Infant Cognition: Acquired or Innate?

If infants are born with cognitive abilities, genetics may play a more significant role in development than environmental factors

Throughout history, psychologists have debated whether people are more strongly influenced by genetics (nature) or their environment (nurture). Because newborns are as close to 'nature' as a human can be, they have often been the object of study by experts attempting to better understand the origins of human cognition. According to Jean Piaget's famous theory of early human cognition, infants acquire intelligence only through the physical actions they perform with objects around them. To him, cognitive ability is not innate but is acquired over time through interaction with the phenomenal world. Newborns practise reflex behaviours and slowly gain control over them through repetition. Over the course of their first few months, they learn to perform actions over and over again, such as sucking their thumbs, which give them some sort of pleasure or satisfaction. In this stage, he maintained, they are still unable to fully anticipate or predict events. From around four to eight months, infants begin to use what Piaget called secondary circular reactions. These are secondary because they involve combining more than one process, e.g. shaking a rattle and hearing it make noise.

Through such actions, infants learn cause and effect and begin to realise that their own actions can create subsequent reactions. To Piaget, these were no more than conditioned responses to the connections between newly acquired actions and their effects on objects, and because these actions are undifferentiated, he believed that they were not goal-directed activities and, thus, they are not intentional. Therefore, only gradually do babies begin to realise that objects have an independent existence outside of their own perception. Piaget argued that infants have extremely limited cognitive ability until around nine months of age but reasoned that, by then, they have usually acquired the ability to recognise object permanence.

Piaget used object-hiding tasks to demonstrate this acquisition. For example, he would show babies an object and then hide it under a cloth or cup and analyse whether infants perceived that the object had disappeared or was merely hidden from view. Piaget based his conclusions on whether the infants responded by removing the cloth or cup to find the concealed item. If they did, he surmised that they had at least a limited apprehension of object permanence; however, he also suggested that this ability was immature and limited because if the object was moved to another location, the infant would still try to find it by removing the original item that obscured it. Nonetheless, according to Piaget, this stage represented the first truly intelligent behaviour in human cognitive development, and he believed it was the basis for all future problem solving.

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Still, not everyone thought that Piaget's analysis was entirely correct. Canadian-born psychologist Renée Baillargeon's studies of cognitive development in infants challenged Piaget's beliefs. She pointed out the importance of conducting experiments and tests that are appropriate for the developmental level of infants, arguing that the limited motor skills of young infants may be responsible for their perceived lack of cognitive abilities. In other words, Baillargeon disagreed with Piaget and accused him of confusing motor skill limitations with cognitive limitations. To test this hypothesis, she focused her studies on visual tasks rather than manual tasks.

In one experiment, Baillargeon showed three-month-old infants a toy truck rolling down a track before getting obscured behind a screen, letting the infants focus on this process several times until they were habituated to it. Baillargeon then introduced a box which was positioned so that it looked like it would block the truck's journey down the track. However, when the truck was sent down again, it passed the box apparently unimpeded. Baillargeon discovered that infants would look for far longer at this unexpected event than they did at the normal progress of the truck before the box was placed on the track. Baillargeon concluded from this that they knew the truck should have been blocked, and were confused when it wasn't. She thus believed that they had an understanding of the properties of objects, including their permanence and their trajectory when in motion. This contradicted Piaget, who believed these abilities only developed at around nine to twelve months.

Her findings rest on the assumption - now widely accepted and supported by various studies - that infants focus longer on events that are novel or surprising, whereas events that are familiar to them capture their attention for a shorter period. This presumption has come to be known as the violation of expectation (VOE) paradigm. She reasoned that, to the infant, the novel event was surprising and even 'impossible'. According to Baillargeon, this means that very young children have the capacity to distinguish between events that are possible and not possible, suggesting that they have far more inborn cognitive ability than Piaget thought.

Yet to say that infants can conceive of objects in the physical world in the same way that adults do does not mean that they always reason in the same manner as adults. Therefore, the innate 'pre-wiring' of the human brain must continue to develop through childhood and adolescence. In this sense, it goes without saying that experience, or nurture, remains a crucial factor in human cognitive development. Still, the experiments of Baillargeon and other child development psychologists built upon the work of Piaget and reenergised the field in much the same way that Noam Chomsky's studies of language acquisition revolutionised linguistics.

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Questions 1-8

*Choose the correct letter, **A**, **B**, **C** or **D**.*

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1 According to Piaget, infants gain knowledge solely through

- **A** observing the world around them.
- **B** interacting with things close to them.
- **C** learning to repeat actions.
- **D** interacting with other people.

2 Why did Piaget believe infants have some understanding of object permanence?

- **A** They had no difficulty determining what was hiding an object.
- **B** They recognised when an object was moved to a different location.
- **C** They were not deceived when an object was replaced with another.
- **D** They uncovered the object that had been hidden.

3 According to Baillargeon, it is important to carry out experiments that are

- **A** easily repeatable and objective.
- **B** focused on innate rather than acquired skills.
- **C** suitable for infants' stage of development.
- **D** undertaken with infants of varying ages.

4 What was Baillargeon's criticism of Piaget?

- **A** His assumptions were founded on insufficient research.
- **B** His research was not backed by experimental evidence.
- **C** He put too much emphasis on visual tasks in his studies.
- **D** He mistook a lack of motor skills with a lack of cognitive ones.

5 In the experiment involving a truck, Baillargeon

- **A** showed infants the same process numerous times.
- **B** moved a screen in front of the infants.
- **C** observed infants playing with a toy truck.
- **D** tested the motor functions of infants.

6 In the last paragraph, the writer suggests that infants' ability to conceive of objects

- **A** reveals how the human brain develops through childhood.
- **B** shows they can reason at the same level of adults.
- **C** demonstrates that their cognitive ability is not innate.
- **D** does not mean they are able to reason like adults.

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7 The writer refers to Noam Chomsky to compare

- **A** the value of linguistic research with psychological research.
- **B** Baillargeon with someone else who made a major academic contribution.
- **C** Baillargeon's work with that of another child development psychologist.
- **D** the differences between the distinct academic goals.

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8 What is the writer's overall purpose in writing this article?

- **A** To show that infant development relies on both nature and nurture
- **B** To prove that cognitive abilities develop before birth
- **C** To explain how cognitive abilities affect infant development
- **D** To prove that nature is more important than nurture in development

Questions 9-11

Complete the sentences below.

*Choose **ONE WORD ONLY** from the passage for each answer.*

9 Recently born babies will try to master their movement through .....

10 Infants only gradually understand the independent existence of .....

11 In the experiment, Baillargeon positioned a ..... which appeared to obstruct the vehicle.

Questions 12 and 13

*Choose **TWO** letters, **A-E**.*

12-13 On what points do Baillargeon and Piaget disagree?

- **A** the importance of education in cognitive development
- **B** the age that infants become aware of object permanence
- **C** how infants learn to distinguish between objects
- **D** the extent to which infant cognition is inborn
- **E** when infant cognition equals to that of adults

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