

# Knowledge Production Model in Psychology

KHODABAKHSH AHMADI<sup>1\*</sup>, MOSTAFA GHANEI<sup>2</sup>, MILAD SABZEHARA LANGAROUZI<sup>3</sup>

<sup>1</sup>*Behavioral Sciences Research Center, Baqiyatallah University of Medical Sciences, Tehran, Iran*

<sup>2</sup>*Chemical Injuries Research Center, Baqiyatallah University of Medical Sciences, Tehran, Iran*

<sup>3</sup>*Behavioral Sciences Research Center, Baqiyatallah University of Medical Sciences, Tehran, Iran*

\*Correspondence to Khodabakhsh Ahmadi. Email: kh\_ahmady@yahoo.com Tel: +98 9383475334

## ABSTRACT

**Background:** Investigating the intellectual-philosophical underpinnings of psychological theories is important for understanding them correctly, the correct application of therapeutic approaches and growth of this field.

**Aim:** To study the model of knowledge production in psychology.

**Method:** This study is a review and qualitative analysis of content. The statistical population under study is all the content and opinions that have the words of "knowledge" and "science" in the field of psychology. Sampling was performed purposefully by sequential sampling method from theoretical to data saturation. The instrument used in this study was the coding checklist that its content and face validity were examined by expert professors. First, the initial coding was performed according to the research questions. Some codes were combined to form a more general title, and some codes became smaller codes (secondary coding). Then, the notes for the same codes were put together, and the psychology perspective were presented and written after re-reading them.

**Results:** The findings show that different schools of psychology influenced by two different thought-philosophical schools of rationalism and empiricism and different scientific approaches such as positivism, falsificationism, understanding based approaches and the relativism of sociological views of science and each emphasizes on the different concepts of anthropology, epistemology and methodology in the field of health and psychological pathology. Also, the field of psychology of science highlights the necessary factors for the development of science and technology.

**Conclusion:** Based on the findings, it can be concluded that in psychology have been effective two general approaches of rationalist-idealistic and empiricist-realistic, which, provides a framework for theorizing and presenting a comprehensive model of science in general and mental health and psychological pathology in particular by being in a cohesive and unifying whole.

**Keywords:** Knowledge, Science, Knowledge production, Psychology

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## INTRODUCTION

Scientific thinking is one of the most prominent human intellectual achievements. Therefore, it is not surprising that scientists in history, philosophy, and sociology have long focused on the processes and products of the production of science. Although psychological principles are intertwined with scientific thought and behavior, and more simply, psychology is behind science, yet, for theoretical and practical reasons, it has been philosophers, historians, and sociologists that they have been studying the nature of scientific thought, behavior, and institutions for decades. Hence, most people are familiar with the terms philosophy of science, history of science, and sociology of science.

Looking at the theories of psychology, we also see that the thinkers of psychology have been influenced by different fields of philosophy and sociology of science in their attitudes towards human beings. For example, in the anthropological foundations of the positivist view of science, a mechanical view of man is taken that considers man captive to the environment, which is dominated by environmental determinism. Similarly, with the influence of the positivist view on psychology, Skinner's behaviorism, under the influence of the positivist paradigm, adopts a mechanical view of man, observing only human behavior and it rejects any qualitative methods and psychological data in this way<sup>1</sup>. Also, it can be seen that Socrates' calligraphy still manifests itself today in schools of psychology with the concepts of critical thinking<sup>2,3</sup>, the

problem-solving process<sup>4</sup> and Socratic questioning in Cognitive-Behavioral Therapy<sup>5</sup>.

However, with the development of the psychology of science [6], as a branch of psychology, the view of science and the scientist has been considered more deeply. At a very general level, developmental psychologists have been implicit psychologists of science since the time of Jean Piaget, because they have been interested in examining the extent to which children think and act like scientists; an approach known as the "child as a little scientist" metaphor. In addition to the "implicit" developmental psychology of science, there is also the "more explicit" developmental psychology of science; When developmental psychologists focus on adolescents and adults and answer questions about why and how certain individuals become interested in science and eventually become scientists<sup>7</sup>.

In short, if psychology is the scientific study of human thought and behavior [8], the psychology of science is the scientific study of scientific thinking and behavior<sup>7</sup>. This scientific thinking can be tacit and fledgling, as expressed by children and adolescents, or quite explicit and developed, as demonstrated by scientists [9]. In fact, the psychology of science uses experimental methods of psychological research to study scientific behavior. In other words, this tendency is the empirical study of the developmental, bio-neurologic, cognitive, personality, social, clinical, and educational effects of individuals who are involved in science and solve scientific problems.

The basic argument of the psychology of science is to achieve a complete understanding of science and scientific

behavior (from infants trying to discover their world to great scientific geniuses). Therefore, the best theoretical and empirical tools available should be used by psychologists. Many concepts in the field of psychology such as abstract thinking, fluid and crystallized intelligence<sup>10,11</sup>, convergent and divergent thinking<sup>12,13</sup> and creativity<sup>14</sup> that are related to knowledge production are examined in the psychology of science.

Based on the above, we see that psychology, as a branch of science that aims to understand human beings and psychological processes with using scientific methods, in different decades, it has been influenced by the prevailing intellectual-philosophical paradigm of that time and it has based the view on health or psychological pathology on that intellectual-philosophical framework. Therefore, it seems that the need to review the intellectual-philosophical foundations raised in various theories of psychology regarding knowledge and its production is important and necessary. Organizing these theories and models can provide the theoretical foundations needed to better understand empirical and clinical research in psychology. Therefore, the question in this study is what is the model of knowledge production in psychology?

## METHOD

This study is a review and qualitative content analysis. Also, the content analysis used in the present study is descriptive. In descriptive studies, the researcher writes the image of reality and the main lines of the text and does not aim to explain or analyze it and does not consider the design of hypothesis and its prove or rejection<sup>15</sup>. According to the purpose of the research, which is to analyze the qualitative content of knowledge in psychological theories, the selected category is a thematic category that deals with the recovery of thematic contexts in the text. The unit of analysis in this research is the terms of "knowledge" and "science", which is presented in various forms such as sentence and paragraph.

### **Statistical population, sample and sampling method:**

The statistical population under study is all the materials and theories that have the words "knowledge", "science", "knowledge production", "science production" and "knowledge and science production model" in psychology. Sampling was performed purposefully by theoretical sequential sampling method. In theoretical sampling, which is known as the popular method in grounded theory; Samples are selected to help create the theory. The researcher first makes the best choices based on his or her judgment of the best sources of information, such as observation, interview, or written sources, and then looks for examples that complement the theory. In grounded theory, sampling begins first convenience and then purposefully to maximize the difference between the concepts created and ultimately leads to theoretical sampling [16]. The end of theoretical sampling is determined by data saturation. This happens when more data will not be included that leads to development, modification, magnification, or addition to existing theory in the research. In this situation, the new data that enters into the research does not change the existing classification or it doesn't offer to create a new class. At this stage, all the

comparisons have taken place. Of course, it must be borne in mind that saturation is more of a goal and a mental judgment than a fact. Because even though we believe that we have reached saturation, it is possible to change classes and their characteristics by changing attitudes, and achieving saturation is only a temporary pause. One criterion for detecting data saturation is the repetition of previous data, so that the researcher is constantly confronted with data that is repeated. For example, when the researcher repeatedly hears similar words and comments in ongoing interviews, he or she can guess that the data has been saturated<sup>17</sup>.

Search for the use of related texts in the field of knowledge production in psychology using the keywords "knowledge in psychology", "science in psychology" and "knowledge and science production model" in Pubmed, Google Scholar, Science Direct, Proquest and Medline databases in English and simultaneously in Persian language databases including SID, Magiran, Elmnet Persian Scientific Research, Noormags and comprehensive portal of humanities. Also, the available book sources were used in Persian and English in the field of psychology of science.

**Research tool:** The instrument used in this study was the coding checklist, the content and formal validity of which were examined by expert professors. The purpose of content validity is to answer questions such as does the content of the tool have the ability to measure the defined target or not? Does the designed tool cover all the important and main aspects of the measured concept? And do the constructs of this tool do what it should? For this reason, expert judgments are used to assess the validity of content judgments about the consistency of the content of the measurement tool and the purpose of the research [18]. In the qualitative review of the content, the researcher asked the experts to provide the necessary feedback after the qualitative review of the tool that the cases were corrected based on that feedback. Face validity, as a subset of content validity, includes whether or not the appearance of the tool is properly designed to assess the intended purpose. Here, too, experts are used to determine face validity and in qualitative determination of face validity are examined and corrected the cases of difficulty level, the degree of disproportion and ambiguity [19]. In the present study, after conducting meetings between researchers and other experts familiar with the subject of research regarding the design of a checklist that can include all the components related to knowledge and use it to encode the collected material, the data encoding checklist was prepared that its components can be seen in the tables presented in the results section. However, it should be noted that judgments about content validity are neither definitive nor conclusive, as experts in their judgments do not always agree with each other.

**Procedure Method:** In order to understand the views offered on science in psychology, without interfering, focused only on the phrases used in the sources. First, all the material that was in the statistical population was read. Then, the sentences and paragraphs containing the words "knowledge", "science", "knowledge and science production" and "knowledge and science production model" as well as related materials are extracted from the studied

text and transferred to the initial research notes. After the transfer of knowledge-specific content from the text of the entire statistical population to the initial notes, coding began. In other words, the content of the notes was re-studied and according to the purpose of the research, was labeled the content of the material. A title that expresses and represents the content of that text. Upon completion of the initial coding, if necessary, some codes were combined to form a more general title. Some codes also became smaller codes (smaller titles). This step can be interpreted as secondary coding. It should be noted that at this stage, the relationship between the word of knowledge with its adjacent words and sentences was examined to further help in inferring and understanding the content. After the secondary coding was completed, the notes related to the same codes were put together, and after re-reading them, the views of the theorists of psychology were presented and written under the heading of the codes. Sometimes the content of some notes that were presented under a code or title was seemingly inconsistent with each other, so that the researchers understood the point of view and presented

the final conclusion by reading it several times and also, with the help of other notes and other titles.

**RESULTS**

Table 1 presents the limitations of science, the characteristics of scientists, and the types of science in the model of knowledge production from a psychological point of view. According to the findings presented in this table, it can be seen that the introspection method is associated with the personal limitation of the findings and the inability to repeat the findings, and on the other hand, experimental psychological research also faces to limitations such as experimenter, observer, interpreter, and expectation effects. Scientists cognitively are characterized with an innate talent for math, creativity, the ability to think in two problem spaces (or more), the ability to abstract representations and analogical reasoning and in terms of personality are characterized with perseverance, high conscientiousness and low neuroticism and the ability to impulses control. Also, from a psychological point of view, knowledge can be divided into two types: propositional or explicit and procedural or implicit.

Table 1: Limitations of science, characteristics of scientists and types of knowledge in the model of knowledge production from a psychological point of view

Dimensions	Psychological model
<b>Limitations of science</b>	The limitations of introspection in the acquisition of knowledge are: 1) It is more unreliable than being considered a documentary scientific evidence [20] 2) What is obtained through introspection is personal 3) Introspection is not a way of observing, rather, it is a kind of theorizing [21]. According to Rosenthal et al.'s research in psychology, the limitations of scientific research are: 1) Experimenter effects 2) Observer effects 3) Interpreter effects and 4) Expectation effects [22-25].
<b>Characteristics of scientists</b>	Scientists Cognitively: 1) Have an innate talent in mathematics [26]. 2) Have the potential for creativity and cognitive ability of ideation and elaboration [27]. 3) Have the ability to think in two spaces of problem (or more) [28, 29]. They are able to reconcile theory with evidence (hypothesis or experiment) and can well separate their beliefs from the fact [30]. 4) Scientists, like non-scientists, are exposed to some of the same cognitive biases such as confirmation bias [31]. 5) They work forward (moving information toward qualitative arguments) [32, 33]. 6) They form abstract representations [34]. 7) They use analogical reasoning [35-37]. 8) They first seek to confirm and then reject their assumptions [38]. 9) They form a complex network of operations (operations in observational and hypotheses spaces) [39]. 10) They Cognitively have a coherent complexity (the ability to differentiate and integrate different perspectives) [40, 41]. 11) Have a good memory [42]. Scientists in terms of personality are: 1) Energetic, physically healthy, persistent and very independent [42]. 2) Have a tendency to excel, innovation, wisdom, not change, determinism and being organized and precise at work [42]. 3) High conscientiousness [43], low openness to experience [44], and low neuroticism [45]. 4) Ambitious, domineering, achievement-oriented and pragmatic [46]. 5) Independent and introverted and less social [45]. 6) They have ability to impulse control and high ego-strength [45, 47]. 7) Prominent and creative scientists are more domineering, arrogant, hostile, and self-confident [48]. 8) Prominent and creative scientists are more pragmatic, ambitious, and achievement-oriented [49]. 9) Prominent and creative scientists are mostly autonomous, introverted, self-sufficient and independent [49-51]. 10) Prominent and creative scientists are more open to experience or flexible in thought and behavior [44, 52]. 11) Scientists are less likely to experience unusual experiences and cognitive disturbances than artists and musicians [53]. 12) Have motivation (passion) and experience [42]. 13) Scientists are the first [54-56] or the last child [56] compared to non-scientists (and creative scientists compared to non-creative scientists).
<b>Types of knowledge</b>	1) propositional or explicit knowledge 2) Procedural or implicit knowledge [6].

Table 2 presents the anthropological and epistemological foundations of science in the model of knowledge production from a psychological perspective. According to the findings, academic scientific-experimental psychology and schools such as

behaviorism and cognitive psychology came closer to experimentation under the influence of empiricism. However, psychoanalysts such as Freud and Jung have been critical of the approach of reductionism and empiricism in psychology and, under the influence of hermeneutics and rationalist philosophy, have used projective methods and tools to gain knowledge. On the other hand, schools of humanistic and existentialist psychology emphasize the methodology of understanding and Husserl's phenomenological approaches, and contrary to behavioral and psychoanalytic views, consider man to have free will and the power of creativity and creation.

Table 2: Anthropological and epistemological foundations of science in the model of knowledge production from a psychological point of view

Dimensions	Psychological model
	<p>Psychoanalysis, influenced by the view of rationalism in philosophy, has a deterministic view of man and considers man enclosed in the myths and priori innate ideas [57, 58].</p>
	<p>Behaviorism, influenced by positivism, has a mechanical and deterministic view of man (environmental stimuli act as the underlying variables in man and determine all of his attitudes and tendencies). For this reason, the free will of man, which is created under creativity, does not have the necessary independence and the algebra of general laws or environment manages human creativity [1, 59].</p>
	<p>Humanistic and Existentialist Psychology:                      - The schools of humanism and existentialism consider man to have free will and the power of creativity and creation [60-62].                      - These schools consider human beings with less precision but more variety. Man at the same time is both a rational and an irrational being; It is both thoughtful and cognitive, as well as emotional and feeling oriented [63].</p>
<p><b>Fundamentals of science</b></p>	<p>The epistemological and methodological foundations of psychoanalysis are:                      - Rationalism and determinism [57, 58].                      - In psychoanalysis under the influence of hermeneutics [64] and rationalist philosophy, free association techniques, dream interpretation, linguistic analysis, active imagination, word association test and other projective methods and tools are used to gain knowledge [57, 58, 64, 65].                      - Jung in criticizing the dominance of the approach of reductionism and empiricism in psychology, believed that as soon as psychology was considered merely as a brain activity, it immediately lost its special value and intrinsic quality and it becomes the result of the action of endocrine glands and one of the branches of physiology [66].</p>
	<p>The epistemological and methodological foundations of behaviorism are:                      - Positivism, by ignoring and rejecting metaphysical philosophy (metaphysical ideas are nonsense in logical positivism), reinforced anti-subjectivist and introspective tendencies in psychology, and provided the grounds for the creation of the psychology of American behaviorism [67].                      - Behaviorism influenced by John Locke's ideas and positivism observes only human behavior and thus rejects any qualitative methods and psychological data [1, 68].                      - Environmental stimuli affect human beings as contextual variables and determine all his attitudes and tendencies [59].                      - Behaviorism believe that language and other aspects of our knowledge and beliefs, and culture in general, are determined by experience [69].                      - John Watson strongly argued that the science of psychology did not make significant progress. His proposed solution was to make it a natural science by changing the subject matter of this field: the subject of psychologists' research should be human behavior, not consciousness or mind. In fact, he argued that all "references to the mind" should be excluded from psychology. He reinforced his advice by arguing that subjective matters do not exist or, to a lesser extent, by arguing that there is no reason for them to exist. At other times, he resorted to a view that later became known as methodological behaviorism, a view in which all subjective explanations are ignored for methodological reasons [1, 59].                      - Skinner argued that while we close our eyes at mediating emotions or other subjective events, we can go directly to the primary physical causes and avoid referring to the subjective causes. Skinner said that if all associations were allowed, nothing would be lost by not paying attention to a subjective association. His second argument is related to the failure of cognitive causes or other subjective cause's explanations. He stated that when a behavioral abnormality is explained by its association with anxiety that anxiety itself should be explained in turn. However, certainly assumption of subjective events prevents the pursuit of a causal chain. Skinner argued that by achieving anxiety, the researcher simply stopped his research and could not ask what is the cause of that anxiety? [21].</p>
	<p>Epistemological and methodological foundations in scientific and experimental psychology:                      - Psychology, under the influence of empiricism, approached experimentation and brought with it a new way of studying psychology, which led to "sensualism". According to this view, since the mind cannot be experienced sensory and laboratory measurement, it should be removed from psychological studies or maximized stated: the mind is nothing but the gradual condensation of sensory experiences [70].                      - Mechanical philosophy with the assumption that the whole world is like a machine; That is, it is systematic, predictable, observable, and measurable. It has influenced psychology and shaped the belief that everything, even man, can be described in terms of the concepts of physics and</p>

	<p>examined in the light of physical characteristics [67].</p> <ul style="list-style-type: none"> <li>- Evolutionary theory has also had a great impact on the establishment of soulless psychology [67].</li> </ul> <p>Epistemological and methodological foundations in Gestalt Psychology:</p> <ul style="list-style-type: none"> <li>- The School of Associativism and Gestalt psychology are influenced by Aristotle's empiricist view and his associative laws [67].</li> <li>- In the light of Gestalt psychology's holistic approach, perception is a single process in which sense and meaning are intertwined and occur simultaneously (contrary to the views of positivists and falsificationists). Thus, according to Gestalt, the senses do not directly represent material objects in their geographical environment; Therefore, the scientist's observations are not a collection of raw data from nature, but this observation is obtained in a field that includes nature, scientist, and a specific socio-cultural environment in which the scientist conducts research [67].</li> </ul> <p>Physiological psychology and comparative psychology, influenced by Descartes' thoughts and the comparison of the human body with machines and animals, emphasize the use of empirical and comparative methods [68].</p> <p>Drive-centered and need-centered theories in psychology influenced by Hobbes's ideas and his claim that human behavior is controlled by desires or hatreds emphasize empirical and analytical methods [68].</p> <p>Epistemological and methodological foundations in cognitive psychology:</p> <ul style="list-style-type: none"> <li>- Cognitive psychology and information processing, influenced by Kant's ideas, emphasize the duality of mind and body [68].</li> <li>- Cognitive psychologists believe in the transformation of psychology into a precise natural science [21].</li> </ul> <p>Epistemological and methodological foundations in humanistic and existential psychology:</p> <ul style="list-style-type: none"> <li>- Schools of humanistic and ontological psychology emphasize the methodology of understanding approaches based on Husserl's phenomenology [60-62, 70].</li> <li>- Existentialist epistemology holds that the individual is responsible for his or her own knowledge. Knowledge originates from one's consciousness and combines the content of one's consciousness and feelings as the product of experience. Human situations are made up of both rational and irrational elements. The validity of knowledge is determined by its value and meaning for a particular person. Existentialist epistemology stems from the fact that human experience and knowledge are subjective, personal, rational, and irrational [63].</li> <li>- Eric Fromm, an existentialist psychologist, criticized the dominance of the approach of reductionism and empiricism in psychology, arguing that psychology is a science that lacks its main subject, the human soul [66].</li> <li>- These schools argue that in our psychology we must explain human actions in a non-casual language and, of course, in terms of intent or motivation. Existential psychiatrist Carl Jaspers also criticizes Freud, arguing that Freud's claim is a confusion of meaning-based or intentional associations with causal relationships. He argues that psychology should be a science of meaning-based relationships [21].</li> </ul>
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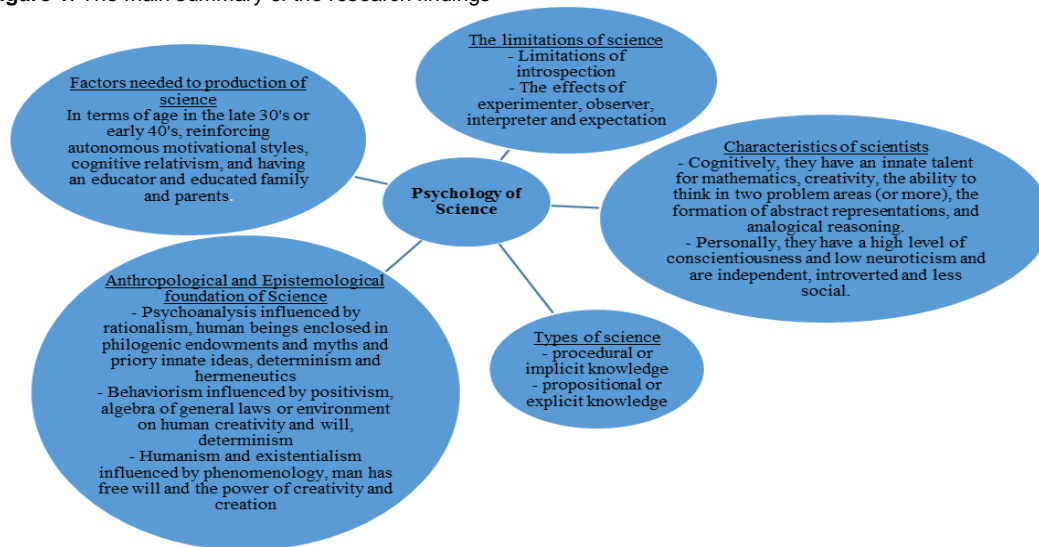
Table 3 presents the necessary factors for the production of science in the knowledge model from a psychological perspective. According to this table, factors such as age, gender, intelligence and genetic predisposition, experience, reinforcement and intrinsic and autonomous motivations, social support and culture have been shown to be effective in increasing the production of science and technology.

Table 3 Factors necessary for the production of science in the model of knowledge production from a psychological point of view

Dimensions	Psychological model
Factors needed to production of science	Age: There is a Curve-shaped relationship (reverse U) between age and scientific productivity and it peak is in the late 1930s or early 1940s and then gradually declines [42].
	Gender: - Studies have shown that men have more scientific output (both total and average annual output) than women [72-74]. - When the rate of scientific production remained constant, women had more effective scientific output [74].
	Intelligence and genetic talent: - Genetic effects predict between 37 and 48 percent of the variance in scientific talent [75].
	Having experience [42, 76].
	Strengthening intrinsic and extrinsic motivations: - Strengthening autonomous motivational styles in the field of education and acquisition of knowledge [77-81]. - Strengthening healthy intrinsic aspirations in pursuit of science and knowledge [82-84]. - Rewards and honors [85].
	Developing cognitive abilities: - Relativity and non-absolutism of knowledge as right or wrong [86]. - Developing cognitive abilities of ideation and elaboration [27]. - Developing the cognitive ability to think in two problem spaces [29]. - Fostering creativity and curiosity [87, 88].
	social support: - Having an educated family and parents [88, 89]. - Having a coach in general [88, 90] and having a prominent coach in particular [85, 90, 91].

	- Organizational support [85].
	Culture:
	- Creative collaboration is more on the side of those who are familiar with two different cultures, which shows that exposure to different cultural frameworks is important for creative productivity in science [87].

Figure 1. The main summary of the research findings



## DISCUSSION

Psychology, as a branch of science, is based on various intellectual-philosophical approaches to science that understanding these philosophical foundations is important in a better understanding of the theories proposed by the various schools of psychology, the appropriate application of therapeutic approaches, and, more generally, the development and growth of this branch of science. Therefore, the aim of the present research was to study the model of knowledge production in psychology. According to the findings, in psychology, which today is itself a science based on empiricist, inductive, and evidence-based perspectives, the effects of different philosophical approaches and the priory view of rationalism and posteriorly view of empiricism has led to the formation of various theories. For example, Freudian and Jungian psychoanalytic approaches with considering the myths and phylogenic endowments, believes that there are natural complexes in human beings whose individual duty is to gain more knowledge of these concepts of nature and to manage his/her life according to this awareness.

Radical behavioral approaches, on the other hand, adopt an empiricist view, basically describing psychology as the study of observable behavior and by rejecting human nature's heritage, is considered man as a product of posterior environmental factors. Because from the point of view of positivism, the mind is a tabula rasa and experience is the initial stage of induction<sup>92</sup>. However, the deterministic view of these two views has been criticized, and humanists, influenced by existentialist philosophical views, believe in the existence of human will and freedom to shape their own destiny. In the meantime, the psychology of science, by using other branches of psychology and theories proposed in those fields, has considered the process of science production and the characteristics of scholars and believes

in the effectiveness of cognitive, personality, developmental, and social, neurological and educational factors in scientific theorizing and the characteristics of theorists.

In addition, it is observed that from the perspective of different psychological perspectives, knowledge is divided into two types, explicit and implicit. Explicit knowledge can be documented and stored in databases, such as rules, processes and quantities, or such as designing and recording patents, but implicit knowledge, which is virtual, is an intangible treasure in people's brains which cannot be stored in a database, like the presence of the mind, the right reactions and the intuition. Polanyi first mentioned in 1962 that "we know more than we say," referring to examples of human abilities such as learning to ride a bicycle and swimming, or how to recognize faces that it is not easy for a person to explain how to do it, he called the knowledge of such abilities "tacit knowledge". In other words, tacit knowledge can be considered as a set of experiences, skills, work perspectives, and value and mental systems within a person that cannot be said and stored in any database, but its place is the human mind and his activities<sup>6,93,94</sup>. Today, in the field of cognitive psychology, it has been shown that information is processed by two systems: experiential, associative, implicit or procedural and rational, reflective, explicit or propositional, and stored at the level of two explicit and implicit memories that for each identified specific areas of the brain<sup>95-97</sup>.

In the background of research in the field of psychology, there was no study that sought to collect a model of knowledge production in psychology. Because, as stated earlier, today's scientific and academic psychology is influenced by empiricist and positivist views, and itself follows the epistemological and methodological models of philosophy and the sociology of science. However, from the

early to mid-1980s, studies of the psychological underpinnings of science expanded [98]. For example, one of these works was a small volume by Grover [99], inspired by the theories of Thomas Kuhn [28] and Paul Feyerabend [100]. Grover's theory was that science is more than logical, it is a function of mental and irrational processes (intuitive, imaginative, and creative), and therefore, if we want to understand the scientific process that involves the stages of justification and experimental experimentation, we need the psychology of scientists [99]. However, in some sources, the opposite effect of psychology on philosophical thought has also been observed. In the mid-1930s, for example, Gaston Bachelard took a psychoanalytic approach to understanding the scientific mind in his books "The Scientific Mind" in 1934 and "The Formation of the Scientific Mind" in 1938. Bachelard's concept of "epistemological rupture" has apparently influenced Thomas Cohen's thinking, and more specifically Cohen's idea of "paradigm shift" <sup>6</sup>.

Apart from many studies in the field of psychology of science and has been mentioned in detail in the findings, and their results have been used as a basis for framing the knowledge production model in psychology, some research has been done in the field of psychology in relation to knowledge and knowledge management, which has some overlaps with the present study. For example, Henriques<sup>101</sup> tried to present a general plan of psychology that is theoretically integrated. By adopting a new epistemological view, he showed that psychology could be seen as an intermediate subject between Skinner's and Freud's basic assumptions. In particular, Skinner's fundamental vision has merged with neuroscience to understand how the mind is affected by the outside world. This concept is then linked to Freud's fundamental vision for understanding the evolutionary changes in the mind that create human culture. By linking life to the mind from down and the mind to culture from up, psychology is effectively placed between biology and the social sciences. The findings of this study are consistent with the findings of present study that knows the behaviorist approach is based on empiricist and positivist perspectives and the psychoanalytic approach as influenced by the rationalist views of Plato to Descartes.

In another study, Kimmerle, Wodzicki and Cress<sup>102</sup> conducted a study to find the social dimensions of knowledge management, and by examining findings related to social psychology and their application in knowledge management research, they introduced the concepts of social psychology as social norms and social identity, which affect the social processes of knowledge sharing and knowledge processing in organizations. In fact, although this study does not seek to examine the knowledge model in psychology but it shows the application of one of the branches of psychology (i.e., social psychology) in the field of knowledge management in organizations that indicates the concepts and findings of different branches of psychology can be used in the field of knowledge production and management.

The main summary of the research findings is presented in diagram 1. In general, regarding the findings of this study, it can be stated that psychology in different periods, both when it has not yet been scientifically established and it was in the form of philosophers' theories,

and what when considered as a scientific discipline, it was influenced by the philosophical theories of the science of its time, and various schools of psychology have sought to understand human and his mental processes by following the ontological, anthropological, epistemological, and methodological forms of their time.

This study also had some limitations. The content analysis in the present study was qualitative only. Therefore, the information obtained from quantitative analyzes that lead to complementary findings was ignored. The model obtained in the present study is limited to the field of psychology and other fields and scientific areas have not been studied. Also, the coding checklist in the present study is based on the mental judgment of researchers and some experts in the field of knowledge; Therefore, it may not include some of the components considered by other experts in this field and may lead to deficiencies in knowledge assessment.

Finally, it should be noted that today's academic psychology is based on positivist and evidence-based epistemology and therefore, the vacuum of research with other epistemological approaches is observed in it. It is suggested that future research in this area take a holistic view and thus provide a more accurate and comprehensive understanding of man and his mental processes.

**Funding:** This research was conducted with the financial support of Baqiyatallah University of Medical Sciences.

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