

Aristotle's "De Anima" - Theoretical Significance in Contemporary Cognitive Psychology

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ABSTRACT

As an independent subject, modern cognitive science has completed a systematic experimental research on human perception and cognition system, and has given a scientific definition and process. At the same time, cognitive psychology has made an experimental summary on human's specific psychological state and external-internal feedback system. However, long before science was separated as an independent research discipline from the philosophy of mind in philosophy, there was discussion and construction of the theoretical model of human's perception system and cognitive system in Aristotle's "De Anima" (Aristotle, a sage of ancient Greece). Aristotle's "De Anima" has the research significance for contemporary cognitive psychology, and has scientific thinking inspiration for understanding the process and structure of mind-body.

Keywords: *Aristotle; Philosophy of Mind; Cognitive Psychology; Cognitive Theory*

1. AN OVERVIEW OF CONTEMPORARY COGNITIVE PSYCHOLOGY

1.1 The Research Field of Contemporary Philosophy of Mind and Its Restriction

Philosophy of mind is an important branch of philosophy that studies the ontology of mind and its relationship with the body. Historically, the well-known problem on the philosophy of mind is whether the mind-body is dualism or monism, and there also are many other problems, such as the continuity of consciousness and the nature of certain psychological states. For the traditional research direction of the mind-body, dualism and monism are two central schools of thought on the mind-body problems. The dualism was proposed by René Descartes in the 17th century. Substance dualist like Descartes argued that 「mind」 is a separate substance, while property dualist argued that 「mind」 is a set of independent attributes that emerges from the brain but cannot be reduced to the brain and is not an independent 「substance」. On the contrary, monism holds that mind-body is essentially a different entity from an ontological point of view, rather than an interdependent 「substance」. This view was first put forward in the fifth century BC by Barmenides, an ancient Greek philosopher, and was later championed by the 17th century Baruch Spinoza. Unlike using the ontology as the basis of the theoretical structure, physicalist argued that 「mind」 can ultimately be interpreted based on entities only if they are assumed to exist through proven physical theories. Instead, idealists

insisted that mind is the root of all that exists, that the outside world is either mind per se, or a reflection, or an illusion of mind.

The research methods adopted by modern philosopher of the minds are particularly influential in the field of science, especially in the fields of evolutionary psychology and various neurosciences. Among them, reductive physicalist believes that all psychological states and characteristics will ultimately be explained by the science of physiological processes and states. While non-reductive physicalist thinks that although 「mind」 is not a separate 「substance」, its properties, like the position of the brain, is higher than the physical properties. Although neuroscience, which has been developing since the 1960s, helps to solve some of these problems, it is restrictive that modern mental philosophers have not yet fully addressed the subjective intent of explaining psychological states and attributes in naturalistic terms. Therefore, it is necessary to use contemporary psychology as a tool in the scientific sense to study the cognitive system with psychological scientific significance and the psychological state with subjective attributes.

1.2 The "Cognition" Theory of Contemporary Psychology

Contemporary psychology flourished from the mid-to late-19th century, and two of the discoveries that cognitive psychology played an important role were Paul Broca's discovery that brain region was primarily responsible for the production of language and Carl Wernicke's discovery

that was thought to be primarily responsible for language comprehension. From the 1920s to the 1950s, the main method of psychology was behaviorism. Proponents of behaviorism have historically argued that thoughts, consciousness, ideas and attention were unobservable, so they were beyond scientific methodology and its definition of psychology as science. In the mid-20th century, Donald Broadbent combined the concept of human performance research with the latest information theory, and the development of computer science led to the combination of human thought and computer computing function, which led to the vigorous development of cognitive psychology after 1950. Around 1956, great changes began to take place in the field of knowledge. George Miller summed up a number of studies that showed that human thinking is limited. He argued that memory constraints can be overcome by recompiling information, an innovation that requires both the encoding and decoding of information with the symbolism of consciousness. In addition, Noam Chomsky rejected behaviorism's hypothesis that language is a learning habit, and argued that language understanding is explained by rules-based psychological grammar. However, how does the cognitive psychology explain human's consciousness and cognitive system from a scientific perspective? At the same time, how to understand the definition of 「cognition」 in the cognitive psychology?

「Cognition」 refers to all processes in which sensory inputs are transformed, reduced, refined, stored, restored, and used. Even if these processes operate without associated stimuli, such as images and hallucinations, cognition is associated with them. By this definition, all human behaviors involve cognition. Every psychological phenomenon is a cognitive one. Although the cognitive psychology focuses on all human activities, not some of them, it is based on a particular perspective. The contemporary psychologist does not ask how a person's behavior or experience is seen from an individual's perspective and is got from the results of experience or idea during an experiment, but asks how to get an answer from the object, need, or instinct of the subject. Therefore, the cognitive psychology avoids the deviation of subjective analysis, and it is more scientific and systematic to analyze human's cognitive theory system. After explaining the development of the contemporary psychology, the cognitive psychology and the main systematic research systems, we should know how the cognitive psychology relates to ontology in philosophy.

1.3 The Interdisciplinary Research Value of Contemporary Cognitive Psychology in Contemporary Philosophy and Classical Philosophy

Contemporary cognitive psychology has important scientific research significance to philosophy, and philosophy can provide a new research angle to cognitive psychology. Historically, philosophers did not make systematic empirical observations or build computational models. However, philosophy is still important to

cognitive science because it deals with ideas and basic design theories as experiments and computational methods. Abstract problems, such as the nature of representation and computation, need not be addressed in the daily practice of psychology or artificial intelligence, but these problems inevitably arise when researchers think deeply about what they are doing. Philosophy also deals with methodological issues, such as the nature of interpretation in cognitive science. Moreover, philosophy itself involves normative questions about how people should think and descriptive questions about how people do things. In addition to understanding the theoretical goals of human thinking, cognitive science can have practical goals to improve human thinking, which requires a reflection of the way we want to think.

The systematic study of cognitive psychology is complementary to philosophy. Firstly, the psychological phenomena and computational model analysis in cognitive science investigation have important potential applications to the traditional philosophical problems in epistemology, metaphysics and ethics. Secondly, cognitive science can be regarded as the object of philosophical criticism, especially regarding thinking as the central assumption of representativeness and computability. Finally, cognitive science can be regarded as a research object in the philosophy of science, and analyze experiments from the perspective of scientific positivism.

At the same time, however, it should not be ignored that the cognitive theory system of contemporary western philosophy was evolved from the ancient Greek sages as a whole, and it was contained in the classical philosophy at the same time. When we compare the elements of contemporary western philosophy with modern cognitive psychology, can we also find some clues about science or cognitive psychology before science is systematically born? While thinking about the significance of modernity, we re-excavate modernity in classicality, so we can find the interdisciplinary research value in the history and content of philosophy and psychology.

2. ARISTOTELIAN SOUL SYSTEM

2.1 Preliminary Deconstruction of Aristotle's "De Anima" System - The Attribute of Soul

In the beginning of *De Anima*, Aristotle listed the first and foremost questions: What does 「soul」 contain? What category does 「soul」 belong to? At the same time, what attributes does 「soul」 have to make it stand on its own? Aristotle claims that there are three types of substances--matter, form, and a compound of both matter and form. He begins with definitions of the first two sorts of substances. The first sort of substance, matter, is defined by Aristotle as a substance that is 「not a this in its own right」 and 「is potentiality」. Here, matter is defined by the power to effect change and is the capacity of a thing to make transitions into different states. As for another sort of substance, form, Aristotle says it 「makes matter a this」 and 「is actuality」. Actuality is then defined as either

[the state of knowing or the activity of attending to what one knows] . Here, Aristotle means that there are two types of actuality which form is defined by—first is just the capability of becoming something, and the second is the activity that is exercised based off the first actuality. After defining the first two kinds of substances, Aristotle notes two important notifications about [bodies] here: First, most substances are bodies, especially natural bodies, because the sources of all bodies are natural bodies. Second, some bodies are alive, and some are not. By [life] Aristotle means the capacity, or potential, to change states of oneself, such as self-nourishment, growth and decay. These are the activities that living bodies should be able to engage in and are the precise activities that this response will later mention in terms of what the soul can allow for a potentially alive body. After the notifications about bodies, Aristotle returns to the discussion of form and matter. He claims that the form, as actuality, accounts for why the matter is what it is. That is, the form gives definition to the matter in the compound of matter and form. Next, Aristotle proves that a living body is indeed one of such compounds of matter and form. He believes that the body itself is the [matter] part of the compound, and that there is a [form] part that actualizes the body to allow it to engage in activities. Aristotle then claims that it is precisely the soul that gives life to a body, and therefore it is the soul that allows for the actualization of a potentially alive body. Essentially, what makes a body [living] is precisely the capacity of the soul to engage in activities that are characteristic of living things. Following this, the soul serves the precise purpose of what a form would. Specifically, the soul gives the potentially alive body the ability to potentially act in activities, meaning that it is a form of the first actuality. Based on the contentions above, Aristotle has proven that the soul is a substance as the form while it serves to make a body engage with activities that define the body as a [potentially alive one.]

2.2 The Relationship between Aristotle’s “De Anima” System and [Perception] in Psychology

After a series of preliminary discussions on the attributes of the soul, Aristotle then explored the components of the [soul] . Aristotle raised the question that do all [souls] belong to a collection of the [soul] ? Or different kinds of organisms have different kinds of [souls] , which may be related to species belonging to the same genus, but may be different at the same time? One of the arguments about Aristotle’s collection of attributes related to the classification of the [soul] emphasizes that different kinds of souls have different kinds of capacities, or that, in a broad sense, different kinds of souls have the different potential to achieve completion processes. Another argument is that although both animals and humans have the ability to perceive, only humans have the ability to [reason] . This ultimately leads to an idea that perception and reason are part of a human [soul] , and that the human [soul] contains the animal [soul] which has the soul with only perception.

But this leads to another question, that the two kinds of souls may not be the [soul] in the same collection? Here, Aristotle transitioned the core of his discussion to the relationship between soul and perception. Through the deconstruction of Aristotle’s attribute of the soul and the soul ontology, we already know the soul’s main position as the carrier of consciousness and perception. At the same time, Aristotle’s consciousness structure model of soul deeply echoes the perception model of contemporary psychology.

Aristotle held that the attributes of an animal, such as perception, memory, emotion, etc., belongs to both the soul and the body. These attributes either appear with perception or are caused by perception. Therefore, perception is a must-have attribute of all animals. For animals with [reason] , perception makes them better because perception makes them understand many different things. That’s where episteme comes from in [soul] . On the contrary, it is impossible to have a [soul] and a [mind] that can judge without perception. It is worth noting, however, that Aristotle believed that the sensory organs do not receive the object’s [substance] when they receive the object, but rather the object’s [form] . Hence we do not perceive anything that is as dry or wet, or hard or soft, <as the organ>, but only the excesses in either direction, because the sense is a sort of intermediate condition between the contraries in objects of perception. And that is why a sense discriminates among its objects; for what is intermediate discriminates, since in relation to each extreme it becomes the other extreme. And just as what is going to perceive both pale and dark must be actually neither pale nor dark but potentially both, and similarly in the other cases, so also in the case of touch, <what is going to perceive the contraries> must be neither hot nor cold. Aristotle has recognized and demonstrated the mechanisms needed by the human’s perception in contemporary cognitive psychology and the consciousness model constructed by psychology. In the later argumentative passage on perception and senses, Aristotle said that in cognitive psychology, the brain receives the form of an object by the following stages. [The primary sense-organ is the seat of this sort of potentiality. Hence the organ and the potentiality are one, but their being is different. sense-organ] that perceives is of some magnitude, being perceptive is not, and <so> the sense is not something with magnitude but is a <specific sort of> form and potentiality of the organ.] Firstly, the object perceived by the senses is systematically organized into the object that the human can perceive and provide its information to the brain. The brain abstracts out the general regularity of the object perceived and puts it into cognitive space to recognize it. Aristotle exemplified and demonstrated this point, [Wax, for instance, receives the design on a signet ring without the iron or gold; it acquires the design in the gold or bronze, but not insofar as the design is gold or bronze. Similarly, each sense is affected by the thing that has color or flavor or sound, but not insofar as it is said to be that thing <for instance, a horse>, but insofar as it has a given quality <for instance, color> and in accordance with the form of the sense] . From here we see that Aristotle

has fully demonstrated the relationship between perception and perception organ in psychology.

2.3 The Relationship between Aristotle's "De Anima" System and the Human's Cognitive Model in Cognitive Psychology

In addition, Aristotle's cognitive model of perception can also serve as a reference in the terminology of modern cognitive psychology. In psychology, 「mental representation」, which represents the systematic, intentional and abstract process of mental thoughts under the semantic attribute, essentially refers to the activation state of a neuron, or the activation state of a few neurons, or an activation state of a network of neurons. When we get information from the outside world (the external environment), to allow our mind to use it, it is necessary to encode the outside information in some way. The information state after encoding forms 「mental representation」, which can stay in our 「consciousness」, in our working memory, or be saved in our 「long-term memory」 for future use. In human's cognitive systems, there are many different types of mental representations, one of which is called 「concept」. 「Concept」 is representation we store in the Semantic Memory about what X is. However, there is a long-standing debate on the definition of concept in the cognitive psychology: is concept stored long-term in the linguistic memory or created temporarily in the working memory. Contrary to the concept is the 「content」 of the mental representation. In the study of philosophy of mind, what is symbolized/represented by the mental representation is 「content」. For the 「content」, philosophers of the mind have put forward several important research directions: firstly, why is there such a representation relationship between the human's mind representation and the 「acceptable object」 symbolized/ reflected by the outside world. Secondly, why does the mind representation have intentionality. For example, why does the representation (object of reference) of football in our mind representation refer to 「football」 not basketball? Maybe it's the environment, maybe it's the dim light, that makes a mistake in the information-receiving system, which activates the 「concept」 of basketball rather than the concept of football, or maybe we first learned the concept of football by the concept of 「basketball」 when we were young.

Many philosophers in modern history put forward different and similar views on cognitive problems. Alex Morgan proposed two symbolic structures, 「structural representations」 and 「internal representations」. Uriah Krieger thought that there are objective and subjective mental representations, of which the objective representation thinks that the brain will generally pursue the environment-induced representation, for example, there is an apple in the external environment, then the mental representation will definitely regard this apple as an object, while the subjective mental representation differs with different cognitive systems, such as color reading by a person who is color-blindness. At the same time, Daniel

Dennet thought that the mental representation has no intentionality, but a habitual attribution of the process of human development. William Ramsey raised 「Job Description Challenge」 for cognitive scientists. Considering that at 350 B.C., Aristotle was already able to argue that the human's cognitive system only recognizes the 「form」 of things rather than the 「substance」 and that 「soul」 contains the important internal structure of 「perception」. Even though Aristotle's interpretation of 「form」 psychology was slightly wrong, it is still the current understanding of the human's cognitive system under such conditions. When facing different concepts, the brain simply needs to make a cognitive comparison with the same concept that is already stored, and identifies concept of other types/attributes through the comparison. 「mental representation」 Play an indicative role. Aristotle think both sensory and perceptual experiences with existing 「concept」 that stored in memory cause the universal 「concept」 by the process of abstraction that common concepts are realized by intellects. At this point, the brain's cognition is transmitted only through one way, and is made by recalling recognition and comparison of the 「content」 of 「mental representation」. Aristotle's taking the mind as an ontological cognitive system fully demonstrated his view of the mind-body dualism, while provided some perspectives of answers for the cognitive psychology on the model of the 「subjective representation」 as well as the 「Job Description Representation」. Although Aristotle does not have a precedent definition in *De Anima* or distinguish the memory from the perception and a part of the soul, we can still see some obscure spatial implications of the memory in Aristotle's soul cognitive structure and its analogy to the information processing system associated with the perception definition.

3.CONCLUSION

In addition to the typical problem of mind-body in history, there is an important representative research "De Anima" in the philosophy of mind, especially in ancient Greek philosophy. Although there were discussions of the composition and function of the soul as well as the relationship between Soul and body in the period of Plato, Barmenides and Demicritus, Aristotle, for the first time, systematically proposed in *De Anima* taking 「Soul」 as the research object and listed the questions needed for the study of soul, thus establishing an objective and experimental exploration of soul. Aristotle provided logical and objective analysis cases from the first stage of argumentation, and then influenced the experimental and analytical stage of modern psychology. Aristotle first logically discussed in *De Anima* the form and structure of soul, the relationship between soul and body, memory and the relationship between soul and consciousness, perception. On the relationship between the soul and the individual psychology, Aristotle firstly distinguished between the energy of soul and consciousness, the structure of soul and memory, and forms a complete soul-theory cognitive system and consciousness system. Aristotle has completed his exploration and connection to

soul science, and combined soul cognition system with psychology cognitive science.

Aristotle's exploration of the soul in *De Anima* represents a model of Greek philosophy's understanding of the human body and the structure of the mind, and other models of the soul, the theoretical content of the soul and consciousness are in harmony with contemporary cognitive science and cognitive psychology, which are instructive. Through fully comparing cognitive models in cognitive science and in cognitive psychology and internal and external feedback systems and carrying out Aristotelian interpretation of the cognitive process of 「concept」 in psychology, this paper focuses on the cognitive process of the brain in cognitive psychology by the cognitive theory system of hylomorphism, re-understands Aristotle's "De Anima" from this perspective, and explores the contemporary significance of studying Greek philosophy. From Aristotle's origin of human rational cognition and definition of form in cognitive process, we can clearly know that Aristotle's theory of mind constitutes the philosophical foundation of cognitive science and cognitive psychology, which is still very enlightening to the present generation.

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