



Research Paper

Cognitive Evolution of the "Human" Concept and Its Adaptation to Piaget's Theory



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Running Title The concept of human and Piaget's cognitive development

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ABSTRACT

Background: Cognitions and attitudes, especially anthropological attitudes, are influential in human behavior.

Objectives: The present study was conducted to investigate the cognitive evolution of the human concept in elementary school female students and its adaptation to Piaget's theory of cognitive development.

Materials & Methods: The present research method is qualitative of deductive-inductive type. Participants were first (n=12), second (n=13), and third-grade (n=12) elementary female students selected through the available sampling method. Semi-structured interviews were conducted with them to the point of theoretical saturation. Consistent with the research method, the findings were analyzed by theme analysis.

Results: The findings showed that regarding human nature, students of all three grades have concrete thinking. Regarding the distinction between humans and animals, first and second grade students have concrete thinking, and third-grade students have concrete-abstract thinking. Regarding the purpose of life, students of all three grades have concrete thinking. Regarding the end of life, students of all three grades have abstract thinking. Regarding the beginning of human life, first-grade students have abstract thinking, and second- and third-grade students have concrete-abstract thinking.

Conclusion: Research findings consistent with some studies have shown that students can achieve abstract cognitive growth at younger ages than what Piaget stated, which can be a function of cultural, religious, and social factors.

Keywords: Cognition, Humans, Psychological theory

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Highlights

- The main themes of the “human” concept comprise human nature, its differentiation from animals, the purpose of life, and the beginning and end of human life.
- Elementary school students can achieve abstract cognitive growth at younger ages than what Piaget stated.
- The concept of “human” is multifaceted, and some of its components are concrete and some abstract.
- Culture and religion influence the formation of the human concept.

Introduction

The concept of “human” has always been at the center of human thought. Attention to the “human” concept is not only because man is one of the creatures of this world and must be known, but also the importance of anthropology for knowing the nature and truth of man [1]. A person’s perception and view of himself or herself are directly related to self-esteem [2]. People with good self-images have higher self-esteem [3]. Man’s attitudes and cognitions form an important part of his or her behavior [4]. Attitudes and cognitions are important aspects of our emotional life. Such views and attitudes often determine how we deal with objects, people, and thoughts. There is no doubt that attitude and cognition affect behavior [5]. Attitude and knowledge of people, including the attitude towards human beings, i.e., the anthropological view of people, determine their behavior [4] because the basis of self-esteem is the attitude that people have toward themselves as human beings.

Cognitive development underlies the formation of attitudes, including anthropological attitudes. Proponents of cognitive development theories seek to examine how cognition works in infants and children when certain cognitive abilities are developed. Researchers are interested in children’s basic cognitive skills, including how children perceive and represent numbers, space, objects, events, and others [6]. In this regard, various theories have been proposed, the most important of which is Piaget’s theory. He introduced four stages of cognitive development in children: sensory-motor, preoperational, concrete operational, and formal operational [7].

In the sensory-motor stage, cognitive development begins with sensory and motor activities that are mainly reflective responses. At the end of this phase, children acquire many cognitive powers, such as the ability to mentally represent and perceive the stability of objects.

In the second stage, children cannot pay attention to what happened to them from different dimensions. The state of self-centeredness causes children to have a kind of inability to imagine what situations and objects look like from the point of view of others [8]. Children in the third stage, concrete operational, can perform various mental operations. The most important feature in this stage is the inability of children to achieve abstract thinking and to hypothesize. Adolescents between the ages of 12 and 18 are at the stage of formal or abstract operational thinking. Besides the abilities that children have acquired in the previous stages of cognitive development, adolescents, at this stage, can think abstractly about the various situations or problems they face. This power of thinking provides them with more hypothetical supremacy compared to children who are at lower stages of cognitive development [9]. Adolescence is a period of formation of abstract mental features and deductive hypothesis, followed by the final form of inferential thinking-hypothesis that is specific to adults [10].

In conclusion, children in the motor-sensory stage use their senses and actions to understand the world. In the preoperational stage, the children consider themselves the criterion of cognition, and if they have no experience in something, they will make an explanation for themselves. In the concrete stage, the children use logic or transformation or the combination and separation of ideas. They use logical thinking to gain knowledge about concrete matters. In the last stage, adolescent thinking becomes similar to adults and finds the power of reasoning, analogy, and abstraction [11]. Piaget thought that all these stages are fixed and that people go through these stages in order, while studies show otherwise. For example, one study found that only 30% of adults have reached abstract cognitive development, not to say that cognitive development occurs at all with increasing age [12]. Some researchers also believe that Piaget’s steps in the formation of cognitive development are not definitive. Because a child of primary school age may be in

one of three stages of cognitive development in terms of mental ability (sensorimotor, preoperational, concrete operational). For example, while half of the 9-year-old children are in the concrete operational phase, a 9-year-old with low mental abilities may still be in the preoperational phase, while another 9-year-old with high mental capacity may be in the formal operational phase [8].

Many contextual factors such as socioeconomic status, environmental conditions [13], cultural meanings, emotions, and social interactions affect children's cognitive development, and various studies have provided significant results that these factors have been neglected in Piaget's theory [14]. For example, Galván et al. [15] showed that socio-demographic factors (age, gender, birth order, and socioeconomic status of the family), primary nutrition (maternal weight during pregnancy, child weight, child weight, and height at 5 years), and psychosocial factors (maternal depression, emotional-social health and the size of the indoor space) affect the cognitive development of children. Santos et al. [16] reported that social and economic factors indirectly affect early cognitive development due to environmental factors around the child.

Other factors affecting children's cognitive development include society [17], culture [18-24], religion [25], family [26, 27], marital conflict, history of parental problems [28], malnutrition [29], food [30], maternal depression [31], air pollution [32], and maternal epilepsy during pregnancy [33]. Although Piaget's theory had a profound effect on the theory of psychology, it was not immune to criticism. One of the drawbacks of this theory is overestimating the ability of adolescents and underestimating the cognitive ability of children. Another methodological critique refers to the bias of their children in their research [35]. Also, Piaget ignored the role of cultural and social factors in forming children's cognitive development, which is prominently considered in Vygotsky's theory [35]. In this regard, the socio-cultural approach emphasizes the key role of culture in the formation of cognitive development [36, 37].

Proponents of the cognitive-cultural approach also believe that children can categorize animate and inanimate beings, material and immaterial, mental and physical, from childhood. Therefore, like adults, they can think about natural and supernatural matters. They can draw conclusions about supernatural factors such as God, life after death, the creation of man, and the world [38]. As shown in previous research, the need to pay attention to other cultures is essential in forming cognitive and attitudinal development [39]. Research in other coun-

tries considers cognitive development as a function of social, cultural [36], religious, [25, 40], and spiritual factors [41]. The literature review shows that no research inside or outside of Iran has addressed this issue, and this research is novel and innovative in its way. For this reason, the current research has been carried out with two goals. The first goal was to determine the view of female students on human nature. The second goal was to compare female students' view of human nature with Piaget's theory of cognitive development.

Material and Methods

The method of the present research was qualitative and inductive-deductive [42]. The first part of the research is inductive; the researcher entered the research inductively and started the interview to determine the cognitive evolution of human nature in students. In the second part, the deductive part, the female students' views of human nature were compared with Piaget's theory of cognitive development. The participants of the present study were students of 12 Bahman School in Rasht City, Iran, in the 2018 academic year. They were selected by convenience sampling method. The sample group comprised 12 students from the first grade of elementary school, 13 students from the second grade, and 12 students from the third grade. The theoretical saturation method in qualitative research is considered a standard to end sampling. Semi-structured interviews were used to collect information.

Some examples of interview questions were "What do you think human beings are?", "What does it do?", "What does a human look like?" and "How does he walk?" The researcher first started the interview with a central question about the nature of human beings and then, by conducting the interview, various issues such as the difference between humans and animals, the purpose of human life, the beginning and the end of human life, appeared during the interview and were examined. For data analysis, the theme analysis method recommended by Saldana [43] has been used. Experts in the field of methodology have proposed different steps for thematic analysis, the most important of which is the categorization of free codes and then the conversion of subcategories to the main theme. Various methods are considered to evaluate the internal validity and acceptability of the findings. One of the methods of ensuring internal acceptability is proper involvement in data collection. This process was performed in the present study. Also, one of the signs of appropriate involvement in the research process is the theoretical saturation of the data, which also appeared in the present study [44].

Results

The data of the present study, which was calculated by thematic analysis, included qualitative data on the evolutionary attitude of elementary school girl students about human nature and its adaptation to Piaget's theory of cognitive development. Qualitative data were collected through semi-structured interviews with female students. The time of each interview varied between 25 and 35 minutes. A total of 37 students were interviewed. In [Table 1](#), demographic characteristics of students and their parents, including their level of education and occupation, are presented.

Categories and themes related to first-grade female students of elementary school

According to the present study, 89 free codes (live codes) were identified from interviews with first-grade female students. After reflecting on the nature of free and live codes and considering their commonalities and differences, subcategories related to students' anthropological perspectives were extracted. Then, by combining similar categories under one category, research themes were created. As a result of this process, the first theme comprised human nature, the categories of eating, personal hygiene, communication skills, emotional being, being with physical characteristics, being with clothes, student, parental roles, moral being, ambiguity and confusion, and female roles.

The second theme included human differentiation from animals, the categories of verbal and speech ability, food difference, the difference in childbearing, different housing, movement, appearance and limbs, human educability, and human clothing. Under the third theme, the purpose of life, learning, academic success, work (job), earning money, achieving comfort, marriage and family formation and its protection, and the continuation of goodness were included. Also, the fourth theme comprised the end of human life, the categories of turning to God, becoming heaven, being buried underground, going to hell, aging and disability, death, and going to heaven. In the end, the category of coming from God was included in the fifth theme, that is, the beginning of man. The themes and categories related to the concept of humans among first-grade students are presented in [Table 2](#).

Categories and themes related to second-grade female students of elementary school

According to the present study, 75 free codes (live codes) were identified from interviews with second-grade elementary school girls. After reflecting on the nature of initial codes and considering their commonalities and differences, subcategories related to students' anthropological perspectives were extracted. Then, by combining similar categories under one category, research themes were created. As a result of this process, the first theme comprised human nature, the categories of gender, moral being, emotional being, self-controlling being, positive being, positive and negative communication, and physical characteristics (such as differences in face and limbs) were placed. In the second theme, human differentiation from animals, the categories of different physical appearance, cognition, differences in housing, differences in type and diet, sensory dimension of movement, human speech, clothing, and self-control were included. The third theme, the purpose of life, included the categories of observance of ethics, aimlessness, the realization of goals and aspirations, and living. Also, under the fourth theme, the end of human life, the categories of helplessness, ignorance, ambiguity, transfer, nothingness and annihilation, conditional end (heaven and hell), and return to God were included. In the end, the category of ambiguity and ignorance and coming from God was included in the fifth theme, i.e., the beginning of man. The themes and categories related to the concept of humans in second-grade students are presented in [Table 3](#).

Categories and themes related to third-grade female students of elementary school

According to the present study, 84 free codes (live codes) were identified from interviews with third-grade elementary school girls. After reflecting on the nature of free and live codes and considering their commonalities and differences, subcategories related to students' anthropological perspectives were extracted. Then, by combining similar categories under one category and axis, research themes were created. As a result of this process, in the first theme, human nature, the categories of gender, emotional being, moral being, artist being, spiritual being, being with free will, social being, and being interested in science were placed. The second theme, human differentiation from animals, comprised the categories of clothing, differences in physical appearance, motor differences, differences in food type, speech, sublime aspects, differences in place of residence, observance of hygiene, and acquiring knowledge. Under the third theme, the purpose of life, the categories

Table 1. Demographic characteristics of students and their parents

No.	Age (y)	Academic Grade of Elementary School	Parent Education		Parent Career	
			Mother	Father	Mother	Father
1	7	1	Diploma	Diploma	Housekeeper	Clerk
2	7	1	Diploma	Diploma	Housekeeper	Clerk
3	7	1	Diploma	Diploma	Housekeeper	Worker
4	7	1	Bachelor	Bachelor	Teacher	Teacher
5	7	1	Diploma	Diploma	Housekeeper	Clerk
6	7	1	Bachelor	Bachelor	Housekeeper	Clerk
7	7	1	Diploma	Diploma	Clerk	Clerk
8	7	1	Bachelor	Bachelor	Clerk	Teacher
9	7	1	Diploma	Diploma	Housekeeper	Clerk
10	7	1	Diploma	Diploma	Housekeeper	Worker
11	7	1	MA	Bachelor	Teacher	Clerk
12	7	1	MA	MA	Teacher	Clerk
13	8	2	Diploma	Diploma	Housekeeper	Clerk
14	8	2	Diploma	Bachelor	Housekeeper	Clerk
15	8	2	Diploma	Bachelor	Factory worker	Clerk
16	8	2	MSc	Bachelor	Teacher	Clerk
17	8	2	Diploma	Diploma	Housekeeper	Worker
18	8	2	MA	MA	Teacher	Clerk
19	8	2	Diploma	Diploma	Housekeeper	Worker
20	8	2	MA	MSc	Company Clerk	Clerk
21	8	2	Diploma	Diploma	Housekeeper	Clerk
22	8	2	Bachelor	Bachelor	Housekeeper	Clerk
23	8	2	Bachelor	MA	Company Clerk	Clerk
24	8	2	Bachelor	Bachelor	Housekeeper	Clerk
25	8	2	Bachelor	Diploma	Clerk	Clerk
26	9	3	Diploma	Diploma	Housekeeper	worker
27	9	3	Diploma	Diploma	Company Worker	Clerk
28	9	3	Diploma	Bachelor	Housekeeper	Clerk
29	9	3	Diploma	Bachelor	Housekeeper	Teacher
30	9	3	Diploma	Diploma	Employed	Clerk
31	9	3	Diploma	Diploma	Housekeeper	Clerk
32	9	3	Bachelor	Bachelor	Company Worker	Clerk
33	9	3	Bachelor	MA	Housekeeper	Clerk
34	9	3	Bachelor	Bachelor	Teacher	Clerk
35	9	3	Diploma	Diploma	Clerk	Clerk
36	9	3	MSc	Bachelor	Teacher	Clerk
37	9	3	MA	MA	Teacher	Clerk

Table 2. Themes and categories related to the concept of human among the first-grade female students

Themes	First-Grade Female Students	
	Categories	Piaget's Perspective
Human nature	Eating	Concrete thinking
	Personal hygiene	
	Communication skills	
	Emotional being	
	Being with physical characteristics	
	Being with clothes	
	Student	
	Parental roles	
	Moral being	
	Ambiguity and confusion	
Differentiation with animals	Female roles	Concrete thinking
	Verbal and speech ability	
	Food difference	
	Difference in childbearing	
	Different housing	
	Different movement	
	Different appearance and limbs	
	Human educability	
Human clothing		
The purpose of life	Learning	Concrete thinking
	Academic success	
	Work (job)	
	Earning money	
	Achieving comfort	
	Marriage	
The end of human life	Family formation and its protection	Concrete-abstract thinking
	Continuation of goodness	
	Turning to god	
	Becoming heaven	
	Being buried underground	
	Going to hell	
	Aging and disability	
Death		
The beginning of human life	Going to heaven	Abstract thinking
	Coming from God	

Table 3. Themes and categories related to the concept of human in the second-grade female students

Themes	Second-Grade Female Students	
	Categories	Piaget's Perspective
Human nature	Gender	Concrete thinking
	Moral being	
	Emotional being	
	Self-controlling being	
	Positive being	
	Positive and negative communication	
Differentiation with animals	Physical characteristics	Concrete thinking
	Different physical appearance	
	Cognition	
	Differences in housing	
	Differences in type and nutrition	
	Sensory dimension of movement	
	Human speech	
	Clothing	
Self-Controlling		
The purpose of life	Observance of ethics	Concrete thinking
	Aimlessness	
	Realization of goals and aspirations	
The end of human life	Living	Concrete-abstract thinking
	Helplessness	
	Ignorance and ambiguity	
	Transfer	
	Destruction and annihilation	
	Conditional end (heaven and hell)	
The beginning of human life	Return to God	Concrete-abstract thinking
	Ambiguity	
	Lack of knowledge	
	Coming from God	

Table 4. Themes and categories related to the concept of human in the third-grade female students

Themes	Categories	Piaget's Perspective
Human nature	Gender	Concrete thinking
	Emotional creature	
	Moral creature	
	Artistic being	
	Spiritual being	
	Creature with free will	
	Social being	
	Being interested in science	
Differentiation with animals	Clothing	Concrete-abstract thinking
	Differences in physical appearance	
	Motor differences	
	Differences in food type	
	Speech	
	Transcendent dimensions	
	Differences in place of residence	
	Observance of hygiene	
The purpose of life	Acquiring knowledge	Concrete thinking
	Education	
	Marriage	
	Family formation	
	Communication	
The end of human life	Pleasure-seeking	Concrete-abstract thinking
	Good end, bad end	
	Annihilation	
	Disability	
	Heaven	
The beginning of human life	Hell	Concrete-abstract thinking
	Coming from God	
	Birth	
	Lack of knowledge	

of education, marriage and family formation, communication, and pleasure-seeking were included. Also, the fourth theme, the end of human life, included the categories of a good end, a bad end, annihilation, and disability. In the end, the categories of coming from God, birth, and lack of knowledge were included in the fifth theme, the beginning of man. The themes and categories related to the concept of humans among third-grade students are presented in [Table 4](#).

The findings showed that regarding human nature, students of all three grades had concrete thinking. Regarding the distinction between humans and animals, first- and second-grade students had concrete thinking, and third-grade students had concrete-abstract thinking. Regarding the purpose of life, students of all three grades had concrete thinking. Regarding the end of life, students of all three grades had abstract thinking. Regarding the beginning of human life, first-grade students had abstract thinking, and second- and third-grade students had concrete-abstract thinking.

Discussion

This study aimed to investigate the cognitive evolution of the human concept in elementary school female students and its adaptation to Piaget's theory of cognitive development. The girl students of the elementary school, aged 7-9 years, are all in the stage of concrete thinking according to Piaget and therefore are far from abstraction. The characteristic of these people is their inability to perform abstract thinking. But as it turned out in the findings section, the first theme, the nature of human beings, the second theme, the distinction with animals, and the third theme, the purpose of life, the categories found by the first-grade female students were at the level of concrete thinking. Nevertheless, the categories made under the theme of the end of human life were concrete-abstract, and the categories related to the beginning of man were abstract. In relation to the second-grade female students, the categories related to the theme of human nature and purpose of life were at the level of concrete thinking, but the categories related to the themes of differentiation from animals, the end of life, and the beginning of man were at the level of concrete-abstract development.

In relation to the third-grade students, the categories related to the themes of nature and purpose of life were at the level of concrete thinking, and the categories related to the themes of differentiation from animals, the end of life, and the beginning of man were at the level of concrete-abstract thinking. These findings refute some of Piaget's

views on cognitive development and are consistent with the research of Babakr et al. [34], Richert et al. [20], Gauvain and Munroe [24], and Dasen [39]. These findings emphasize the importance of paying attention to cultural and social factors in the formation of cognitive development. For example, Richert et al. [20] stated that cultural factors such as religious background, participation in religious activities and parents' views on prayer, and abstract concepts such as God lead to the formation of children's intellectual and cognitive ability to understand. Gauvain and Munroe [24] stated that cultural differences affect human cognitions and activities. Because it has been proven that in different cultures, cognitive functions are different.

In explaining the findings of this study, we can use the cognitive-cultural theory that opposed the step-by-step and cognitive development in children, especially in matters related to abstract categories such as the concepts of soul, God, heaven, and the beginning and end of man. This approach claims that evolution is influenced by cultural diversity throughout life and follows the pattern of deciduous shrubs and that no one can predict in advance which branch is better. Contrary to Piaget's view, this approach believes that evolution is not only organic and a function of age but also a function of culture. Because cultural foundations in interaction with cognitive processes affect the evolution of individuals and lead to the evolution of supernatural concepts, especially the concepts of God, soul, prayer, and life after death [38]. A look at the categories resulting from the interviews of female students also shows this issue. For example, the categories of the first-grade students in relation to the theme of the beginning of man were at the abstract level, and they pointed out things that are not tangible and concrete. For example, they stated that "we came from God or we are God's creatures." Regarding the theme of the beginning of man and how man comes into being, which is a biological process and occurs through the sexual intercourse of parents, the first-grade female students mentioned things like coming from God and being a creature of God.

Because of various reasons, in our country, sex education is not discussed, at least in pre-university ages, and parents refer their children to such categories in response to questions about how they were born. It seems that in this subject with no sensory and concrete information, the students referred to parental and cultural hearings, which are typically abstract. The same abstract cases were repeated in relation to the theme of the end of human life. Therefore, the role of cultural conditions and the educational level of parents in the formation of abstract views cannot be denied.

Because the child's experiences within the family form his or her beliefs and values, the cultural traditions, beliefs, and values of the family are transmitted to the children, which are themselves derived from the prevailing traditions in society. We can also point to the role of religious and spiritual experiences within families, which affect a major part of human cognitive, personal and social development over a lifetime, especially in childhood [25]. This finding is in line with what Boyatzis and Marks [26] stated in their research. They stated that the family acts as a context for transmitting religious and spiritual experiences for children and can pave the way for children's cognitive development. Also, this finding is consistent with the social conditions of Iran, which are family-oriented. Piaget, on the other hand, firmly believed in his theory that these four paths are linear and that everyone follows them in order. In contrast, Cartwright [41] proved otherwise. Regarding the role of culture and, of course, religion in the cognitive development of individuals, we can refer to the categories related to the theme of life purpose in third-grade students, which was the most repetitive code by these students. Compared to their first- and second-grade peers, these students mentioned much more about marriage, having children, formation of a family, and caring for children, which can be attributed to cultural and religious teachings. These students were at the age of religious maturity (the official time for praying and fasting). As we all know, some things are taught to these children in the form of puberty rituals. Concepts such as motherhood, growing up, and the ability to marry and have children are related to education during the legal age of puberty of students, which even if the family does not take action in this regard, schools in the form of programs called "celebration of worship and servitude" to these issues are addressed to some extent. Therefore, the role of cultural components in the formation of students' concrete categories can also be observed here. The same formal or informal religious teachings can be mentioned in relation to the theme of the end of human life, which was mentioned as abstract and concrete in all three sections. This training takes place both in schools by teachers of religious education (heavenly messages) and in the national media, which can shape children's views about the end and beginning of human life. Of course, the level of parental education and their ability to convince children rationally is also an important issue that cannot be ignored.

Conclusion

In conclusion, the present study found evidence that children reach a level of abstract thinking at a younger age than what Piaget believed. The reason for this difference is that this cognitive development is not just a biological category that is a function of age [12] but also a function of social, cultural, and educational conditions, which have been neglected in Piaget's theory. Lack of control over demographic variables such as cultural and religious characteristics of students and their families was one of the limitations of the present study. The family itself, family education, and the type of socialization of the family have profound effects on the child's cognitive development. It is suggested that the present study be conducted on adolescents and young girls and boys in an exploratory mixed method and that the findings be validated. It is also recommended that, based on the findings of the present study, a questionnaire to assess anthropological attitudes be developed and validated.

Ethical Considerations

Compliance with ethical guidelines

All study procedures were in compliance with the ethical guidelines of the Declaration of Helsinki (2013).

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Conflict of interest

The authors declared no conflict of interest.

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