



ANCIENTGREEK PHILOSOPHY AND MODERN SCIENCE

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ABSTRACT

The ancient Greek philosophers made significant contributions to the development of modern science. They laid the foundation for critical thinking, logic, and the scientific method that are still used today. One of the most influential Greek philosophers was Aristotle, who studied a wide range of subjects, including physics, biology, and astronomy. He emphasized the importance of observation and experimentation in understanding the natural world. Aristotle's works on logic and reasoning also provided a framework for scientific inquiry.

Another notable Greek philosopher is Pythagoras, who is known for his contributions to mathematics and the development of the Pythagorean theorem. His work on numbers and geometric shapes laid the groundwork for the mathematical principles used in modern science. Additionally, the Greek philosopher Democritus proposed the concept of atoms, suggesting that all matter is composed of tiny, indivisible particles. This idea laid the foundation for the modern atomic theory.

The influence of these ancient Greek philosophers on modern science can be seen in various fields. Their emphasis on empirical observation and logical reasoning is central to the scientific method used by scientists today. Moreover, their ideas and theories continue to inspire and shape our understanding of the natural world.

Keywords: Science, Philosophy, Plato, Newton, Aristotle

How Plato influenced the scientific thought

Plato, the ancient Greek philosopher, had a significant influence on the development of modern science in several ways:

- **Theory of Forms:** Plato's concept of the Theory of Forms, which suggests that the physical world is a mere reflection of a higher reality of perfect and unchanging forms, laid the foundation for the search for universal truths and abstract reasoning in scientific inquiry.
- **Rationalism:** Plato's emphasis on reason and logic as the primary tools for understanding the world greatly influenced the scientific method. His belief in the power of human intellect to uncover truths through systematic observation and deduction contributed to the development of empirical research methods in modern science.
- **Mathematics:** Plato considered mathematics as the key to unlocking the secrets of the universe. His belief in the fundamental role of mathematics in understanding the natural world influenced later scientists, such as Isaac Newton, who used mathematical principles to explain physical phenomena.

- Separation of Mind and Body: Plato's distinction between the physical body and the immaterial mind or soul laid the groundwork for the mind-body problem, which has been a central focus of scientific inquiry in fields like neuroscience and psychology.
- Influence on Aristotle: Plato's student, Aristotle, went on to become one of the most influential philosophers in the history of science. Aristotle's scientific method, which involved systematic observation and classification of natural phenomena, was heavily influenced by Plato's teachings.

Overall, Plato's ideas and philosophical framework provided a strong intellectual foundation for the development of modern science, shaping the way scientists approach the study of the natural world and the search for universal truths.

How Plato influenced Descartes

Plato's influence on René Descartes, the 17th-century philosopher and mathematician, can be seen in several key ways:

- Dualism: Plato's separation of the mind and body, as well as his emphasis on the immaterial and eternal nature of the soul, influenced Descartes' concept of dualism. Descartes famously proposed that the mind and body are distinct substances, with the mind being a thinking, non-extended entity, and the body being an extended, non-thinking entity.
- Rationalism: Both Plato and Descartes were proponents of rationalism, the belief that reason and logic are the primary sources of knowledge. Descartes, building on Plato's emphasis on reason, developed his own method of systematic doubt and deduction, famously expressed in his "Cogito, ergo sum" (I think, therefore I am) statement. This rationalistic approach to knowledge was influenced by Plato's belief in the power of human intellect.
- Innate Ideas: Plato's theory of innate ideas, the notion that certain knowledge is already present within the soul and is merely recollected through learning, influenced Descartes' concept of innate knowledge. Descartes argued that certain fundamental truths, such as the existence of God and mathematical principles, are innate and not dependent on sensory experience.
- The Theory of Forms: Although Descartes did not explicitly adopt Plato's Theory of Forms, some scholars have noted similarities between Descartes' concept of clear and distinct ideas and Plato's theory. Both philosophers believed in the existence of abstract, perfect forms that underlie the imperfect physical world.

While Descartes developed his own philosophical system, influenced by various thinkers of his time, it is clear that Plato's ideas played a significant role in shaping Descartes' views on the nature of the mind, knowledge, and the relationship between the physical and immaterial realms.

How the philosophical thinking of Plato influenced Newton

Plato's influence on Sir Isaac Newton, the renowned physicist and mathematician, can be seen in a few key aspects:

- **Mathematics:** Plato's belief in the fundamental role of mathematics in understanding the natural world influenced Newton's approach to physics. Newton was deeply inspired by the mathematical rigor and abstract reasoning found in Plato's works, and he applied these principles in developing his laws of motion and universal gravitation.
- **Ideal Forms:** Plato's theory of Forms, which posits the existence of perfect and unchanging forms that underlie the physical world, influenced Newton's view of the universe. Newton believed that there were underlying mathematical laws and principles governing the behavior of celestial bodies, reflecting the idea of ideal forms.
- **Rationalism:** Like Plato, Newton was a rationalist who believed in the power of reason and logical deduction. Both philosophers emphasized the importance of systematic observation and logical reasoning in uncovering truths about the natural world.
- **Influence on the Scientific Method:** Plato's emphasis on the systematic study of nature and the pursuit of universal truths influenced Newton's approach to scientific inquiry. Newton's use of empirical observation, experimentation, and mathematical modeling to formulate his laws of motion and gravity reflected Plato's influence on his scientific method.
- **Influence on Newton's Cosmology:** Plato's cosmological ideas, such as the belief in a harmonious and orderly universe, influenced Newton's own cosmological theories. Newton's concept of a clockwork universe, governed by precise mathematical laws and principles, can be seen as a reflection of Plato's belief in an ordered and rational cosmos.

While Newton developed his own groundbreaking theories and made significant contributions to science, it is clear that Plato's ideas on mathematics, ideal forms, rationalism, and the systematic study of nature had a profound influence on Newton's thinking and approach to scientific inquiry.

Influence of the philosophy of Plato on Psychology

Plato's influence on modern psychology can be seen in several key ways:

- **Theory of Forms:** Plato's theory of Forms, which suggests that the physical world is a mere reflection of a higher reality of perfect and unchanging forms, has parallels with modern psychological theories of perception and cognition. Plato's emphasis on the existence of abstract concepts and ideal forms influenced later psychologists' understanding of how individuals perceive and categorize the world.
- **Innate Knowledge:** Plato's concept of innate knowledge, the idea that certain fundamental truths are already present within the soul and are not dependent on sensory experience, has parallels with modern theories of cognitive development. Psychologists such as Jean Piaget and Noam Chomsky have built upon this notion, arguing for the existence of innate cognitive structures and universal grammar.
- **Dualism:** Plato's distinction between the physical body and the immaterial mind or soul has influenced modern psychological theories on the mind-body problem. While contemporary psychology tends to take a more monistic approach, Plato's dualistic

ideas have shaped the discussions around consciousness, self-awareness, and the relationship between mind and brain.

- Rationalism: Plato's emphasis on reason and logical thinking as the primary tools for understanding the world has influenced modern cognitive psychology. The study of cognitive processes, such as problem-solving, decision-making, and reasoning, draws heavily on Plato's belief in the power of human intellect.
- Influence on Philosophical and Existential Psychology: Plato's exploration of the nature of the self, personal identity, and the pursuit of a meaningful life has had a lasting impact on philosophical and existential psychology. His ideas on the nature of the soul, the quest for truth, and the importance of self-reflection have shaped modern psychological theories on self-concept, identity formation, and existential concerns.
- While modern psychology has evolved significantly since Plato's time, his ideas on perception, cognition, innate knowledge, dualism, rationalism, and the self continue to inform and influence contemporary psychological theories and research.

Ancient Greek philosophers and the development of science

Several ancient Greek philosophers had a significant influence on scientists throughout history. Here are a few notable examples:

- Thales of Miletus: Thales, often considered the first philosopher, is known for his emphasis on natural explanations for phenomena. His ideas contributed to the development of observational and empirical methods in science.
- Pythagoras: Pythagoras is renowned for his contributions to mathematics, particularly the Pythagorean theorem. His mathematical discoveries laid the groundwork for the development of mathematical principles in various scientific fields.
- Democritus: Democritus proposed the concept of atomism, the idea that all matter consists of indivisible particles called atoms. His atomic theory influenced later scientists, such as John Dalton, in the development of modern atomic theory.
- Aristotle: Aristotle's works encompassed a wide range of scientific disciplines, including biology, physics, and psychology. His systematic approach to observation, classification, and logical reasoning influenced countless scientists throughout history.
- Archimedes: Archimedes made significant contributions to mathematics, physics, and engineering. His work on buoyancy, levers, and the calculation of pi had a lasting impact on scientific and mathematical advancements.
- Euclid: Euclid's work in geometry, particularly his book "Elements," became a foundational text in mathematics. His logical and deductive approach to geometry influenced mathematicians and scientists for centuries.

These are just a few examples of ancient Greek philosophers who influenced scientists. Their ideas, methods, and discoveries provided a strong intellectual foundation for the development of scientific inquiry and continue to shape scientific thought today.

Pythagoras ideas which influenced Newton

Pythagoras' ideas on mathematics and the harmony of the universe indirectly influenced Newton's work in several ways:

- **Mathematical Principles:** Pythagoras' emphasis on the significance of mathematics in understanding the natural world laid the foundation for Newton's mathematical approach to physics. Newton recognized the power of mathematics in describing and explaining physical phenomena, and he applied mathematical principles extensively in his work on calculus, laws of motion, and universal gravitation.
- **Harmony and Order:** Pythagoras believed in the existence of a harmonious order in the universe, where everything was governed by mathematical relationships. This idea resonated with Newton, who sought to uncover the underlying mathematical laws that govern the motion of celestial bodies. Newton's laws of motion and universal gravitation reflect his belief in the harmonious order and mathematical precision of the universe.
- **Influence on Philosophical Tradition:** Pythagoras' ideas, along with those of other ancient Greek philosophers, were part of the broader philosophical tradition that influenced Newton's thinking. Newton was well-versed in the works of ancient philosophers, including Pythagoras, and he drew upon their ideas and principles in developing his own theories.
- **Music and Harmonics:** Pythagoras is also known for his work on the mathematical relationships and harmony in music. While not directly linked to Newton's physics, Pythagoras' exploration of the mathematical principles underlying music may have influenced Newton's broader understanding of the mathematical nature of the universe.

It is important to note that while Pythagoras' ideas indirectly influenced Newton, the specific connections between their work are not as direct or explicit as in the case of other influences on Newton, such as his predecessors in physics or his contemporaries in mathematics. Nonetheless, Pythagorean principles of mathematics, harmony, and order align with Newton's broader approach to understanding the physical world through mathematical modeling and seeking underlying principles.

Ancient Greek philosophers who influenced Einstein

Albert Einstein was influenced by several ancient Greek philosophers, as well as other philosophical traditions. While it is challenging to pinpoint direct influences, some philosophical ideas align with Einstein's scientific and philosophical worldview:

- **Parmenides:** Parmenides' concept of the unchanging and eternal nature of reality resonated with Einstein's belief in the constancy of physical laws. Einstein's theory of relativity, particularly the idea of the invariance of the speed of light, aligns with Parmenides' notion of a fixed and unchanging reality.
- **Heraclitus:** Heraclitus' philosophy of flux and change influenced Einstein's understanding of time and space. Einstein's theory of relativity challenged the traditional notions of absolute time and space, suggesting that they are relative and interconnected, echoing Heraclitus' idea of constant change and flux.

- Plato: Plato's philosophy, particularly his theory of Forms, may have indirectly influenced Einstein's thinking. Plato's emphasis on the existence of abstract and ideal forms aligns with Einstein's search for fundamental and universal laws that govern the physical world.
- Spinoza: While not an ancient Greek philosopher, Baruch Spinoza's ideas had a profound impact on Einstein. Spinoza's pantheistic worldview, which sees God and the universe as one and the same, influenced Einstein's belief in the unity and interconnectedness of the universe.

It is important to note that while these philosophers may have influenced Einstein's thinking, Einstein's scientific work was primarily shaped by his own revolutionary ideas and the empirical evidence available to him during his time. Einstein's theories, such as the theory of relativity and his contributions to quantum mechanics, were groundbreaking and largely independent of direct influences from ancient Greek philosophers.

Ancient Greek philosophers who influenced Descartes

René Descartes, a French philosopher and mathematician, was influenced by several ancient Greek philosophers. Here are a few notable examples:

- Plato: Descartes was influenced by Plato's philosophy, particularly his theory of Forms. Plato's idea that there is a realm of perfect and unchanging forms that underlie the imperfect physical world resonated with Descartes' search for certain and eternal truths. Descartes' concept of innate ideas, which he believed were imprinted in the mind, can be seen as influenced by Plato's theory of innate knowledge.
- Aristotle: Descartes had a complex relationship with Aristotle's philosophy. While he rejected many of Aristotle's ideas, such as the concept of substantial forms, Descartes still engaged with Aristotle's thought. Descartes appreciated Aristotle's emphasis on systematic and logical thinking and incorporated Aristotelian logic into his own philosophical framework.
- Socrates: Descartes admired Socrates' commitment to questioning and seeking knowledge. Like Socrates, Descartes emphasized doubt as a starting point for philosophical inquiry. Descartes' famous statement "Cogito, ergo sum" (I think, therefore I am) reflects his Socratic approach of questioning and seeking certainty through self-reflection.
- Skepticism: While not associated with a specific philosopher, Descartes was influenced by the ancient Greek skepticism tradition. He engaged with the skeptical challenge of doubting everything in order to find indubitable truths. Descartes' method of doubt, where he systematically doubted all his beliefs to arrive at foundational truths, can be seen as influenced by the skeptical tradition.

These are just a few examples of ancient Greek philosophers who influenced Descartes. Descartes' philosophical ideas were also shaped by other philosophical traditions, such as medieval scholasticism and his own innovative thinking. Nonetheless, the ancient Greek philosophers played a significant role in shaping Descartes' philosophical framework and methods of inquiry.

Ancient Greek philosophers who influenced Newton

Isaac Newton, an English physicist and mathematician, was influenced by several ancient Greek philosophers. Here are a few notable examples:

- Plato: Newton was influenced by Plato's philosophy, particularly his emphasis on the existence of a harmonious and mathematical order in the universe. Plato's concept of a higher reality governed by abstract forms resonated with Newton's belief that the laws of nature could be described by mathematical equations.
- Aristotle: Newton engaged with Aristotle's ideas, particularly in the field of physics. While he rejected Aristotle's view on the nature of motion and the concept of natural places, Newton appreciated Aristotle's emphasis on observation and empirical evidence. Newton's approach to scientific inquiry, which involved meticulous observation, experimentation, and mathematical modeling, aligns with Aristotle's emphasis on empirical investigation.
- Euclid: Newton was heavily influenced by Euclidean geometry, which was developed by the ancient Greek mathematician Euclid. Newton applied Euclidean principles to his work on calculus and the laws of motion. Euclid's logical and deductive approach to geometry influenced Newton's own rigorous and logical approach to mathematical reasoning.
- Archimedes: Newton admired Archimedes' contributions to mathematics and physics. Archimedes' work on buoyancy and the principles of levers influenced Newton's understanding of forces and the concept of equilibrium. Newton's laws of motion, which describe the relationship between forces and motion, can be seen as building upon Archimedes' principles.

These are just a few examples of ancient Greek philosophers who influenced Newton. Newton's work was also influenced by other philosophical and scientific traditions, such as the works of his predecessors in physics and mathematics. Nonetheless, the ancient Greek philosophers played a significant role in shaping Newton's understanding of the physical world, his approach to scientific inquiry, and his mathematical reasoning.

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