

The views of Piaget and other researchers regarding the achievement of object permanence in the first year of infancy

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Abstract

The present study attempts to investigate the views of researchers (Piaget, Baillargeon, Hebb) on the developmental course of human development during infancy. In the field of developmental psychology there are various theories about the stages of human maturation. In particular, we will attempt to present one of the most important achievements of cognitive psychology which has been influenced by the theories that have been developed from time to time in the constructivist frame of reference. In particular, we will present the views of Piaget and other more recent researchers regarding the achievement of object permanence in the first year of infancy.

Keywords: Concept of object; Object permanence; Nativist theory; A versus B error; Innate mechanisms of skill acquisition; Visual preference

1. Introduction

Various theories of human development have been put forward over the years. Each theory interprets in its own unique way and its own principles the course of development of each human being. There is, therefore, no broad theoretical framework that unifies all scientific knowledge on development issues. The field of developmental psychology is approached from different theoretical perspectives, specifically from four broad frames of reference (Cole & Cole 2002).

According to the first frame of reference, biology/maturation, the main cause of development is maturation, i.e. genetically determined patterns of change that are created as the individual grows. Here the environment plays a secondary role in shaping the basic course of development and the genetic information that each individual carries in his or her genetic code is primary. In the second frame of reference, the environment/learning, theories that have been developed claim that the main causes of developmental change are exogenous, i.e. they come from the environment and that learning is the main mechanism of development. In the cultural frame of reference, psychologists working from this framework agree that biological and environmental factors influence human development but also that this process depends on how these factors combine in the particular cultural-historical context. In the last frame of reference, the constructivist one, biology and environment play reciprocal roles in developmental change. One of the pioneering proponents of this view was the developmental psychologist Jean Piaget who belongs to the field of cognitive psychology (Cole & Cole, 2002).

2. Theory of Piaget

For Piaget, the child's cognitive-mental development goes through four stages which appear in the same order of succession. These stages are as follows: a) the sensorimotor from 0-2 years b) the preverbal from 2-7 years c) the concrete logical operations from 7-11 years and d) the formal and logical operations from 11 years and above (Piaget,

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1954). The first stage of development which we will study in more detail since it falls within our interests and is relevant to our work, will be the starting point for the exposition of Piaget's views on what the terms concept and object permanence mean.

Piaget argued that the concept of an object is likely to take many months for infants to mature and respond to the ability to put together the pieces, the fragments of an object in order to gain a complete picture (Johnson & Soska, 2008). An adult is able to perceive that an object exists even if it is hidden from the senses. If at this moment someone comes along and snatches the book we are holding out of our hands and runs into the next room, is there any chance that we would think that the book or the person who grabbed it from us has ceased to exist? Of course not. We hold a sense of the book and the person in our minds, even though we do not see them, nor hear them, nor touch them. But infants live in a world where an object is "a mere image that reenters the void as soon as it disappears and emerges from it for no apparent reason" (Piaget, 1954, p.11). The cognitive ability to perceive objects as permanent and unchanging is something that develops during the first two years of life (Piaget, 1954, p.238). Therefore an infant is required to acquire the ability of object permanence at the beginning of life in order to "pass" later on to internal cognitive reasoning (Piaget, 1954).

2.1. The sub-stages of development of object permanence

So, according to Piaget's views, the development of object permanence that takes place in the first stage, the sensorimotor stage, is completed through a series of six sub stages (Piaget, 1954).

In the first stage (from birth to the first month) we have no indication that the infant even vaguely manifests such an ability. In the second stage (from the 1st to the 4th month) we would say that it functions preparatory to the infant's ability to master the object's permanence. The preparatory stage involves the deliberate repetition of specific behaviors centered on the infant's own body, which Piaget called primary cyclical responses. Also playing an equally important preparatory role in this stage is the behavior of passive anticipation. The term passive expectancy is used to describe the repeated reappearance of an object in the same position with the result that the child begins to look more persistently at that point.

In the third stage (from the 4th to the 10th month) the first signs of the object's permanence appear. We are referring, of course, to the secondary cyclical reactions which are behavioral actions of children in order to deliberately and repeatedly manipulate objects they encounter in the environment. For example, children look for objects that are not entirely covered but a small part of them is visible. However, Piaget still believes that the concept of the object is not fully formed and that for the child the object does not have an independent existence. In other words, "it would be impossible to say that the half-hidden object is understood as an object covered by a curtain. It is perceived simply as something in the process of disappearing" (Piaget, 1954, p.35).

Fourth stage (from the 10th to the 12th month). It is now a fact that children know that objects still exist even if they are no longer visible. However, according to Piaget's theory, the concept of object permanence is not fully developed, as the child cannot understand visible shifts. That is, infants tend to make a characteristic error called the A versus B error. If, for example, we repeatedly hide an object in position A and each time ask an infant to point out where the object is hidden by removing the cover and it (the infant) does indeed locate it, it is quite possible to think that the child will continue to locate the same object with the same ease when it is hidden in position B rather than in position A. In reality, however, this is not the case. The child continues to point to location A even though the object has moved and the infant saw it hidden in location B (Piaget, 1954).

In the fifth stage (from 12 to 18 months) the child is able to follow successive object shifts and find the hidden object even though he/she has not fully understood what Piaget called "unseen shifts" (Piaget, 1954, p.242). In the sixth and final stage (from 18 to 24 months) the concept of permanence is fully understood. The child can make an internal representation of the object by understanding in depth the "unseen shifts" (Piaget, 1954, p. 242).

2.2. Summary of Piaget's theory

In conclusion, we could say that Piaget considered the cognitive skill of object permanence as the beginning of true thinking and the ability to insight and use mental symbolism in problem solving. In other words, object permanence is the foundation for subsequent advances in cognitive ability (Piaget, 1954, p.243).

Piaget's theory was defended by many but there were also many who questioned the existence of logic in infants' behaviors through the above developmental substages (Johnson & Soska, 2008).

3. Friction point (error A instead of B)

In particular, for the typical error that infants make in stage 4 error A instead of B, there have been hundreds of successful iterations but the same point remains the cause of countless disputes and conflicts (Johnson & Soska, 2008).

Adele Diamond (1991) was the first to argue that one cause of error is that infants forget quickly (Cole, 2002). She believes that the A versus B error occurs because of the underdeveloped prefrontal cortex area of the infant brain which is responsible for the development of short-term memory and, also, it occurs because there is a difficulty in inhibiting the tendency, which infants have, to reach a "full" position (Johnson & Soska, 2008, p.471). Furthermore, always according to Diamond, infants have difficulty performing sequential actions directed towards a goal, such as removing an obstacle to get, for example, the candy behind them (Diamond, 1995).

Researchers Linda Smith & Esther Thelen have argued that the wrong A versus B doesn't "tell" us, doesn't offer us anything about the meaning of the object because the whole experimental procedure is set up in the wrong way. They believe that infants will make the same error even when we have nothing to hide (Johnson & Soska, 2008).

But Renee Baillargeon, argued that the A versus B error is a poor indicator to understand how infants perceive the object concept and that is because there is "a general lack of coordinated hand-motor, exploratory behavior in infants who are still learning how to reach correctly" (Johnson & Soska, 2008, p.471).

Renee Baillargeon not only expressed her disagreement with Piaget's theory on this particular point but was also an opponent of the whole theory. In the following, we will attempt to present the main points of her own findings after long and intensive research.

4. The views of Baillargeon

A diametrically opposed view to that of Piaget was expressed by the researcher Baillargeon and her colleagues. Baillargeon conducted extensive research to demonstrate that infants possess the idea of the existence of objects long before they begin to make coordinated movements (Baillargeon, 1985). She was able to refute Piaget's view that infants are able to master the achievement of object permanence many months later when some other functions have matured. He demonstrated this by conducting a series of experiments on 3.5-month-old infants.

He concluded that infants aged 3.5 months fully understand that objects continue to exist when hidden and that objects cannot move in space occupied by other objects (Baillargeon, 1985). The same researcher experimented in order to secure information-evidence about how infants perceive not only the existence of the object but also the physical and spatial characteristics of hidden objects (Baillargeon & Julie De Vos, 1991).

He found that infants as young as 5.5 months of age are able to account for the existence, height, and trajectory of a hidden object (Baillargeon, 1987). Specifically, during a series of heuristic studies and research techniques known as "visual preference" infants were presented with one probable and one non-probable event-event. Initially infants were familiarized with the event and then researchers divided the infants into two groups where the first group watched the probable event unfold while the second group watched the unlikely event unfold. The infants in the first group showed no interest in the possible event but their interest and surprise was high for the unlikely-unexpected event (Fantz, 1963).

5. H Nativist Theory

Another theory, called the Nativist Theory, claims that the concept of an object is innate in infants and that the further development of the concept is due to "emerging action systems and the development of the nervous system" (Johnson & Soska, 2008, p.469). A diametrically opposite view was held by Piaget, claiming that the concept of an object matures as the child develops (Johnson & Soska, 2008).

Representatives of nativist theory, such as Donald Hebb, emphasized the existence of an "Intrinsic Organization" which characterizes the infant's EEG as a mechanism that contributes to the infant's later perceptual development (Johnson & Soska, 2008, p.472). But Gestalt, a proponent of the same theory, also espouses the view that "dynamic forces" of electrical activity in the brain are responsible for guiding infants' general perceptual organization and capacity in conjunction with experience (Johnson & Soska, 2008, p.472). According to Spelke (1984), infants are born with the

perception that objects are spatially dependent entities that exist continuously in time and move continuously in space while maintaining their internal unity and external boundaries.

More generally, in the course of their research, nativists have shifted their focus from the role of the innate concept of the object to the role of the innate process, inherent in infants' brains from the moment they are born, in the formation and acquisition of knowledge (Johnson & Soska, 2008).

5.1. Basic arguments of the representatives of Nativist theory

The nativist theory, according to which object concepts are innate, is based on three main arguments: a) that infants from very early on can acquire objective and complete knowledge of the object concept which suggests that these premature concepts, acquired so early, are not, at least, the product of postnatal learning. (b) young infants do not have enough opportunities to observe the conditions under which an object behaves in a consistent or inconsistent manner with respect to a particular concept. This, consequently, implies that concepts are innate since they cannot be acquired by observing contrasting elements of the real world and c) there is evidence that e.g. animals' mechanisms for object tracking during occlusion (partial occlusion of the object) can operate in a similar way to humans, suggesting that object concepts are programmed through "evolutionary pressure" (Johnson & Soska, 2008, p.473).

6. Conclusion

In this paper we attempted to present the views of Piaget and other researchers regarding the achievement of object permanence during infancy. The psychological researchers who have worked and experimented on the phenomenon of object permanence could be said to be divided into two major categories according to what they advocate. In the first group belong those who believe that the development of this particular cognitive skill is innate in humans and that infants are born with the learning mechanism that gives them the ability to acquire this mode of perception. The second group is made up of researchers who believe that the perception of the concept - permanence of the object is developed, evolves as the infant grows and is not inherent at birth. Proponents of the first theory were the supporters of nativist theory such as Gestalt, Hebb, Tom Bower, Spelke etc., while the second group included Piaget, Baillargeon and her colleagues, Diamond etc.

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