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ABSTRACT

This paper addresses several issues concerning the nature of imitative acts and the conditions under which they take place. These issues include: (1) the separation of imitative acts from reinforced behavior; (2) the separation of true imitative acts from reflexive acts; (3) the separation of imitative acts from acts which normally have a high likelihood of occurring and from acts which are related to general arousal; (4) the degree and kind of similarity required of the child's action as compared to the model's action; (5) the nature of temporal parameters controlling deferred imitation; (6) the role and nature of the model in imitative behavior; and (7) the nature of the action to be imitated. In addition, the paper raises issues concerning the development of imitation and the role of subjective imitation (actions which are not imitative but which are perceived by parents as imitative) in facilitating parent-child interaction. (SS)

Issues in the Study of Imitation[1]

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Most of our theories about the transaction of the young organism with its environment are passive views of human nature. Social control and biological imperative explanations constitute the two major models which account for socialization and learning. In both the social control and the biological imperative theories the child is acted upon; in the former case, by the culture in which the child lives and, in the latter, by the biology which the child inherits. Alternative views are possible, ones in which the organism is an active participant in the socialization process and in the activity of learning. In such a theory, the organism participates in, acts on, and creates the structures of its social and cognitive life.

While imitation can be viewed as a reinforced and/or elicited response to a limited class of stimuli, most theorists have claimed that imitation represents an intended response of the organism. As such, imitation represents an example of an intended behavior and reflects an active organism. The study of imitation may be important for other reasons since it represents a phenomenon which touches upon learning, motiviation, self knowledge, and social development issues.

Consider learning; imitation allows for learning with minimum trial and error behavior. The organism watches the behavior of another and with minimum behavior, repeats the actions. Imitation also allows for learning without didactic experience. The model need not teach what is learned, only demonstrate it. Imitation, therefore, is an indirect form of learning. The organism can simply

[1]Paper presented in a Symposium "Imitation in Infancy: What, When and How?" at the SRCD meetings, March 1979, San Francisco, California. Appreciation is given to Laurie Waite for her critical reading of this paper.

watch an event, engage in little direct rehearsal, is not directly taught but is able to acquire information. The efficiency of such a learning procedure is obvious.

From a motivational framework imitation when viewed as an active process involves the notion of intention. In imitation the organism seeks to replicate some action or event which has occurred. The motive to imitate implies that there be an agent who intends and at the same time is different from the to-be-imitated event or person. The notion of agency, intentions, self-other differentiation have relevance for the concept of self development, an issue we have recently considered in some detail (Lewis & Brooks-Gunn, in press). For this reason the study of imitation and the study of self development are related.

Moreover, what we learn about ourselves and what we learn about others is also facilitated by imitation. As Baldwin has said, "My sense of myself grows by imitation of you and my sense of yourself grows in terms of my sense of myself." (Baldwin, 1973, p. 338). Thus, Baldwin points out another function of imitation: Imitation binds social objects together. The caregiver-child relationship is facilitated by the fact that at times both caregiver and child behave the same; that is, the caregiver observes that the child repeats her behavior. This similarity between caregiver and child allows the caregiver to conclude that since they behave the same, they must be alike. The interpretation of sameness provides the caregiver with behaviors which she can give attribution. It is these attributions which help socialize the child. From the child's perspective, the perception of the sameness of its own action and that of its caregiver helps to define itself and, at the same time in the same process, allows it to separate self from other.

Interestingly, from an interactional perspective, imitation which is related to and parallels early self-other differentiation is ultimately influenced by the emerging self. Michel (1966), Kohlberg (1966) and Lewis and Brooks-Gunn

(in press) have pointed out the role of self in imitation. Given the emergence of the self, all agree that the relationship between the model and the self constitutes an important factor in imitation. As a general rule, it seems to be the case that children are more likely to imitate "like self" models than not (Bandura, 1978) although other factors also influence imitation, for example the power of the model. All told, imitation occupies an important theoretical position in the study of the development of children.

The study of imitation raises two general issues: what is an imitative act and under what conditions does it take place? To ask such questions raises several specific issues which we will attempt to address in this paper. These include: (1) the role of reinforcement/learning contingencies; (2) reflexive acts; (3) baseline and arousal controls; (4) similarity of actions; (5) temporal parameters; (6) the nature of the model; and (7) the imitated actions.

What is an Imitative Act?

(1) The Role of Reinforcement/Learning Contingencies. In demonstrating that an imitative act has occurred, it is necessary to ensure that the act is independent of any history of reinforcement. An act is not considered imitation if it has a history of being reinforced. Thus, it is necessary to ensure that the experimenter or parent has not reinforced in the past the action that we wish the child to imitate or that during the demonstration of the to-be-imitated act the child is not reinforced for producing it. Thus, if one wishes the child to imitate a tongue protrusion or arm wave one has to ensure (a) that tongue protrusion or arm waving has not been reinforced in the organism's past, and (b) that while tongue protrusion or arm waving is demonstrated we do not reinforce the occurrence of the action by the child if it should occur. Meltzoff and Moore's (1977) procedure of placing a pacifier in the

child's mouth during the display of the to-be-imitated tongue protrusion is one method of preventing reinforcement from occurring. Whether or not it succeeds in coping with this difficulty remains to be seen; nevertheless, the role of either the historical or the concurrent reinforcement of the imitative act needs to be controlled.

(2) Reflexive Acts. If we hold to neither a social reinforcement nor a biological imperative control of imitation, then it is necessary to demonstrate that there are no biological dispositions to act. Jacobson and Kagan (1978) and Waite and Lewis (1979) have studied this possibility in the imitation of young children. Both have demonstrated that the child's tongue protrusion occurs not only after a human model protrudes her tongue, but after the model moves her fingers or when the model points an object at the child's face. Given that tongue protrusion occurs to a large class of diverse events, it appears likely to be the case that tongue protrusion, especially in the very young, represents a general reflexive or biological disposition and as such would not constitute true imitative behavior. Several investigators (Lewis & Brooks-Gunn, in press; Lipsitt, 1976; Trevarthen, 1977) have suggested that early complex behavior may be reflexive in nature and may, like other simple reflexes such as the Moro or Babinsky, disappear over time. A similar arguement has been made for early co-occurring behaviors. Given the Jacobson and Kagan (1978) and Waite and Lewis (1979) results, such a conclusion, at least for tongue protrusion, may be warranted although more research on this point is still needed.

(3) Baseline and Arousal Controls. Of particular importance in the discussion of what constitutes an imitative act is the issue of appropriate controls. Two controls have been mentioned as possible sources of error and are necessary to consider if we are to conclude that a true imitative act has

occurred. In the first case, it is necessary to show that an imitated act occurs with greater frequency during than not during an imitative episode. Such a control has not been used often, although many studies obtain a base period. Without such a control, it is not possible to demonstrate that the act is imitative rather than one which normally has a high likelihood of occurring. Thus, for example, if the child puts a block in a cup after observing the model putting a block in the cup, we cannot conclude that this is imitation unless we observe whether, when given a block and cup without a model, the child is unlikely to act in like fashion. While this source of error has been discussed, this control has received little attention; indeed few studies actually use it in data analysis (Maratos, 1973; Jacobson & Kagan, 1978). Controlling for arousal level is necessary since it may be the case that certain actions on the part of the model may cause general arousal on the part of the child. This arousal may have as a behavioral concommitant some of those behaviors which we hope to show as imitated acts. Thus, if tongue protrusion by the model causes general arousal in the child, and if general arousal is accompanied by tongue protrusion, then in fact we may see increased levels of tongue protrusion which have nothing to do with true imitation but are related instead to general arousal. The appropriate control for this is to observe the frequency of the child's tongue protrusion when the model protrudes her tongue and to assess tongue protrusion when the model performs some other activity, for example, waving the fingers in a sequential fashion. Waite and Lewis (1979) have initiated arousal controls for such a possibility. In studying the imitative behavior across a wide number of gestures including tongue protrusion, mouth opening, hand waving, sequential finger moving, and head shaking, we found that while the child's performance of these acts showed increased frequency over a base period, there was no more likelihood of an act occurring to a model's specific action. Thus, tongue protrusion was equally likely to

occur when the model protruded her tongue as when the model shook her head or moved her fingers. Thus, newborns and 3- and 6-month-old children showed no imitative behavior when arousal level was controlled.

(4) Similarity of Action. Little attention has been given to the issue of the similarity of the action of the model and the action of the child. How similar does the child's action need to be as compared to the model's action for the experimenter to conclude that imitation has occurred? Does the same action with the same object constitute imitation and nothing less, or is it possible that we can consider an action imitative if the organism chooses the model's action but not the object, or the model's object but not the action? The exploration of what constitutes an imitative act remains to be considered. What is needed is an articulation of the potential taxonomy of actions which must include objects and actions separately and in some relationship. Rather than scoring partial imitations as simply less than a true imitation (see for example Killen & Uzgiris, 1978), it may be important to consider them as something quite different. The course of development of exact or full imitations and incomplete or partial imitations may help clarify this issue. At this point, we have almost no information on this topic. Moreover, the use of scales where full imitation is scored as 2 and partial imitation as 1, masks the problem and makes across-study comparability impossible. A better method may be to treat them separately until more data have been gathered.

(5) Temporal Parameters. Piaget (1945/1962) and Guillaume (1926/1971) have clarified the issue of immediate and deferred imitation and have articulated their developmental progression. Clearly, a child cannot engage in deferred imitation until it is able to store and retrieve previously experienced events. Deferred imitation rests on an elaborate set of cognitive

capacities which the child certainly possesses by the age of two (McCall, Parke, & Kavanaugh, 1977). Deferred imitation also is controlled by what we can call situational constraints, two examples of which come readily to mind. A child watches another playing in a sandbox, but is unable to play in the sand herself. Days later, when allowed in a sandbox, the actions of the other, now remembered, are imitated. The deferred imitation can occur because of the child's cognitive capacity, but does occur because of the situational similarity. The second example involves a longer temporal parameter and again is situationally determined, this time not by place but by role. In this case the child receives a particular parental socializing experience. There is no reason or way for the child to imitate this particular parental behavior until the child becomes a parent herself and acts in a similar fashion to her child. Again, deferred imitation is controlled by situational constraints not the cognitive capacity of the child.[2] Thus, once the child is cognitively capable of deferred imitation, the parameters controlling temporal parameters have to be found elsewhere than in the child's cognitive ability.

Under What Conditions Does Imitation Take Place?

Having discussed some of the more cogent issues pertaining to the definition of an imitated act, we now turn toward some issues related to when imitation is likely to occur; that is, the nature of the model and the nature of the to-be-imitated act.

(6) The Nature of the Model. The nature of the model has received considerable attention in the study of older children's imitative behavior (Bandura, 1971). One view has held that imitation is more likely to occur when the attributes of the model are similar to those of the child. This position

[2]This example points to the interrelationship between long-term deferred imitation and processes such as identification and role modeling acquisition.

can be said to focus on the relationship between the model and the actor, with similarity between model and actor being most salient for the occurrence of an imitated act. In this regard, Kohlberg (1966) and Lewis and Brooks-Gunn's (in press) notion of the role of self in social and cognitive behavior, becomes highly relevant. The role of the model has received little attention in infancy and this is rather unfortunate since the role and nature of the model may be useful in trying to understand active imitative behavior as opposed to elicited or reinforced imitation. We conclude, for example, that active imitation has not occurred if we do not find differences between models associated with children's actions. That Jacobson and Kagan (1978) found social objects (female experimenters) sticking out their tongues were no better models than nonsocial objects (pencils) moving back and forth demonstrates that infant tongue protrusion may not be active but rather reflexive imitation. In a recent study, Waite and Lewis (1979) utilized three different models, two social (people), one nonsocial (object) in order to see if there were differences in imitation across children 2, 12, 24, and 36 weeks of age. It was hypothesized that any imitation found in the neonatal and 12-week period would be reflexive in nature and therefore equally likely to be elicited by any of the three models. By 24 and 36 weeks, active imitation might begin to appear, therefore be influenced by the nature of the model. The data, while not completely analyzed, support this hypothesis and indicate that by 24 and 36 weeks infants are more likely to imitate social than nonsocial models. Unfortunately, there is little information on imitation as a function of model, although there are some data to indicate that young children imitate same-sex peers and parents more than opposite sex (Lewis & Weinraub, 1979) and imitate children more than adults (Lewis & Brooks-Gunn, in press).

(7) The Nature of the Action. When we turn our attention to the nature of the action to be imitated, we find considerably more information; for example, see Maratos, 1973; McCall et al., 1977; Uzgiris, 1972. Imitated acts have been divided into a variety of categories: (1) gestures such as tongue protrusion, arm waving, head moving, etc., or (2) actions on objects such as rolling cars across table tops, drinking from cups, etc. Gestures can be divided further into visible and invisible gestures, visible being those which the child can see such as hand movements, while invisible ones are tongue protrusion or head shaking. Actions on objects has been divided into those which are familiar or unfamiliar. Thus, for example, Killen and Uzgiris (1978) have observed the likelihood of imitation when a car is rolled over a surface top as opposed to pushing a paper cup in a similar manner. In the former case, the car rolling across the table top is a familiar action and the action on the cup unfamiliar.

A variety of theoretical positions argue for the greater likelihood of some imitation over others. Piaget (1945/1962), for example, has argued that visible gestures, that is gestures which the child can see itself make, are more likely to be used in imitation than are gestures which the infant cannot see. Moreover, although the data are not clear Abravanel, Levan-Goldschmidt, & Stevenson (1976) have argued that imitation is more frequent with objects than without objects. Likewise, there is still some confusion as to whether familiar of unfamiliar gestures or actions on objects are more likely to be imitated (Killen & Uzgiris, 1978).

From the active view of imitation, whether a child imitates an action or not should be related to the reasons why the child wishes to imitate. This cannot be otherwise if we believe that imitation, at least by the last quarter of the first year, is intentional. Moreover, the reasons why a child wishes to imitate a particular action may vary and may

have to do both with the action to be imitated and the model. Let us consider familiar and unfamiliar actions and familiar and unfamiliar models as an example. Actions and models make a 2 x 2 matrix of (1) familiar actions by familiar people; (2) familiar actions by unfamiliar people; (3) unfamiliar actions by familiar people; and (4) unfamiliar actions by unfamiliar people. A child may choose to imitate a familiar action by a familiar model because of a social/communicative motive; the repetition of a familiar action by a familiar model may facilitate social commerce. Imitating a familiar action by an unfamiliar model may also facilitate social commerce around common action; a way to get to know the unfamiliar person. Imitation of unfamiliar actions of familiar people is a method of learning new behavior; imitation now may be motivated by cognitive rather than social reasons. Finally, imitation should be least for unfamiliar actions of unfamiliar people; indeed it may be fearful.

Unfortunately, little exploration of differences in actions to be imitated and no studies relating action and model have been undertaken (with the exception of Waite & Lewis, 1979). Given that imitation is a process generated by the child, differences in imitation have potential value for exploring the child's motivational and cognitive structures.

The Development of Imitation: Some Particular Issues

The development of imitation has been articulated by Guillaume (1926/1971) Valentine (1930), and Piaget (1945/1962) among others, and we do not intend to discuss the process in great detail. We do wish to direct our attention to co-occurring actions early in the child's life, within the first eight months or so, and see how they are related to imitation.

Although several investigators have argued for early imitation (Gardner & Gardner, 1970; Maratos, 1973; Meltzoff & Moore, 1977), the studies of Jacobson

and Kagan (1978) and Waite and Lewis (1979) clearly indicate that when appropriate controls are utilized, active imitation cannot be demonstrated. The data show that an infant's action is no more likely to occur with any higher frequency when the same action is modeled than when another action is modeled. Thus, active imitation cannot be said to occur within the first six months, at least for bodily gestures. Of particular interest, however, is the observation that if one does not look for baseline level or across-gesture comparisons, but instead asks simply is there any correspondence between the action of the model and of the child, one finds that between 30% to 60% of the time the infant's behavior corresponds to that of the model (Waite and Lewis, 1979). We have called this correspondence subjective imitation. From the point of view of the model, the child is matching its behavior to that produced by the model. This subjective impression is especially relevant if, as Tvorsky (197) has suggested, adults do not take base levels into account when thinking about logical problems. Direct evidence for this subjective imitation view comes from an earlier finding of Waite and Lewis (1978) who found that the mothers of the infants 2 to 24 weeks old report that their infants imitate their behavior. Since Waite and Lewis (1979) could find no true imitation with these same children, and since there was a high correspondence between the model's action and that of the child, we conclude that the mother's report represents a subjective view of infant imitation.

The importance of this subjective imitation may reside in the parents' attribution that their child is doing something to them; that is, subjective imitation serves the function of social exchange since the infant affects the parents' behavior; specifically the parents' attribution of their in-

fant's behavior. As such, the subjective imitation should enhance parent-child interaction since parents attribute intention to their infants. In particular, it should facilitate more parental contingent behavior as the parent engages in mutual imitative behavior. Thus, subjective imitation, in the same manner as active imitation, facilitates both parental and child social commerce and exchange. The social and cognitive structures that develop from this reciprocal, complex, contingent and, at times, similar chain of behavior have already been alluded to; from these chains secondary circular reactions develop and with them true infant intention (rather than attribution), self and other differentiation, and the emergence of agency.

For the parent, the similarity of infant and self allows for parental attribution of infant abilities, the development of empathy, and the facilitation of the socialization of the child. In some sense, then, the phenomenon of subjective imitation may not only precede but facilitate true imitation and the development of self.

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