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DEVELOPMENT OF INTENTIONAL BEHAVIOR IN EARLY INFANCY

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Abstract

The recently revived interest in the development of intentional behavior can be traced back to one century ago when there was an important debate between Associationism and Voluntarism. Associationist theories emphasize on the aspect of integration in developing intentional behavior. The Voluntarist theories emphasize on how the child's psychodynamic system, such as desire, affect, perception, and action, differentiates as a result of interaction between organism and environment. Such a contrast of different ways of conceptualizing the course of early development can be seen in more recent theories. Piaget hypothesizes that processes underlying the early development of intentional behavior are generalizing assimilation and apprenticeship, which leads toward a more coordinative and integrated level of functioning. Bower and Gibson posit that infants begin life with more general and undifferentiated states and become more specific and differentiated throughout development. In the end, an attempt was made to reconcile both Piagetian and Bowerian views on the development of intentional behavior. It is proposed that infants start with an abstract sense about the function of behavior. They become more discriminating in selecting an intentional behavior with development, and later on are more active in interacting with the environment which enable them to invent new effective behavior.

Intentionality is one of the basic concepts that have been used by psychologists who attempt to explain the active nature of behavior in an organism. Such an attempt of researchers existed one hundred years ago when psychology just emerged as a scientific discipline. The interest in intentionality decreased with the movement of Behaviorism in psychology, and has been greatly revived especially during the last decade in several interrelated fields such as philosophy (Searle, 1983, 1984), cognitive science (Bechtel, 1988), and developmental psychology (Lewis, 1990).

The issues about the origin and early development of intentional behavior in human beings fascinate developmental psychologists for at least two reasons. One, it is often observed that human adults in general are more advanced than children in their

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intentional characteristics of their behavior. Human adults are more goal-oriented, planful, and resourceful than infants in activities, which in most cases helps them interact with the environment in a more adaptive way. Two, how to conceptualize the origin and the developmental process of intentional behavior is an important criterion for evaluating the strength and weakness of basic models of psychological development. For example, the biological model may assume that intentionality is not a necessary concept, since behavior can be attributed to the influence of biological or genetic factors. The behavioristic model may argue that all seeming intentional behavior can be explained by the past experience in which the association between the intended target in the environment and the basic biological desire was established. A psychodynamic model may assume that all behaviors are intentional with their origin in biological drive and social-emotional history. The constructivist model posits that intentionality gradually develops as an organism actively participates, with desire and plan, in interactions with the environment.

In this article the analysis will focus on Piaget's constructivist model because it is so far the best and most detailed theory on the early development of intentional behavior. However, to better understand Piaget's position, it is necessary to review a debate that occurred before Piaget.

1. Two developmental views of intentional behavior

Around the turn of this century, there was a debate between Associationism (e. g., Bain, 1859) and Voluntarism (e. g., Wundt, 1894, 1907) about the development of intentional or volitional behavior. In essence, the Associationist theory of the development of volitional behavior is based on following principles. (1) Organisms initially are equipped with involuntary or reflex behavior. (2) Repetition of the reflexive behavior that leads to some result in the environment will establish the association between action and its result, which strengthens the habitual behavior. (3) With a series of experiences, the associative connection becomes reversible: the end (e. g., satiation) will become a goal that is elicited by the stimulus and will direct the associated means behavior (e. g., searching for food) (Ebbinghaus, 1902). (4) Finally, actions become associated with participation of reasoning and representation about the desired object, which creates the intentional or volitional behavior. The general developmental sequence first was proposed by philosophers, such as Bain (1859) and Herbart (1889), and later on was elaborated by developmental psychologists, such as Piaget (1952). The Associationist theory of the development of intentionality in general attempts to attack the issue of the connection from non-intentional behavior to intentional behavior by proposing some intermediate processes, such as habitual behavior as Herbart (1889).

The Voluntarist theory of the development of intentional behavior is based on the following principles. (1) Organisms are born with drives that generate a particular kind of impulsive behavior that is undifferentially accompanied by an affective state (Wundt, 1907). (2) Repetition or practice of this primary drive-generated behavior leads to the "heterogony of ends" (Wundt, 1904): the action on the environment will have unintended consequences, which will modify and expand the original intended end of the action in a situation. Later on, the same situation may in turn generate a multiplicity of

affective states that are undifferentially associated with action tendencies in a situation. To transform this multiple action tendencies into an overt behavior, the organism has to make a choice, which is the first version of volitional behavior. (3) Opposite to the direction of development toward multiplicity and differentiation, repetition of a drive-generated behavior or volitional behavior also results in formation of automaticity or habit, which reduces or eliminates the element of choice and affect, therefore, volition (Wundt, 1904). (4) The simultaneous development of the cognitive availability of a multiplicity of movements and effects makes possible the fully formed voluntary activity. Nevertheless, in Wundt's system, the affective components never disappear in the course of development of volitional activity. (5) Both Wundt (1907) and James (1890) pointed out the importance of obstacle or difficulty in developing voluntary or will behavior. According to James (1890, pp 1166), "the essential achievement of will, when it is most voluntary, is to attend to a difficult object and hold it fast before the mind."

In sum, both Associationist theories and Voluntarist theories of the development of intentionality posit that (a) human infants begin their life with non-intentional behavior, (b) the full form of intentionality depends on the higher cognitive capacity (e. g., representation) that can represent objects or goals in the mind, and (c) the development of intentionality largely depends on the organism's interaction with the environment. However, one major difference between these two theories lies in their views about the direction of development. The Associationist emphasizes that various elements (e. g., behaviors, associations between behavior and its results, and representations) integrate or coordinate with each other in developing intentional behavior. In contrast, the Voluntarist theory views the development of intentionality in general as a continuum and a process in which infants' psychodynamic system, such as desire, affect, perception, and action, differentiates as a result of interaction between the organism and the environment.

These two ways of conceptualizing the development of intentional or volitional behavior provide us with two different pictures of intentional development. The tension between them did not abate even after Piaget (1952) proposed his theory of child development half a century later, although to some extent Piaget's theory synthesized both Associationist and Voluntarist theories of the development of children's intentional behavior.

2. Piaget's Synthesis

Piaget has offered the most coherent developmental model of intentional behavior. He believes that the infant begins life without intentionality and fully constructs it around the middle of the second year of life. His theory on the development of intentional behavior is a successful synthesis of both Associationist theories and Voluntarist theories. From Associationist theories, Piaget adopted the following points. (a) Infants are born with reflex schemes, through which infants interact with the environment. (b) Practice of the reflexive behavior will generate a habit-like activity, such as the secondary circular reactions. (c) It is symbolic representation that brings the organism into a level at which cognitive intentionality comes into being. Piaget (1952,

1954) also used some of concepts that appeared in Voluntarist theories of intentional development. For example, (a) Piaget believes that infants are born with desires, although the desire, in his view, exists in a form of assimilatory mechanism, i. e., infants display a compelled tendency to repeat the previous behavior. (b) The concept of "heterogony of ends" is reflected in his accommodation mechanism by which the schemata structure expands as a result of action upon the environment. (c) The importance of obstacle in developing intentional behavior has also been elaborated in Piaget's theory.

For Piaget, although the full display of intentionality does not occur until the middle of the second year of life, the first sign of intentional behavior, which he also called "intelligent behavior", emerges at Stage IV, somewhere during the second half of the first year of life. He noticed that intentional behavior differs from sensorimotor habit, such as secondary circular reactions, in that an intentional behavior involves an attempt to overcome obstacles and maintain the direction toward the original goal. Piaget (1952, pp 226) writes, "Intention exists, that is to say, consciousness of a desire to the extent that the assimilatory schema set in motion by contact with the object, is opposed by an obstacle and thereafter only is made manifest in the form of a tendency and not of immediate realization."

He further says, "it is therefore the dissociation of means and ends, due to intervening obstacles, which creates intention and puts the present behavior pattern in opposition to simple habits." (Piaget, 1952, p. 226). In the example he described, when an infant is trying to reach an interesting object and blocked by a pillow, the infant pushes away the pillow with one hand and reaches the object with another one. The behavior of pushing away the pillow, as a secondary circular reaction, is considered as a familiar scheme that has been successfully practiced in other situations. Applying familiar scheme in a new situation is an indication of the dissociation of means and ends.

In general, according to Piaget, a behavior is considered intentional and therefore "intelligent", if it meets the following three criteria: (1) Desire: the infant has a desire or goal in mind and does not discover it accidentally as in Stage 3, (2) Obstacle: an obstacle arises which prevents direct attainment of the goal and necessitates some kind of indirect approach, and (3) substitution: to overcome the obstacle, the infant employs an alternative behavior (means) which serves the same function (ends) but differs from that employed previously (Ginsburg & Opper, 1988).

The substitution process in which an alternative behavior replaces or integrates with the behavior that is blocked by the obstacle is a type of coordination of two schemes. According to Piaget, there are at least two principles guiding the process of finding a new means behavior. One, for younger infants (e. g. , infants at Stage IV), intentional substitution is based on generalizing assimilation. First, infants apply a secondary circulatory scheme in a new context where the interesting event is the same as the event that used to be part of the practiced secondary circular reactions in a previous context. Take the example we mentioned before, when a pillow blocks an infant's reaching toward a toy, the pillow as an interesting event in the environment will remind the infant of the pushing-pillow behavior, a previous successful secondary circular reactions. Younger infants seem to have the ability to code the function of a

behavior and find an alternative behavior in the new context based on the coded function if a behavior with the same function becomes ineffective.

Another principle is the procedure called “apprenticeship”. For older infants (e.g., at Stage V), when the existing schema cannot reach the goal, infants will gradually modify a behavior so that the result of each modification will gradually lead to the desired object. For example, when an infant shakes a string to generate a mobile, if the string sags and the previous successful shaking does not generate the expected mobile movement, the infant at Stage V may gradually stretch the string more and more and eventually learn that stretching the string is the way to achieve the goal. The direction of such modification of behavior is guided by the tendency to assimilate the event that only constitutes moderate novelty as compared with the event generated by the previous (modified) behavior. At stage VI, this external groping process is internalized and the observer may see that a new means behavior will suddenly be invented and solve the problem.

In Piaget’s model of intentional development, the fundamental mechanism underlying the process of intentional substitution is assimilation, a tendency to incorporate another behavior of functional equivalence. Such an emphasis on integration has been challenged by other theoreticians.

3. Alternatives to Piaget's theory

As we mentioned earlier, Piaget synthesized two rivaling theories—the Associationist theory vs. the Voluntarist theory—on the development of intentional behavior. However, Piaget only partially accepted the Voluntarist theory by rejecting differentiation as a primary developmental process. Piaget leans towards the Associationist theory and views development as a process toward more and more integrated or coordinated behavior, rather than a course of differentiation.

In the recent years, some theoreticians (Bower, 1974; Gibson, 1969), on the other hand, propose that development may in general occur in a direction from undifferentiated state to a more specific and differentiated state. Differentiation and specification as a developmental trend has found its evidence in perceptual and motor development (Bornstein, 1987; Bower, 1974, 1982; Thelen, 1983). In terms of concepts relevant to intentional processes, it is believed that infants begin life with a motive towards self-efficacy (White, 1969). According to these researchers, it is very likely that information of efficacy conveyed in an amodal form of contingency is more detectable to the younger infant than the information specified by the concrete features of an object in the environment (Bower, 1989). If so, a younger infant may code efficacy as the function of behavior, whereas an older infant may code the specificity of events as the function of the behavior. In other words, in the developmental course, infants first care about whether a behavior is efficient in generating an event or not, and later on attend to what exactly a behavior is efficient about. Although such a position does not refute Piaget’s general notion that intentional substitution is based on assimilation, the emphasis focuses on the role of differentiation in developmental course. According to this theory, we may predict that when a means behavior is no longer effective due to the obstacle, a younger infant is more likely to apply an alterna-

tive behavior as long as the behavior was previously successful, regardless of whether the specific result generated by the behavior is the same as the target event in the present situation. However, when the infant grows older, with his perception and memory becoming more discriminative, he will only apply an alternative behavior that is closely relevant to the present task.

4. Conclusion

It is possible that both Piaget and Bower are partially correct. These two views of the development of intentional behavior may be reconciled into the following developmental progression. (1) When intentional behavior first emerges as an intelligent adaptation to environmental change, infants may only have an abstract sense about the function of behavior. When a behavior becomes ineffective due to environmental change, the infant will retrieve any behavior from memory that used to be effective in the past, regardless of the specific consequence of each behavior. (2) With development, in order to adapt to the environmental change in a more efficient way, infants become more discriminating in identifying the functional equivalence and only select alternative behaviors that used to generate exactly the same consequence. (3) Later on, children become more active in interacting with the environment and sensitive in adjusting their own behavior contingent with the changing result of the previous behavior. Such experimentation leads to invention of the new effective solution. Eventually, this experimentation process will be internalized and a new invention will come into being through symbolic thinking.

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