Research Article

The role of language and memory in children reasoning

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ABSTRACT

Aim: Reasoning is the most complex and complete function of the mind. It is also one of the important factors of humane behavior. Language is called as the most important and effective factor of controlling behavior. Memory is a systematic process, which processes and stores information. Also, it is necessary for high-level cognitive functions. This paper tries to study if language has a role in children reasoning? Also, it studies whether the memory is also effective. In order to answer these questions, the theoretical and research principles were studied. **Methods:** Text analysis is a qualitative research that attempts to take advantage of the resources and facts, logical reasoning methods to identify the children. Text analysis as a research method focused on the actual content. Study of children with visual analytic reasoning methods can help administrators to understand the current situation of education programs tailored to predict the future. Databases and search engines of the Internet and library databases universities in the world, book and journal accessible with logical reasoning of children and the training of 100 books and 60 articles sphere volume study The study is. Analyze and adjust the content, the method used in an analog form - is inductive. **Result:** The results show that except Chomsky, who believes language has an independent role; others believe that the language can control and determine the direction of reasoning and the use of language. **Conclusion:** In children, one of the factors of power and reasoning is problem-solving. Also, memory is related to the ability of using previous experiences and problem-solving techniques. Memory is a cognitive factor, which depends on reasoning and leads to appropriate progress in reasoning.

Key words: Children reasoning, language, memory

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Introduction

Reasoning is a process through which mind can realize theoretical evidences of obvious evidences. In other words, the mind gains information about what it does not know using what it knows. This takes place when there is a relationship between the obvious and the unknown processes.

Reasoning is the most complex and complete function of the mind by which the development of civilization, culture, discovery of geometric miles, physical and chemical formulas, and any other kind of research is possible. Reasoning has different definitions. One of them is: A series of propositions that is called the premise. Supporting the propositions leads to the conclusion.[1] Reasoning is a series of claims. Conclusion is a claim that is supported by other propositions.[2]

The ability of reasoning and problem solving is one of the important factors of humane behavior. Although, mammals and other animals have such ability but this ability is more developed in human.[1,3-8]

The use of language is one of the reasons for reinforcing the power of reasoning and problem-solving in human. Baldo *et al.* (2005) concluded that Aphasia patients were harmed in Wisconsin Card Sorting Test. They needed different kinds of cards such as color, shape and numbers and the rules change frequently. To lock from one criterion to another is the most problematic language harm in many patients.

In the second experiment, even normal people experience problem regarding distinct pronunciation, (They

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frequently repeated the word "no"). The obtained results revealed that the use of problem-solving at high level depends on a specific part of language system. The recent studies confirm these findings through nonverbal reasoning tests. According to the studies, the use of reasoning of the standard matrix is effective in treating aphasia penitents.

Language and Reasoning

Language is the most important and effective factor in controlling behavior. Roger Brown believes that language provides a situation in which an individual talks about the objects that are absent and transfers his information about that events and objects. Inventing meaning and productiveness are other features of the language. This means human language is free to develop and increase. This can be done through word order, making sentences, using new words and using the words that have several meanings. Noam Chomsky, an American contemporary linguist, claimed that the human brain is organized in a manner that is sensitive to any differentiations that are created by language. According to Chomsky, these features of mind help children control the sounds and learn the mother tongue. According to Vygotsky, language is an important tool for social interaction, thinking, self-organization or self-regulation. In this theory, self-organization means "the ability to think and solve the problem without benefiting from assistance of others."[9]

Chomsky believes that the language is independent and is different from other abilities of the mind. He says Language follows the rules that are instinctive and are exclusive to human beings. Human beings can learn and use languages instinctively while following these rules. Chomsky stated: Children produce clear sentences and statements that they have never heard.[10]

According to Vygotsky, in children, thought, and language begin as two separate and independent activities. At first, there are prelinguistic (preverbal) thoughts or thought without language and preintellectual speeches or speeches without thoughts. In fact, as in animals, they think without a language. For example, during the 1st month, infants attempt to solve problems such as reaching objects using thinking without a language. The child babbling to get the adults' attention is also an example of language without thought.[11]

Vygotsky believes that in children aged between 2 and 7 years, language plays an internal role. This means that the language controls the thoughts and also has an external role that transfers the conclusions to others. Since the child cannot realize these functions of language, something will happen which Piaget calls it self-oriented speech.

According to Krin (1975), the child talks about his plans and internal actions and he/she does not make any difference between his personal speech and the social speeches. When a child is almost 8-year-old, the child learns to limit the use of language to the situations in which he communicates with others. At this time, language acts as thoughts. Language used as inner speeches will not be heard.[12] Vygotsky suggested a model for understanding social developments. In this model, recognizing the sign as a tool for conceptual functions was emphasized. Then, he studied social development during the childhood, the relations between individuals, social and environmental variables as well as their roles in social improvements.

Jons (2009) argues about the change of general concepts in language and combination of them which he calls "the legend of the language."

According to Vygotsky, the structure of language preserves its identity among people and culture. Jons studies Vygotsky's cultural and social psychology and he states that if we study these communication issues which have mentioned by Vygotsky from a compound perspective, they can be interpreted differently. Vygotsky found if we use self-oriented speeches in problem solving, it should be increased when the duties are harder. Piaget did not predict the positive usage for self-oriented speech. So, Vygotsky tried to provide situations in which duties are harder. For example, when the child was ready to draw a picture, suddenly he found he does not have a paper and colored pencils. In other words, the child faces problems because of prevention.[13] In these situations, the rate of self-oriented speech was 2 times more than whole speech.[14] The children tried to solve their problems through talking to themselves. For example, a boy said: "Where is the pencil? I want a blue pencil. It is not important. I write with a red pencil, and I wet it by water; so, it will be more colored."[13] This study showed that the self-oriented speech has a problem-solving usage. This conclusion was also made by Kohlberg (1968) and others.

Memory and Reasoning

Memory is a systematic process that processes and stores the information. This is necessary for a high-level cognitive functions.[15] Memory is the ability to keep the information

in the mind while doing complex duties. The ability to use previous experiences in current situations and the use of problem-solving techniques are associated with working memory. The sense-memory processes the information.[16]

Gadercol *et al.* (2007) studied the class behavior and the function of short term memory in children. They also studied this supposition that inattention in behavior and the problems regarding short term memory happen simultaneously. The teachers studied the behavioral problems of 52 children aged 5, 6, 9 and 10 in terms of their attention and performance. Majority of them experienced cognitive problem about signs. It was figured out that these individuals did not pay a sufficient amount of attention. These persons are absent-minded. They cannot control the duty and have problems using new problem-solving techniques. These conclusions also confirmed that the problems of working memory and inattention happen simultaneously. The conclusion displayed that the decrease in the ability of the working memory plays a contributing role in behavioral problems of children.[17]

Some scientists including Piaget explained the theories of cognitive development. They resorted to the capacity of the information processing as a reason to develop from one stage to another. John Paskal Leon was the first one who developed this method. He stated that human's thinking has two stages. The first stage is explained by the power of memory or capacity. It means that this stage is involved in a process that determines the amount and the kind of information that individuals can process. Working memory shows the function of the conceptual ability. The capacity of functional (operational) memory is determined about the numbers of categorized information or the units that the individual can keep simultaneously in his mind for a short time. It means the individual is involved in the concepts, physical and biological patterns, communicative world and the symbols that he uses to refer to them such as, words, numbers, and conceptual imaginations. Also, the individual is involved in conceptual functions that he can control them. Examples include arithmetic operation on numbers and conceptual revolution on conceptual imagination.

Paskal Leon suggested that the increase of conceptual units that a person can show simultaneously enables him to think about more complex concepts. For example, a person needs to keep two mental parts in his mind while deciding if this number is bigger than the other one or not.

To be able to sum these numbers, he should keep three parts in his mind. In other words, it contains two numbers plus functional operation, such as addition or subtraction. In order to understand the proportion, the person should remember two groups of numbers in order to compare the relation between them.

According to Paskal Leon, the conceptual ability is one or some information unit (s) in children aged 2–3. It increases every 2 years and is seven units in children aged 15. He claimed that a person needs the conceptual ability from 1 to 7. Having less conceptual abilities makes the finding of the responsibility ways impossible because it cannot make necessary relationships. So, by increasing conceptual abilities, the individual gets an idea and learns the appropriate skills in order to be capable of new situations. A decrease or increase in conceptual abilities leads to slow or quick progress.

Allyson *et al.* (2010) conducted a research in the nerve in situation of California University. Its topic was the speed of education and reasoning in children. The aim of this research was to determine a pressed training which could improve the cognitive skills of children aged 7–9 who were at low social and economic status. The children participated in a cognitive training program which lasted 8 weeks. Both training programs include the rate of commercial access to video games. Training of the reasoning emphasizes the universality of programming and communicative. The rate of training emphasizes on the quick physical and visual responses. The standard evaluations were administered before and after training about the ability of reasoning nonverbal intelligence in children. All groups were controlled during the training of standard tests. The reasoning children group developed fundamentally in nonverbal intelligence test. They increased their intelligence quotient to 10, but they did not develop in encoding programming. Against, the speed group developed in encoding, they were not successful in nonverbal intelligence test. The conclusions displayed that we could correct the fluid reasoning and the speed of processing through training.[11]

The children with average fluid reasoning.[18] Showed that they have the capacity of logical thought and problem-solving in new situations.[19] Cattle suggested the deposited theory in order to do fluid reasoning as a framework that allows children know their cognitive skills.[19] In addition to fluid reasoning, this theory shows a strong prediction of children's performance at school, at university and any job which are related to the cognitive compass. Although the fluid reasoning is an individual steady fixed characteristic, the researches use these questions in long term theories. It is clear that the ability of the fluid reasoning is proportional to

educational productions and is probably influenced by the environmental factors. It is supposed that the cognitive skills are used effectively in the cognitive interventions of children who have undesirable socioeconomic situations. This showed that several cognitive skills which support the reasoning such as working memory, precision.[20] And the language[21] correspond to low socioeconomic status. The academic conclusions were in accordance with the socioeconomic status. In recent years, research has done in which there were children aged 7–10 who have low scores and unsuitable economic situation. The election was done according to age-bracket; because the most influences of reasoning in previous functions are shown in children aged 5–10.[22]

Several researches proved that the training of the working memory is a cognitive factor that strongly depends on reasoning and will lead to proper developments in reasoning. Besides, Hams *et al.* acknowledged that the training that is related to an increase in the working memory can lead to the correction of the academic conclusions even if the absence of the participants is excessive.[17] They even generalized this theory and used the differences of the working brains in any kind of reasoning. It is supposed that during the training of different kinds that need the communicative generalization, this will lead to fulfilling most of the reasoning aims; because the characteristics of the fluid intelligence can face the new problems. The children will oppose and compare against the new situations. A designed speed intervention emphasizes on quick visual discovery and physical responses during the function of the species of the easy games. This training program evaluated the processing speed or the ability of the easy function of the behaviorism, especially when full attention is paid to the precision and the concentration.[23] This skill studies a basic factor in cognitive development. Moreover, Kill and Salt House (1994) proved that the changes of the processing speed during the life will alter many observations of the cognitive function. Furthermore, Bavliy *et al.* showed that the conclusions of the active video games among different kinds of actions that are related to precision and understanding are more effective to improve the processing speed. So, it is expected that the processing speed leads to secondary aims; and the conclusions of the direct training of the fluid reasoning will be more than predicted rate. On the contrary, because the training does not emphasize the quick response, it expects reasoning training to have the least conclusion or do not change the cognitive speed. In general, the test is used in which the children participated in the cognitive training programs (which lasted 8 weeks), should show the expected cognitive process. Fundamentally, the two groups who participated in active interventions, emphasized on the primary cognitive skills. Encouraging individuals is an important issue in this relationship. So, the commercial games were used which were designed for entertainment. Also, recognition of the social bilateral effects in learners is very important.[15] The children developed in spite of the equal bilateral effects of the researchers and other children who participated in the program.

This paper studies whether language has a role in children reasoning or not. Also, it studied the role of memory in children reasoning.

Methods

Text analysis is a qualitative research that attempts to take advantage of the resources and facts, logical reasoning methods to identify the children. Text analysis as a research method focused on the actual content.[10] Study of children with a visual analytic reasoning methods can help administrators to understand the current situation of education programs tailored to predict the future. Databases and search engines of the Internet and library databases universities in the world, book and journal accessible with logical reasoning of children and the training of 100 books and 60 articles sphere volume study The study is. Analyze and adjust the content, the method used in an analog form - is inductive.

Conclusion

The first question was whether the language has a role in children reasoning. The conclusions show that the use of language is one of the reasons of power, reasoning and problem-solving in the human being (Philips; Cook zaj Hendry; Pen; Holyack and Pavinl). Although in children at first language is independent from the thinking ability (Chomsky), but by at the age of 2–7 the thought controls and determines the direction (Chomsky; Vygotsky; Krin; Frinhoog). Another rule of Language in reasoning is that, language is a tool for inner discourse and cognitive conceptual functions at high level in problem solving (Creen; Jonse; Valdo; Wilson). So, the role of language in children's reasoning is that the language is a controller and helps the problem-solving ability in the forms of inner discourse and self-oriented speech. According to reports by Basoo, Capitani and Spilner; Basoo, Rensi, Fagiloni, Scotti and Spilner, Language has a basic role in reasoning. Some researches (Drankerz, Wilkinz, Van Walin, Red Fren and Giger; Drankers and Baldo, showed the relationships between language and reasoning. It is predicted that reasoning is related to those parts of the brain that are related to language (the middle folds of the left hemisphere).

Another question considers the role of memory in reasoning. The memory is necessary till the cognitive level (Canada, Osaka). The memory has an active relationship with the previous experiences and problem-solving techniques. Some factors such as memory and precision support reasoning (Mezaka, Nobel, Mack and Candlis). The working memory is a cognitive factor which strongly depends on the reasoning and leads to the appropriate developments in reasoning, (Hams, Helmes, Gasrecool, Daning and Paskalleon). In general, the role of the memory in reasoning is a bilateral role. On one hand, it strongly depends on reasoning. On the other hand, it leads to the appropriate developments in reasoning. Hikaru Takyvchy *et al*. found that exercises involving memory lead to grafts of the outward structure of prefrontal lattice (section), partial areas and frontal part of the corpus callosum of the brain which plays an important role in forming the reasoning. The brain exercises increase the relationship between the right side of the brain and the part that are located in prefrontal lattice (section). The participants who took part in the test of the law faculty used reasoning for 3 months. Then, the researchers (Elison Mack K. Kristin Vitaker and Silvia Bunge) found the flexibility of the structure of the white substance of prefrontal and partial sections of the brain. They also understood the relationship between partical Cortkes and grooved part (Striatom), which has a role in reasoning a learning skill in both cognitive and movement domains.

Discussion

Language is the most important and effective factor in controlling behavior. The use of language is one of the sources of power, reasoning and problem-solving in the human being (Philips, Cook zaj Hendry, Pen, Holyack and Pavinl. Chomsky believes that the language is independent of the brain. According to Chomsky, human is naturally able to use language about its framework. Vygotsky claims that the Language is an important tool for thinking and self-organization. In other words, he believes that the human can think and solve the problems without others' assistance. Chomsky states that the ability of reasoning that is one of the thinking aspects and begins in children before language does. It means children try to solve the problems without using language. In children aged 2–7, language determines the direction, controls the thought and transfers the conclusions of thinking. According to Krin, in children aged 7 and more, language has an internal speech role that Piaget calls it self-oriented speech. Frinhooy emphasizes on knowing symbols as a means for the conceptual functions. Jons states this role of language makes the concepts and changes their forms. The legend of the language problem solving at high level depends on language system.[9]

The memory is necessary till the cognitive level.[18]

The memory has an active relationship with the previous experiences and problem-solving techniques. The low scores of memory in children aged 5–10 show that children have problems knowing the signs (Gadercol *et al*.,). The working memory shows better functions of the conceptual ability such as reasoning (Paskal Leon). An increase in the capacity of the information units leads to a drastic increase in other skills. Also, the training increases the processing speed and the reasoning ability. (Berdli, Knoyn, Berchinal, Mackado, Vcool; Mack Loyid). The children with average fluid reasoning showed that they have the capacity for logical thinking and problem-solving in new situations (Cattle; Hern and Cattle). Some cognitive skills support the reasoning such as working memory, precision (Mezakapa) and language (Nobel Mack Candelis) and correspond to Low socioeconomic status. The academic conclusions were in accordance with socioeconomic status.

Several researches proved the training of the working memory is a cognitive factor that strongly depends on reasoning and will lead to proper developments in reasoning. Also, Hams *et al*. acknowledged that training which is related to the increase in working memory can lead to correction of academic conclusions even if the absence of the participants is excessive (Helmes, Gasercool and Daning).

The recent studies of Rovens Matrix tests are used to treat the problems of patients. The conclusions of these tests show the bilateral roles of reasoning and language (Basoo, Capitani and Spilner; Basoo, D. Renzi, Fagiloni, Scotti and Spilner).

According to a report, language has a basic role. Other studies found differences regarding the role of language in reasoning (Renzi and Fagiloni; Shan and Visben; Vilardita).

While studying the aphasia patients, each of them-who has problems and needs a reasoning pattern-was studied. The conclusions especially concentrated language (lingual) failure. The researches (Drankerz, Wilkinz, Van Walin, Red Fren and Giger; Drankers and Baldo) show the relationships between Language and reasoning. It is predicted that reasoning is related to those parts of the brain which are related to language which is the middle folds of the left hemisphere (Drankers, Wilkinz, Van Walin, Red Fren and Giger; Drankers and Baldo). The

harms of the nape of the head, the areas that are related to the visual processes, influence the visual patterns.

Hikaru Takyvchy *et al*. found that exercises involving memory lead to grafts of the outward structure of prefrontal lattice (section), partial areas and frontal part of the corpus callosum of the brain which plays an important role in forming the reasoning. The brain exercises increase the relationship between the right side of the brain and the part that are located in prefrontal lattice (section). The participants who took part in the test of the law faculty used reasoning for 3 months. Then, the researchers (Elison Mack K. Kristin Vitaker and Silvia Bunge) found the flexibility of the structure of the white substance of prefrontal and partial sections of the brain. They also understood the relationship between partical Cortkes and grooved part (Striatom), which has a role in reasoning a learning skill in both cognitive and movement domains.

Some scientists accepted Piaget's idea and resorted to the capacity of the information processing as a reason to develop from one stage to another. Especially, they stated human's thinking has two stages. The first stage is explained by the power of memory or capacity. It means that this stage is involved in a process that determines the amount and the kind of information that individuals can process. Working memory shows the function of the conceptual ability.

Regarding the conceptual ability, Kiss used his pattern for making clear how children use language, the capacity of the working memory, its role in children reasoning and the techniques that children use in their social interactions. This pattern corresponded to MiC. Halford's interpretation about the capacity of the working memory and its role in children reasoning. According to Kiss, language can affect the style of children reasoning. However, Halford believes that this role is not completely clear.

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