge, and especially scientific knowledge depends upon it. Causation is where something influences another thing, which could either be a process or an event, leading to some change or the production of something. Here the latter is known as an effect, whereas the thing which influences another is known as a cause. So, usually any definition of causality comprises the binary terms 'cause' and 'effect' to complete it. Thinkers from antiquity till present have argued that there is nothing in nature which does not have a cause. The Law of Causation therefore states that whatever is, must have a cause. Suggesting also that, if there is a thing or an event, then there will be an effect that will inevitably follow from that thing or event. Causality implies change. Change is another very important concept that we grasp while observing Nature. Change is a transformation of something into another thing where the thing transformed passes from being (existence) to non being (non-existence), say a paper burnt becomes non-existent after it turns into ash; and to what it is transformed which was not there before is coming into being (existence) from non being (non-existence), say the ash before the paper is burnt is non-existent. Importantly, causation or causality involves three important concepts, the idea of cause, the idea of effect, and the idea of change (from non being to being and vice versa). Hence what appears central to and implied from, the idea of causation, is the idea of 'becoming'.

Historically, the study of causation in western philosophical thinking dates back to the times of the ancient Greek thinkers, and finds its instantiation in the philosophies of Parmenides and Heraclitus. Where Parmenides argued that a transition from being to non-being (and vice versa) is a contradiction and therefore impossible (owing to the opposite nature of being and non being); Heraclitus believed that the reality is always in the state of neither being nor non being but becoming (i.e., a constant transition of being to non being and vice versa). These issues were further taken up for discussion by the likes of Plato and especially Aristotle who argued that there are multiple ways in which the relation between cause and effect can be understood. The present unit deals with the theoretical understanding of the concept of causation and its critique. It begins with Aristotle's four kind of causes that shows that cause

and effect are not of the same nature, followed by its universal form that we find in the philosophy of Aquinas. Next is the understanding of causation as a law and principle as explained by Spinoza. This is followed by a critique by Hume who believed that causation is merely a constant conjunction of our observed sequences of things and events. Lastly, the chapter brings up a brief discussion on causation in relation to science and chaos theory.

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## 4.2 ARISTOTLE'S PHYSICS AND THE FOUR CAUSES

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Aristotle was interested in understanding not only the phenomena (physics) but also what is beyond the phenomena (metaphysics). How the universe or Nature works, how the knower can understand how it works, and the quest for discovering the foundational principle that is behind everything that we observe, which is the source of the mechanism in Nature (*arche*) were some of the most central concerns of Aristotelian philosophy. In his works *Physics* and *Metaphysics*, Aristotle describes four kinds of causes that explain the natural phenomena, and the human production and action. The following causes, according to Aristotle's explanation are responsible for coming into being, or change, or creation:

1. The Material Cause (Matter)
2. The Formal Cause (Form)
3. The Efficient Cause (Agency), and
4. The Final Cause (Purpose or *Telos*)

### 4.2.1 The Material Cause (Matter)

If a thing is there then the material cause is what is given as a response to the question, "what that thing is made up of?" The matter, out of which the thing (effect) is made up, is the material cause of that thing. Say for instance brass is the material cause of a coin, bricks are the material cause of a building, cellulose is a material cause of a plant, minerals are a material cause of a stone, etc.

### 4.2.2 The Formal Cause (Form)

If a thing is there then the formal cause is what is given as a response to the question, "what that thing is?" The concept, definition or the form of the thing (effect) is the formal cause of that thing. Another way to put it is that the shape of a thing as conceptualised will be the form

of the thing. Say for instance the appearance, shape and form of a statue is the formal cause of a built statue (effect).

#### **4.2.3 The Efficient Cause (Agency)**

If a thing is there then the efficient cause is what is given as a response to the question, “who made that thing or what made the change in the thing to be what it is?”; “Who or what created that thing?” Say for instance the sculptor is the efficient cause of a built statue, a baker is the efficient cause of the cake, or according to Aristotle, God (Unmoved Mover) is the efficient cause of all motion and change.

#### **4.2.4 The Final Cause (Purpose or Tέλος)**

If a thing is there then the final cause is what is given as a response to the question, “what is the purpose of that thing?” This is with the understanding that a thing is created or comes into effect for a purpose or goal. Say for instance the purpose of a duster is to clean, purpose of teeth is mastication etc.

According to Aristotle these four causes are not mutually exclusive but rather inclusive of everything and of each phenomenon in Nature. Aristotle differentiates between two kinds of causes, viz. intrinsic and extrinsic. Since Matter and Form pertain directly to the thing, and are the defining aspects of a thing, they are intrinsic causes. However, Agency and Purpose are extrinsic causes because they are external and not integral part of that thing. A further development of and a philosophical discussion on Aristotelian causal theory was carried out by the philosopher and theologian St. Thomas Aquinas who formulated the Cosmological Argument for proving the existence of God (First Cause).

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### **4.3 THOMAS AQUINAS’ FIRST CAUSE (CAUSA SUI)**

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Thomas Aquinas was a medieval Italian philosopher and theologian who was influenced by Aristotle and referred to him as ‘The Philosopher’. Aquinas in his *Summa Theologica* argued that the four causes of Aristotle are exhaustive and that there cannot be any other type of in addition to the ones identified by Aristotle, namely material, formal, efficient, and final. Aquinas however prioritised one kind of cause over another. He believed that the matter is shaped by the form as there cannot be matter without form; the form is actualised by the Agency— Human or Godly— as the efficient cause; and lastly the Agent has to have a

purpose to create or to bring change into something, hence the final cause is the most prioritised cause. The list of causes in order of priority are:

1. Final Cause
2. Efficient Cause
3. Formal Cause, and
4. Material Cause

Aquinas' philosophy is largely based on the Law of Causation, which entails the assertion that there is nothing from which an effect does not follow, and there is a cause behind everything that there is. There is a continuous chain of cause and effects in Nature, however, the chain does not recede backwards infinitely. Since infinite regress implies indefiniteness and prohibits finality, Aquinas proposed the concept of the First Cause (*Causa Sui* or *Prima Causa*). The First cause is the self-caused cause, i.e., it is the cause of itself, thereby terminating the possibility of infinite regress. According to this view there is no cause which is prior to the First Cause; and every cause, which is not the First Cause, is also an effect (is simply a result of another cause).

This First Cause is further identified by Aquinas as God. The above argument, as given by Aquinas, is also known as the First Cause Argument. The modern understanding of this argument avoids the infinite regress by suggesting an alternative explanation which does not account for a backward tracing of the causal events, rather focusses on the epistemology of conclusive regress of explanations of causes, so an effect is made sensible and intelligible by its cause, which again is rendered intelligible by another cause, and so on. Now if we do not halt this series then we will reach a complex point where the causes will become unintelligible and non-explanatory. And the universe will look like an unintelligible reality. Aquinas sees this regress as culminating in a self-explanatory reality of the whole. Through this, the argument supports the conclusion that there must be a prime cause which is self-caused. The idea of the First Cause has however been questioned by philosophers who point out that we cannot be certain as to whether or not the universe is in fact an unintelligible endless reality. Aquinas' First Cause argument is a form of a Cosmological argument for the proof of existence of God.

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#### **4.4 SPINOZA'S LAW OF CAUSATION**

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Dutch philosopher Benedict Spinoza is regarded as a Monist and a Pantheist. A major building block of Spinoza's philosophy is the concept of cause and effect. In his magnum opus *Ethics*, Spinoza, explained that the world is an unfathomable system of cause-and-effect relationships where a body in motion contacts another body and so on. The first body causes the movement of the second. And the second one moving is the effect of being struck by the first. If the second didn't move, then it didn't get hit by the first. The word "cause" has been subjected to much scrutiny and debate by scholars of Spinoza, for it is very much possible that for him, cause was understood as a logical explanation. Spinoza argues that there was only one substance namely God or Nature. He says that there cannot exist in the universe two or more substances having the same nature or attribute. Spinoza considered the terms Nature, Universe or Cosmos, and God to be synonymous. He reasoned that everything in the universe is essentially one substance, and God causing changes in the cosmos would have meant that God was part of the cosmos. Substance cannot be created nor destroyed. Substance, then, is described as self-caused. It causes itself. It is not caused by anything else; otherwise, it would not be a true substance. Since substance is beginning-less and endless, the universe too has also always been there. Nature therefore, was never created, according to Spinoza's thought, nor can it ever come to an end. Time which is a part of Nature extends forever, infinitely, backwards and forward, so there never was a beginning moment, and there will never be a final moment. Further, the cosmos or Nature extends incessantly outwards spatially; there is no end. Spinoza held that every substance is necessarily infinite. God or Cosmos denotes this one infinite reality. Notably, this view is quite divergent from the one given by Aquinas.

Spinoza argues that if God is all there is, then God causes everything. If a cause exists, then the effect from it must follow, and likewise for Spinoza, if there is causation, then everything is determined. It is of the nature of reason to regard things as necessary, not as contingent. Individual things exist with a finite extension and duration; modes have finite existence; they get created as things in time and cease to exist after a point in time. Finite things are born, live and die. In extension, they are bodies or things and in thought, they are minds or ideas. Particular things are part of nature or the universe or God and there are infinitely many things and ideas as well as infinite possible things and ideas. Particular things and ideas are in God, but they are not the same thing as God. Individual or particular things exist in sequences of cause and effect. Spinoza maintained that each individual thing, or anything which is finite and has a determinate existence, can neither exist nor be determined to produce an effect unless it is determined to exist and produce an effect by another cause, which is also finite

and has a determinate existence. Again, this last cause also can neither exist nor be determined to produce an effect unless it is determined to exist and produce an effect by another, which is also finite and has a determined existence, and so on, to infinity. Being a rationalist, this is Spinoza's thorough and deterministic philosophy of the law of Causation. His theory of causation is best understood within his strict deterministic cosmic system. Spinoza ascribes this causal determinism not only to things but also to humans. None of the attributes, including mind and body, are free, there is no free will, rather everything is influenced by a prior cause and so on.

### Check Your Progress I

**Note:** a) Use the space provided for your answer.

b) Check your answers with those provided at the end of the unit.

1. Explain what are is Material Cause and Formal Cause with examples.

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2. What is the law of Causation? Briefly explain.

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## 4.5 HUME'S CRITIQUE OF CAUSATION

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Scottish philosopher David Hume was an empiricist who raised critical questions against the law of causation, which was recognized as the basis of reasoning and scientific knowledge. What is regarded as the law of causation, was recognized by Hume as a 'constant conjunction', a position he elucidated in his *A Treatise of Human Nature*. The cause effect relation was for him a mere sequence of repeated events conditioning us to relate these linear sequences in a logical sequence of causal influence. Hume argued that all our reasoning is causal in nature. And the most significant feature of this reasoning is that it is a part of the scientific inductive method of investigation of nature. Hume believed that the connection between cause and effect is the primary concept behind our thinking about facts and

empirical study. As we saw above, it has been discussed at length by Aristotle, Aquinas, and Spinoza, who admit of there being a necessary connection between cause and effect.

A cause necessarily produces an effect and each effect necessarily has to have a cause or reason behind it. Hume objects to this by asking 'where is the observation or impression that gives me the idea of causation?' Hume explains that among the two things or events between which a causal relation is established, we can only observe contiguity (two things or events before and after in space), priority (two things or event are in temporal succession), and proximity (two things or events are relatively close to each other); but we fail to trace any impression of there being a necessary connection or causality between them. The law or principle that everything must have a cause and that nothing is without a cause had hitherto not been questioned and it had been accepted by scholastic as well as modern philosophers alike. Hume however pointed out that since there is no impression of causal connection between things or events, there is no possibility of demonstrating causation rationally. But the question is why do we still believe in the law of causation? Or to say in other words, what is the basis of the belief that a particular cause must necessarily lead to a particular effect? Hume clarifies that owing to our habit (custom) and our mental propensity whenever we observe and experience 'constant conjunction' between two objects/events repeatedly then we start getting conditioned to expect the same effects from the same causes in the future. Accordingly, however, there is no empirical or rational justification of causation but only psychological. In presenting this explanation, Hume shifted causation from physics and brought it within the domain of psychology. This revolutionary critique presented a challenge to Newtonian Mechanics which was recognised later by Kant. Seemingly taking cue from Hume's suggestions about causation being a psychological propensity or habit, Kant identified Causation as a category of Understanding. For Kant (like Hume) causation was therefore no more part of the absolutely real objective world, but rather it was part of the epistemic apparatus of human agents.

Hume redefined the cause-effect relation from its traditional meaning. Hume was an emotivist with regard to the status of morality and believed that what is true of morality is also true for science as both are based on psychological tendencies and propensities. If there is no impression there cannot be any idea corresponding to that impression. And since we have no impression of the law of causation, what we call the law of causation is simply a mental feeling. This law of causation comes from the repeated patterns of events which is inductively believed to be certain. This is what Hume calls the problem of induction. The



instances are limited of repetitive events, but we formulate laws out of it. The fallacy of deriving certainty from inductive reasoning leads to the misnomer of the principle of uniformity of nature, which gives the false impression that we can make causal scientific laws and understand Nature. However, since necessary causal connection does not come from any sensory impressions, it is a human imagination and subjective exposition. It was for this reason that Hume emphasised on the study of Human nature and the psychological association of ideas. As said it is only our mental propensity to create false ideas between causes and their effects, and they are not in the objects, they are not factual, but are in the mind. These ideas of necessary connection (causation) are not derived from reason either, for reason only works of what we have experienced, hence its neither sensory experience nor reason that begets this idea but only our psychological feelings, and repetition of these events condition us to predict a particular effect from a particular cause. Necessary connection between objects is an impossibility because the method for empirical investigation is induction which only establishes probable truths, not certainty. Hume is regarded as being sceptical about the possibility of knowledge of matters of facts, for any such knowledge relies upon causation, induction, and uniformity in nature as its basis and it therefore lacks necessity and certainty.

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#### **4.6 ALTERNATIVE INTERPRETATIONS: CHAOS THEORY**

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There are many alternative interpretations of causation, out of which we shall be focussing on the chaos theory. All sciences accept and rest on the assumption that there is space, time continuum and there are causes at least in the macroscopic sphere and knowing the causes behind phenomena can help us understand the way the universe functions. Causation is very fundamental to all natural, life, and behavioural sciences. Chaos theory is the scientific and mathematical study of cases where like any other case or situation, deterministic causal laws apply, however, since the production effects are extremely sensitive to the causes, the causation almost becomes random and chaotic making determination of causes and their corresponding effects almost impossible. Chaos theory does not deny causal connections but because these connections are too subtle (assumed theoretically) that it appears that there is no causation happening between the things under observation.

One important aspect of this theory is the butterfly effect. It is described as a phenomenon where a slight change in the scenario or to say in other words, a minimal causal influence can bring about a large change in the result or the effects. The underlying principle is that the

magnitude of the causal force may not necessary be equal to the force of the effect or the outcome. The name of this theory has come from the metaphor that a butterfly flaps its wings at a location and as a result there is a tornado at a distant location. This effect is often noticed in meteorology, where it is a challenge to find what has led to a certain disturbance in the weather. The implication is that the intensity of a cause can be weak but it can lead to tremendous effects leading to a great difference between the two states, and likewise there can be a reverse butterfly effect where the intensity of the cause can be a lot and the effect is minimal, to the extent that the difference may even be hardly noticeable. This theory makes us understand that causation may be significant or completely insignificant as a natural phenomenon.

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## 4.7 LET US SUM UP

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The unit discusses various ideas and theories of causation from the ancient, medieval, modern and contemporary perspectives. The unit includes some of the most prominent and significant developments of the principle of causality. We learned that a certain cause is a principle of influence which brings about an effect or result. Likewise, an effect is a principle which is an outcome of a causal influence. In principle every effect has a cause and vice versa. Traditionally, causality has been classified by Aristotle in his metaphysics under four types—material, formal, efficient, and final cause. Later these four causes were grouped as intrinsic and extrinsic causes. A further development of the philosophical idea of causation was developed in the medieval times by Thomas Aquinas, who used the principle of causation as the basis of demonstrating the existence of God, through the Cosmological argument. Aquinas argued for the existence of the Self caused cause, which is the First Cause and made the law of Causation divine and Universal by equating it to theism (God). Another development of the idea of causation, as a strict geometric formulation, is presented by Spinoza, who held that there is nothing from which an effect does not follow. This necessity of every event or thing to be both cause and effect is the contribution of Spinoza, which he justified in a pure rational manner.

The unit then takes up the critique of causation by Hume who questioned not just the empirical and rational basis of the law of causation, but also denied its existence except as a mere figment of the mind, a misapprehension due to constant conjunction of events and getting habituated through that repetitive conjunction of those events. Hume reduces

causation to a mere repetition of sequences, and redefines the principle of cause and effect from being an absolute principle to merely a habit and custom.

Lastly, the chapter discusses an alternative interpretation of the causal law, given in the form of the chaos theory. Chaos theory brings apparently contrasting concepts of randomness and cause and effect determination together and explains the meaning of cause and effect from the point of view of their intensities, and suggests that unpredictability due to chaos and predictability due to cause effect is not mutually exclusive always. The chapter concludes with a special instance of the Butterfly effect.

### **Check Your Progress II**

**Note:** a) Use the space provided for your answer.

b) Check your answers with those provided at the end of the unit.

1. What is causation according to Chaos Theory?

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### **4.8 KEY WORDS**

**Law of Causation :** The law that ‘Every thing is a cause of something and is an effect of some cause’.

**Causa Sui :** Self-caused cause

**Constant Conjunction :** Repeated observation of events that are successive and contiguous in space and time.

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### **4.9 FURTHER READINGS AND REFERENCES**

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## **4.10 ANSWERS TO CHECK YOUR PROGRESS**

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### **Check Your Progress I**

1. A material cause is a cause which is responsible for the materiality of the thing under consideration. It is what that thing is made up of. For example, the material cause of a table is wood, the material cause of a rock is minerals, etc. A formal cause is the concept or idea behind the thing. A thing cannot come into effect without its idea or form. For example, the appearance and shape of a statue is the formal cause of the statue that is there.

2. There is nothing from which an effect does not follow, and every effect must have a cause. This is the Law of Causation. There is a necessity that everything is caused. Every thing is a cause of something and is an effect of some cause.

### **Check Your Progress II**

1. Chaos theory is the scientific study of cases where like any other case or situation, deterministic causal laws apply, however, since the production effects are extremely sensitive to the causes, the causation becomes almost random and chaotic, making determination of causes and their corresponding effects almost impossible. Chaos theory does not deny causal connections but because these connections are too subtle (assumed theoretically), it appears that there is no causation happening between the things under observation.