

Infant Imitation and Social Interaction

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Today *imitation* (i.e., copying another's behaviors) is recognized as the fundamental mechanism by which cultural knowledge is socially transmitted across generations (Gergely & Csibra, 2006). Indeed, inquiries into children's imitation have been at the forefront of developmental science nearly since its inception. Piaget suggested that at its core, imitation acted as the child's representation of self-in-action before the representation of self-in-thought (Piaget & Inhelder, 1966/1969). While Piaget discussed the presence of reflexive imitation within the first months of life (e.g., a baby crying upon hearing another baby's cry), he reasoned that children could not imitate others' gestures until the end of the first year due to cognitive immaturity and lack of social experience. While at Oxford and the University of Washington respectively, Andrew Meltzoff and M. Keith Moore evaluated newborns' imitative competence, and in doing so, provided evidence for humans' innate ability to match their own unobservable behaviors to the abstract actions performed by others. By conducting the first series of empirical investigations of newborn imitation, Meltzoff and Moore (1977) altered the predominant view of infants' perceptual-cognition at the time, emphasizing the role of imitation at both the individual- and species-level.

In the first experiment 12- to 17-day old infants (3 girls, 3 boys) participated in one session. Each session began with the researcher demonstrating a neutral face to the child for 90

seconds and comprised the following procedure: one of four gestures (i.e., lip-protrusion, mouth-opening, tongue-protrusion, sequential finger movements) was displayed four times (15 seconds), the child's responses were videotaped while the researcher presented a neutral face (20 seconds), then the researcher continued to exhibit a neutral face before the next gesture was demonstrated (70 seconds). The gestures were presented in random order and the procedure was repeated until all four gestures had been modeled. Responses were scored according to whether the newborns' behavior was indicative of the modeled gesture. Results indicated that the behavioral responses of children only weeks old matched the gestures they were shown. However, because some infants "missed" gestures due to the brief 15-second display, some gestures were repeated. As the researcher may have unknowingly repeated the gesture until the infant's random behavior matched the target gesture, experiment two was conducted to control for this possibility.

The second experiment consisted of 16- to 21-day-old (6 girls, 6 boys) participants whose imitation was assessed during one session utilizing a pacifier technique to ensure that the adult model was blind to the child's reactions. First, the child was given a pacifier while the experimenter demonstrated a neutral face (30 seconds). After the pacifier was removed, the child observed a neutral face for 2 ½ minutes. Following this baseline period, the infant's pacifier was reinserted as the first gesture (tongue-protrusion or mouth-opening, counterbalanced across participants) was modeled. Once the experimenter deemed the infant had observed the gesture for 15 seconds, they returned to a neutral face and removed the infant's pacifier. For the next 2 ½ minutes, the child observed a neutral face while their responses were videotaped. At the end of this first response period the infant's pacifier was returned and the same procedure was repeated for the second gesture. Frequencies of tongue-protrusions and mouth-openings were then

determined for each response period. Infants demonstrated significantly more tongue-protrusions directly after witnessing that behavior when compared to baseline or after the experimenter modeled mouth-opening. Similar abilities were found for mouth-opening as well. Particularly striking was that these very young newborns could defer their imitation until the gesture was no longer displayed on the experimenter's face.

In discussing their findings, Meltzoff and Moore countered alternative explanations for the participants' imitation: they negated suppositions of reinforcement from others, evolved behavioral patterns, as well as increases in stimuli-arousal. While some debate whether their results represent pure imitation (cf. Jones, 2009), the findings of Meltzoff and Moore shifted our understanding of infants' cognitive abilities. Contrary to prevailing views suggesting that abilities to associate our own perceptually-unavailable behaviors with others' actions was the culmination of months of postnatal experience and cognitive growth, Meltzoff and Moore (1977) revealed that imitation instead is the *foundation* for children's imminent social and cognitive development, enabling us to transmit knowledge to each other, as well as generations to come.

Further readings:

- Gergely, G., & Csibra, G. (2006). Sylvia's recipe: The role of imitation and pedagogy in the transmission of cultural knowledge. In N.J. Enfield & S.C. Levenson (Eds.) *Roots of human sociality: Culture, cognition, and human interaction* (pp. 229-255). Oxford: Berg.
- Jones, S.S. (2009). The development of imitation in infancy. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 364(1528), 2325-2335.
- Meltzoff, A.N., & Moore, M.K. (1977). Imitation of facial and manual gestures by human neonates. *Science*, 198(4312), 75-78.
- Piaget, J., & Inhelder, B. (1966/1969). *The psychology of the child*. New York: Basic.