

= Conatus =

In early philosophies of psychology and metaphysics , conatus (/ koʔneʔtʔs / ; Latin for " effort ; endeavor ; impulse , inclination , tendency ; undertaking ; striving ") is an innate inclination of a thing to continue to exist and enhance itself . This " thing " may be mind , matter or a combination of both . Over the millennia , many different definitions and treatments have been formulated . Seventeenth @-@ century philosophers René Descartes , Baruch Spinoza , Gottfried Leibniz , and Thomas Hobbes made important contributions . The conatus may refer to the instinctive " will to live " of living organisms or to various metaphysical theories of motion and inertia . Often the concept is associated with God 's will in a pantheist view of Nature . The concept may be broken up into separate definitions for the mind and body and split when discussing centrifugal force and inertia .

The history of the term conatus is that of a series of subtle tweaks in meaning and clarifications of scope developed over the course of two and a half millennia . Successive philosophers to adopt the term put their own personal twist on the concept , each developing the term differently such that it now has no accepted definition . The earliest authors to discuss conatus wrote primarily in Latin , basing their usage on ancient Greek concepts . These thinkers therefore used " conatus " not only as a technical term but as a common word and in a general sense . In archaic texts , the more technical usage is difficult to discern from the more common one , and they are also hard to differentiate in translation . In English translations , the term is italicized when used in the technical sense or translated and followed by conatus in brackets . Today , conatus is rarely used in the technical sense , since modern physics uses concepts such as inertia and conservation of momentum that have superseded it . It has , however , been a notable influence on nineteenth- and twentieth @-@ century thinkers such as Arthur Schopenhauer , Friedrich Nietzsche , and Louis Dumont .

= = Classical origins = =

The Latin cʔnʔtus comes from the verb cʔnor , which is usually translated into English as , " to endeavor " ; but the concept of the conatus was first developed by the Stoics (333 ? 264 BCE) and Peripatetics (c . 335 BCE) before the Common Era . These groups used the word ʔʔʔʔ (hormê , translated in Latin by impetus) to describe the movement of the soul towards an object , and from which a physical act results . Classical thinkers , Marcus Tullius Cicero (106 ? 43 BCE) and Diogenes Laertius (c . 235 BCE) , expanded this principle to include an aversion to destruction , but continued to limit its application to the motivations of non @-@ human animals . Diogenes Laertius , for example , specifically denied the application of the term to plants . Before the Renaissance , Thomas Aquinas (c . 1225 ? 1274 CE) , Duns Scotus (c . 1266 ? 1308 CE) and Dante Alighieri (1265 ? 1321 CE) expressed similar sentiments using the Latin words vult , velle or appetit as synonyms of conatus ; indeed , all four terms may be used to translate the original Greek ʔʔʔʔ . Later , Telesius and Campanella extended the ancient Greek notions and applied them to all objects , animate and inanimate .

First Aristotle , then Cicero and Laertius each alluded to a connection between the conatus and other emotions . In their view , the former induces the latter . They maintained that humans do not wish to do something because they think it " good " , but rather they think it " good " because they want to do it . In other words , the cause of human desire is the natural inclination of a body to augment itself in accordance with the principles of the conatus .

= = Medieval views = =

There is a traditional connection between conatus and motion itself . Aquinas and Abravanel (1265 ? 1321) both related the concept directly to that which Augustine (354 ? 430 CE) saw to be the " natural movements upward and downward or with their being balanced in an intermediate position " described in his De Civitate Dei , (c . 520 CE) . They called this force that causes objects to rise or fall , " amor naturalis " , or " natural love " .

In the 6th century, John Philoponus (c . 490 ? c . 570 CE) criticized Aristotle 's view of motion , noting the inconsistency between Aristotle 's discussion of projectiles , where the medium of aether keeps projectiles going , and his discussion of the void , where there is no such medium and hence a body 's motion should be impossible . Philoponus proposed that motion was not maintained by the action of some surrounding medium but by some property , or *conatus* implanted in the object when it was set in motion . This was not the modern concept of inertia , for there was still the need for an inherent power to keep a body in motion . This view was strongly opposed by Averroës and many scholastic philosophers who supported Aristotle . The Aristotelian view was also challenged in the Islamic world . For example , Ibn al @-@ Haytham (Alhazen) seems to have supported Philoponus ' views , while he developed a concept similar to inertia . The concept of inertia was developed more clearly in the work of his contemporary Avicenna , who conceived a permanent force whose effect is dissipated only as a result of external agents such as air resistance , making him " the first to conceive such a permanent type of impressed virtue for non @-@ natural motion . " Avicenna 's concept of *mayl* is almost the opposite of the Aristotelian conception of violent motion and is reminiscent of Newton 's first law of motion . Avicenna also developed an idea similar to momentum , when he attempted to provide a quantitative relation between the weight and velocity of a moving body .

Jean Buridan (1300 ? 1358) also rejected the notion that this motion @-@ generating property , which he named *impetus* , dissipated spontaneously . Buridan 's position was that a moving object would be arrested by the resistance of the air and the weight of the body which would oppose its *impetus* . He also maintained that *impetus* increased with speed ; thus , his initial idea of *impetus* was similar in many ways to the modern concept of momentum . Despite the obvious similarities to more modern ideas of inertia , Buridan saw his theory as only a modification to Aristotle 's basic philosophy , maintaining many other peripatetic views , including the belief that there was still a fundamental difference between an object in motion and an object at rest . Buridan also maintained that *impetus* could be not only linear , but also circular in nature , causing objects such as celestial bodies to move in a circle .

= = In Descartes = =

In the first half of the seventeenth century , René Descartes (1596 ? 1650) began to develop a more modern , materialistic concept of the *conatus* , describing it as " an active power or tendency of bodies to move , expressing the power of God " . Whereas the ancients used the term in a strictly anthropomorphic sense similar to voluntary " endeavoring " or " struggling " to achieve certain ends , and medieval Scholastic philosophers developed a notion of *conatus* as a mysterious intrinsic property of things , Descartes uses the term in a somewhat more mechanistic sense . More specifically , for Descartes , in contrast to Buridan , movement and stasis are two states of the same thing , not different things . Although there is much ambiguity in Descartes ' notion of *conatus* , one can see here the beginnings of a move away from the attribution of desires and intentions to nature and its workings toward a more scientific and modern view .

Descartes rejects the teleological , or purposive , view of the material world that was dominant in the West from the time of Aristotle . The mind is not viewed by Descartes as part of the material world , and hence is not subject to the strictly mechanical laws of nature . Motion and rest , on the other hand , are properties of the interactions of matter according to eternally fixed mechanical laws . God only sets the whole thing in motion at the start , and later does not interfere except to maintain the dynamical regularities of the mechanical behavior of bodies . Hence there is no real teleology in the movements of bodies since the whole thing reduces to the law @-@ governed collisions and their constant reconfigurations . The *conatus* is just the tendency of bodies to move when they collide with each other . God may set this activity in motion , but thereafter no new motion or rest can be created or destroyed .

Descartes specifies two varieties of the *conatus* : *conatus a centro* and *conatus recedendi* . *Conatus a centro* , or " tendency towards the center " , is used by Descartes as a theory of gravity ; *conatus recedendi* , or " tendency away from the center " , represents the centrifugal forces . These

tendencies are not to be thought of in terms of animate dispositions and intentions , nor as inherent properties or " forces " of things , but rather as a unifying , external characteristic of the physical universe itself which God has bestowed .

Descartes , in developing his First Law of Nature , also invokes the idea of a *conatus se movendi* , or " conatus of self @-@ preservation " . This law is a generalization of the principle of inertia , which was developed and experimentally demonstrated earlier by Galileo . The principle was formalized by Isaac Newton and made into the first of his three Laws of Motion fifty years after the death of Descartes . Descartes ' version states : " Each thing , insofar as in it lies , always perseveres in the same state , and when once moved , always continues to move . "

= = In Hobbes = =

= = Conatus and the psyche = = =

Thomas Hobbes (1588 ? 1679) , too , worked off of the previous notions of the conatus principle . However , he criticized the previous definitions for failing to explain the origin of motion . Working toward this end became the primary focus of Hobbes ' work in this area . Indeed , Hobbes " reduces all the cognitive functions of the mind to variations of its conative functions " .

Furthermore , Hobbes describes emotion as the beginning of motion and the will as the sum of all emotions . This " will " forms the conatus of a body and its physical manifestation is the perceived " will to survive " . In order that living beings may thrive , Hobbes says , " they seek peace and fight anything that threatens this peace " . Hobbes also equates this conatus with " imagination " , and states that a change in the conatus , or will , is the result of " deliberation " .

= = Conatus and physics = = =

I define [conatus] to be motion made in less space and time than can be given ; that is , less than can be determined or assigned by exposition or number ; that is , motion made through the length of a point , and in an instant or point of time .

As in his psychological theory , Hobbes 's physical conatus is an infinitesimal unit of motion . It is the beginning of motion : an inclination in a specified direction . The concept of impetus , as used by Hobbes , is defined in terms of this physical conatus . It is " a measure of the conatus exercised by a moving body over the course of time " . Resistance is caused by a contrary conatus ; force is this motion plus " the magnitude of the body " . Hobbes also uses the word conatus to refer to the " restorative forces " which may cause springs , for example , to contract or expand . Hobbes claims there is some force inherent in these objects that inclines them to return to their previous state . Today , science attributes this phenomenon to material elasticity .

= = In Spinoza = =

Conatus is a central theme in the philosophy of Benedict de Spinoza (1632 ? 1677) . According to Spinoza , " each thing , as far as it lies in itself , strives to persevere in its being " (Ethics , part 3 , prop . 6) . Spinoza presents a few reasons for believing this . First , particular things are , as he puts it , modes of God , which means that each one expresses the power of God in a particular way (Ethics , part 3 , prop . 6 , dem .) . Moreover , it could never be part of the definition of God that his modes contradict one another (Ethics , part 3 , prop . 5) ; each thing , therefore , " is opposed to everything which can take its existence away " (Ethics , part 3 , prop . 6 , dem .) . This resistance to destruction is formulated by Spinoza in terms of a striving to continue to exist , and conatus is the word he most often uses to describe this force .

Striving to persevere is not merely something that a thing does in addition to other activities it might happen to undertake . Rather , striving is " nothing but the actual essence of the thing " (Ethics , part 3 , prop . 7) . Spinoza also uses the term conatus to refer to rudimentary concepts of inertia ,

as Descartes had earlier . Since a thing cannot be destroyed without the action of external forces , motion and rest , too , exist indefinitely until disturbed .

= = = Behavioral manifestation = = =

The concept of the conatus , as used in Baruch Spinoza 's psychology , is derived from sources both ancient and medieval . Spinoza reformulates principles that the Stoics , Cicero , Laertius , and especially Hobbes and Descartes developed . One significant change he makes to Hobbes ' theory is his belief that the conatus ad motum , (conatus to motion) , is not mental , but material .

Spinoza , with his determinism , believes that man and nature must be unified under a consistent set of laws ; God and nature are one , and there is no free will . Contrary to most philosophers of his time and in accordance with most of those of the present , Spinoza rejects the dualistic assumption that mind , intentionality , ethics , and freedom are to be treated as things separate from the natural world of physical objects and events . His goal is to provide a unified explanation of all these things within a naturalistic framework , and his notion of conatus is central to this project . For example , an action is " free " , for Spinoza , only if it arises from the essence and conatus of an entity . There can be no absolute , unconditioned freedom of the will , since all events in the natural world , including human actions and choices , are determined in accord with the natural laws of the universe , which are inescapable . However , an action can still be free in the sense that it is not constrained or otherwise subject to external forces .

Human beings are thus an integral part of nature . Spinoza explains seemingly irregular human behaviour as really " natural " and rational and motivated by this principle of the conatus . In the process , he replaces the notion of free will with the conatus , a principle that can be applied to all of nature and not just man .

= = = Emotions and affects = = =

Spinoza 's view of the relationship between the conatus and the human affects is not clear . Firmin DeBrabander , assistant professor of philosophy at the Maryland Institute College of Art , and Antonio Damasio , professor of neuroscience at the University of Southern California , both argue that the human affects arise from the conatus and the perpetual drive toward perfection . Indeed , Spinoza states in his Ethics that happiness , specifically , " consists in the human capacity to preserve itself " . This " endeavor " is also characterized by Spinoza as the " foundation of virtue " . Conversely , a person is saddened by anything that opposes his conatus .

David Bidney (1908 ? 1987) , professor at Yale University , disagrees . Bidney closely associates " desire " , a primary affect , with the conatus principle of Spinoza . This view is backed by the Scholium of IIP9 of the Ethics which states , " Between appetite and desire there is no difference , except that desire is generally related to men insofar as they are conscious of the appetite . So desire can be defined as appetite together with consciousness of the appetite . " According to Bidney , this desire is controlled by the other affects , pleasure and pain , and thus the conatus strives towards that which causes joy and avoids that which produces pain .

= = In Leibniz = =

Gottfried Leibniz (1646 ? 1716) was a student of Erhard Weigel (1625 ? 1699) and learned of the conatus principle from him and from Hobbes , though Weigel used the word *tendentia* (Latin : tendency) . Specifically , Leibniz uses the word conatus in his Exposition and Defence of the New System (1695) to describe a notion similar that of Hobbes , but he differentiates between the conatus of the body and soul , the first of which may only travel in a straight line by its own power , and the latter of which may " remember " more complicated motions .

For Leibniz , the problem of motion comes to a resolution of the paradox of Zeno . Since motion is continuous , space must be infinitely divisible . In order for anything to begin moving at all , there must be some mind @-@ like , voluntaristic property or force inherent in the basic constituents of

the universe that propels them . This conatus is a sort of instantaneous or " virtual " motion that all things possess , even when they are static . Motion , meanwhile , is just the summation of all the conatuses that a thing has , along with the interactions of things . The conatus is to motion as a point is to space . The problem with this view is that an object that collides with another would not be able to bounce back , if the only force in play were the conatus . Hence , Leibniz was forced to postulate the existence of an aether that kept objects moving and allowed for elastic collisions . Leibniz ' concept of a mind @-@ like memory @-@ less property of conatus , coupled with his rejection of atoms , eventually led to his theory of monads .

Leibniz also uses his concept of a conatus in developing the principles of the integral calculus , adapting the meaning of the term , in this case , to signify a mathematical analog of Newton 's accelerative " force " . By summing an infinity of such conatuses (i.e. , what is now called integration) , Leibniz could measure the effect of a continuous force . He defines impetus as the result of a continuous summation of the conatus of a body , just as the vis viva (or " living force ") is the sum of the inactive vis mortua .

Based on the work of Kepler and probably Descartes , Leibniz develops a model of planetary motion based on the conatus principle , the idea of aether and a fluid vortex . This theory is expounded in the work *Tentamen de motuum coelestium causis* (1689) . According to Leibniz , Kepler 's analysis of elliptical orbits into a circular and a radial component can be explained by a " harmonic vortex " for the circular motion combined with a centrifugal force and gravity , both of which are examples of conatus , to account for the radial motion . Leibniz later defines the term monadic conatus , as the " state of change " through which his monads perpetually advance .

= = Related usages and terms = =

Several other uses of the term conatus , apart from the primary ones mentioned above , have been formulated by various philosophers over the centuries . There are also some important related terms and concepts which have , more or less , similar meanings and usages . Giambattista Vico (1668 ? 1744) defined conatus as the essence of human society , and also , in a more traditional , hylozoistic sense , as the generating power of movement which pervades all of nature . Nearly a century after the beginnings of modern science , Vico , inspired by Neoplatonism , explicitly rejected the principle of inertia and the laws of motion of the new physics . For him , nature was composed neither of atoms , as in the dominant view , nor of extension , as in Descartes , but of metaphysical points animated by a conatus principle provoked by God .

Arthur Schopenhauer (1788 ? 1860) developed a philosophy that contains a principle notably similar to that of Hobbes 's conatus . This principle , *Wille zum Leben* , or " Will to Live " , described the specific phenomenon of an organism 's self @-@ preservation instinct . Schopenhauer qualified this , however , by suggesting that the Will to Live is not limited in duration . Rather , " the will wills absolutely and for all time " , across generations . Friedrich Nietzsche (1844 ? 1900) , an early disciple of Schopenhauer , developed a separate principle which comes out of a rejection of the primacy of Schopenhauer 's Will to Live and other notions of self @-@ preservation . He called his version the Will to Power , or *Wille zur Macht* .

Sigmund Freud (1856 ? 1939) , greatly depended on Spinoza 's formulation of the conatus principle as a system of self @-@ preservation , though he never cited him directly in any of his published works . Around the same time , Henri Bergson (1859 ? 1941) , developed the principle of the *élan vital* , or " vital impulse " , which was thought to aid in the evolution of organisms . This concept , which implies a fundamental driving force behind all life , is reminiscent of the conatus principle of Spinoza and others .

For Max Scheler , the concept of *Drang* is the centerpiece of philosophical anthropology and metaphysics . Though his concept has been important throughout his entire philosophical career , it was only developed later in his life when his focus shifted from phenomenology to metaphysics . Like Bergson 's *élan vital* , *Drang* (drive or impulsion) is the impetus of all life ; however , unlike in Bergson 's vitalistic metaphysics , the significance of *Drang* is that it provides the motivation and driving force even of Spirit (*Geist*) . Spirit , which includes all theoretical intentionality , is powerless

without the movement of Drang , the material principle , as well as Eros , the psychological principle

The cultural anthropologist Louis Dumont (1911 ? 1988) , described a cultural conatus built directly upon Spinoza 's seminal definition in IIP3 of his Ethics . The principle behind this derivative concept states that any given culture , " tends to persevere in its being , whether by dominating other cultures or by struggling against their domination " .

= = Modern significance = =

= = = Physical = = =

After the advent of Newtonian physics , the concept of a conatus of all physical bodies was largely superseded by the principle of inertia and conservation of momentum . As Bidney states , " It is true that logically desire or the conatus is merely a principle of inertia ... the fact remains , however , that this is not Spinoza 's usage . " Likewise , conatus was used by many philosophers to describe other concepts which have slowly been made obsolete . Conatus recedendi , for instance , became the centrifugal force , and gravity is used where conatus a centro had been previously . Today , the topics with which conatus dealt are matters of science and are thus subject to inquiry by the scientific method .

= = = Biological = = =

The archaic concept of conatus is today being reconciled with modern biology by scientists such as Antonio Damasio . The conatus of today , however , is explained in terms of chemistry and neurology where , before , it was a matter of metaphysics and theurgy . This concept may be " constructed so as to maintain the coherence of a living organism 's structures and functions against numerous life @-@ threatening odds " .

= = = = Systems theory = = = =

The Spinozistic conception of a conatus was a historical precursor to modern theories of autopoiesis in biological systems . In systems theory and the sciences in general , the concept of a conatus may be related to the phenomenon of emergence , whereby complex systems may spontaneously form from multiple simpler structures . The self @-@ regulating and self @-@ maintaining properties of biological and even social systems may thus be considered modern versions of Spinoza 's conatus principle ; however , the scope of the idea is definitely narrower today without the religious implications of the earlier variety .