Pictorial Prompts for Discursive Analyses

Developmental Considerations and Methodological Innovations

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When developmental researchers assess children's stock of information, a key concern is getting the children to tell us what they know. Because children know more than they spontaneously produce, researchers have often underestimated their knowledge. Piaget, for example, often relied on a wholly verbal method for finding out how much children knew. Thus children's performance depended on their mastery of language, a skill that is relatively undeveloped during the early years of life.

In real-life interactions, young children often rely on gestures, actions, and other nonverbal props to improve their linguistic communications. These are also part of the discursive repertoire. As such, they can be adapted to the research setting. Pictures, for example, can provide a concrete base from which children can organize their verbal utterances. Because pictures can prompt children to say things, developmentalists often use pictorial methods for understanding the ways that children solve verbal problems. This type of visual methodology provides a window into children's linguistic ways of thinking and knowing about their world.

The purpose of this article is to examine various uses of pictorial prompts as ways to stimulate and to examine children's discursive commentaries and problem-solving activities. Pictorial methods that tap the process of thinking and the products of thought are both described. To document the usefulness of this approach in developmental research, a range of areas of empirical inquiry, including problem-solving tasks, comprehension of television programs, and understanding of gender, are considered.

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THE DOUBLE-SIMULATION METHOD

One of Vygotsky's (1962) major contributions to developmental psychology was in the area of methodology. Vygotsky was concerned with the process of learning. For this reason, he devised techniques of investigation such as the double-simulation method, which taps children's "online processing" of information (Valsiner, 1988).

In the double-simulation method, a child participates in a problem-solving task. Sometimes, the experimenter explicitly defines the goal of the task; at other times, a child must infer the goal from contextual cues presented in the task.

While undertaking a task, a child is exposed to various objects. A collection of objects forms a complex pattern, such as a picture. The pattern serves as a cue for a child to bring his or her problem-solving strategies to bear (Thomas, 1992).

As the experimenter observes the child's actions and listens to the related statements in this problem-solving task, one is observing firsthand how the child thinks. In this manne., intellectual development is indexed by the child's method of performing the task (Thomas, 1992).

Using the double-simulation methodology (adapted from the approaches of Thomas, 1992, and Valsiner, 1988), I created the picture shown in Figure 1 to examine children's linguistic problem-solving strategies for a particular task: catching a horse so that the child can go for a ride. The problem-solving strategy involves a child's use of both action and language to solve the problem.

Heather, who is 5 years 8 months old, was presented with this picture and then asked to solve the following problem:

Experimenter: Mary wants to ride her horse today. And when Mary was thinking about riding her horse, she realized that she had to get it over here in the corral so she can put the saddle on it. [Experimenter points at the corral.] How can she do that?

Heather: [She points at the horse and draws a line with her finger into the corral.]

Experimenter: Well, how is she going to get him over there? How is she going to get the horse to come over into the corral?

Heather: I don't know.

Experimenter: You don't know. Well, if you wanted to ride that horse, what could you do to get that horse to come over here? What do you think that horse might like? [No response] Look at the picture and tell me what the horse might like.

Heather. The food.

Experimenter: The food. Yes. How could you get the horse to the food?

Heather: She could bring the food over to him right like this. [Points to the barrel and draws a line through the gate into the corral]

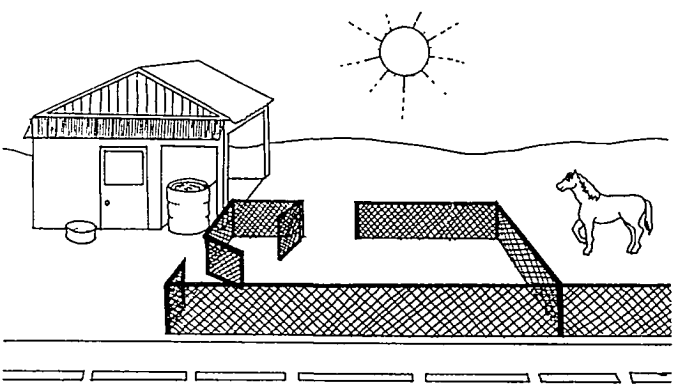

Figure 1: Pictorial Prompt for Problem-Solving Activity

Experimenter: She could bring the food over to him. That's a very big barrel. Is there anything she could put the food in to make it easier?
Heather: Yes. [Points at the bucket]
Experimenter: Tell me what she would do with that?
Heather: She'd put it in right in there. [Points at the corral]
Experimenter: She'd put it in there. How does the horse know where the food is?
Heather: He'd look at it.
Experimenter: He'd look? So he'd come through the door. So if he comes in there where the food is, is there a problem? What would happen? Would it be easy to catch him, or could he get out again?
Heather. Lock the door, and then come in there and catch him.
Experimenter: So you could lock this door and then come in there to catch him Is that what you'd do?
Heather: Yes.
Experimenter: So once he's in the corral, then you'd have him. You know, that's really good!

Using the double-simulation approach, one can follow the process of thought rather than merely record the products of thought. By examining the child's ongoing linguistic commentary and associated actions, one has direct access to the problem-solving process itself. How a child solves a particular problem becomes the focus of the inquiry.

PICTURE SEQUENCING AND STORY COMPREHENSION

Through pictures, children are also able to express the organization of their thoughts about a story. One should also remember that through the strip cartoon, pictures in sequence have now become one of our discursive practices of storytelling. Pictures can be used to elicit storytelling from children of varying ages. In television studies, five or six photographs of central, essential story events are taken (e.g., Calvert, Huston, & Wright, 1987; Calvert & Scott, 1989; Wright et al., 1984). Typically, two or more sets are sequenced for each television program viewed. A set can cover the entire program (whole program picture sequencing) or be limited to a section of that program (segment picture sequencing).

These picture sets are sealed with clear, sticky shelf paper so that they can be used many times. The back of each photograph is numbered sequentially from the first to the last story event. A sample set of photographs taken from a study that we ran on "Frère Jacques" is presented in Figure 2.

After a child views a television program, a set of such photographs is placed in random order in front of the child. The experimenter tells the child that these are pictures of things that happened in the story. The child is asked to put the pictures in order from the first thing that happened in the story to the last in a line right in front of them. After a child sequences the story events, the experimenter asks the child to tell her what happened in the story.

Children invariably begin with the first event of their picture series and describe the story in the sequence that they have created. Many point to particular pictures as they engage in story retellings. For preschoolers, storytelling is based on the specific picture that is their referent. Verbal descriptions are concrete. As children develop, they begin to connect story events with words like "next," "then," or "finally." Others use ordinal expressions such as "first" and "second" as they move from picture to picture. Both linguistic approaches reflect the importance that the child places on the order of events for a coherent story. Finally, children's stories express an appreciation for character motives, intentions, feelings, and the causal relation of one story event to the next. The levels of sophistication of these verbal descriptions express levels of cognitive development and children's understanding of causal links between story elements. Put another way, as children begin to understand how motive is used to account for what people do, the use of such hidden information becomes apparent in their story constructions. The process of thought is concretely realized in discursive practices, prompted by the pictures.

Figure 2: Picture Sequencing Set for "Frère Jacques"

continued

(Figure 2 continued)

Errors in story memory organization can be observed in both children's inaccurate picture sequencing and the linguistic distortions that are subsequently made as they attempt to describe a coherent story. Some errors indicate confusion about events from the original program, where events from one section of the program are remembered in the wrong context (e.g., Collins, Wellman, Keniston, & Westby, 1978). Stereotype errors reveal instantiation of typical story events that are not relevant to the program at hand (Collins et al., 1978).

"Online processing" can be observed as children correct errors in their sequencing of pictures. More specifically, children will sometimes reorder and reorganize story events as they retell the story. Through verbal retellings, they realize that the sequence of events happened differently. Language in this instance serves a corrective function to guide action.

Story organization can also be analyzed in a quantitative manner. The scoring procedure, developed and described in detail by Wright et al. (1984), compares a child's picture order to the sequence of events in the original episode. To do so, pictures are numbered in the order that the events depicted occurred originally. This sequence is considered the "correct" order. Next, a child's picture order is compared with the correct order on two dimensions: correct absolute position of photographs and the number of correctly sequenced adjacent pairs of pictures. The first part of this equation is similar to a rho correlation. One point is awarded for every picture with a lower number to the left of it. For a set of five pictures, the maximum possible score for the first part of the equation is 10. However, if a child sequences a set 2, 3, 4, 5, 1, the rho correlation is 0; by contrast, a sequence of 1, 3, 2, 4, 5 yields a rho correlation of .80.

The second part of this equation corrects for any partial sequences that are out of order. One point is given for each correct adjacent pair of pictures, regardless of its absolute position. For a set of five items, 4 is the maximum possible score for the second half of the equation. The final score is created by adding both scores. In the present example, this results in a maximum possible score of 14. Because scores of 12 and 13 were numerically impossible, scores have been reduced to a maximum of 12 (Wright et al., 1984). The picture sequencing scores can then be used in various statistical analyses. These scores measure the disparity between the narrative conventions that children use and those used by the adults who created the original stories. They do not reveal whether the children are using different narrative conventions from those used by the adults.

DYNAMIC MOVING PICTURES AS A STIMULUS FOR VERBAL PRODUCTION

Another approach to examine linguistic productions is to record children's discourse as they view television programs. This online approach allows investigators to examine the spontaneous verbal exchanges between children as they view dynamic moving visual images. Recording children's discussions in situ tells us what children find interesting about various television programs as well as making it possible to investigate environmental features that influence whether or not children talk about programs (Rice, 1981).

Rice (1981) compared children's comments while same-aged pairs viewed four different television programs together. Programs varied in the amount of verbal dialogue used to convey messages. Specifically, "Road Runner" had no dialogue, "Popeye" and "Bugs Bunny" had moderate amounts of dialogue, and "Adventures of Gilligan" had very high levels of dialogue.

Videotapes of preschoolers and third graders were made as they viewed the programs. Verbal exchanges were later transcribed and coded into either 1 of 13 television-related content categories or into 1 of 8 nontelevision content categories. Quantitative analyses revealed that children talked most during the nonverbal program. Put another way, the nonverbal program elicited children's verbal descriptions, probably because none were provided to assist their comprehension. This pattern was more pronounced for older than for younger children.

Analyses were also performed on the content of the children's exchanges, focusing on differences between the nonverbal and verbal television programs. When viewing the nonverbal television program, children were more likely to talk about "actions and events (such as "It's gonna blow up over there"), [make] emotional or self-referenced comments (e.g., "I like this"), [ask] questions about program content (e.g., "Did he hide that thing?"), and [make] statements of recurrent program themes (such as "He always does that")" (Rice, 1981, p. 34).

Children's discussions as they view a television program together can provide a great deal of information about what children do and do not understand. Such analyses also tell us what is important to children, based on their decisions to discuss particular program content. However, one must acknowledge that children may be interested in a program without talking about it.

Linguistic analyses can also be performed on the discourses produced when parents and children watch television together. Young children often ask questions of parents, obviously in an attempt to understand the story.

Such questions indicate children's active efforts to comprehend television programs.

PICTORIAL AIDS FOR CONCEPTUAL ASSESSMENT: GENDER CONSTANCY

Sex typing is a multidimensional construct composed of several content areas. These include an understanding of one's biological gender as male or female; activities and interests, including play with various toys; personal-social attributes that focus on masculine and feminine personality characteristics, such as aggression and nurturance, respectively; gender-based social relationships that include the sex of one's friends and of later sexual partners; and stylistic differences, such as nonverbal mannerisms and gestures (Huston, 1983). The initial focus for our purpose here is assessing a child's understanding of biological gender, as indexed by measures of gender identity and gender constancy.

By age 2 or 3, children learn to identify their own gender as that of a boy or a girl. Only later in development, however, do children understand that changes in perceptual cues do not alter one's gender. They are then said to have the concept known as "gender constancy" (Kohlberg, 1966). Grasping gender constancy includes understanding that one's gender does not change as one ages (stability) or by transformations of tertiary characteristics, such as clothing, hair style, and activities (consistency). Because gender constancy requires a child to understand the immutable nature of biological gender in the face of conflicting perceptual information, pictorial methods are particularly useful (Huston, 1983).

Bem (1989), for example, created a measure of gender constancy using six nude or seminude photographs of two toddlers, one male and one female. In this approach, biological gender is identical to sex differentiation. Children initially view a photograph of a nude toddler and are asked if the baby is a boy or a girl. They are also questioned about how they know the baby's gender. In the second photograph, gender inconsistent information is presented. Specifically, the boy wears frilly clothes and a wig with ponytails, whereas the girl wears a polo shirt and holds a football. The experimenter shows the child this photograph and says that it is the same baby playing "dress up." The child is asked whether the baby looks like a boy or a girl, whether the baby is really a boy or a girl, and what makes the baby a boy or a girl. Finally, photographs are presented where the same toddlers wear gender-consistent clothing. Here, the boy wears the polo shirt and the girl

wears frilly clothes. The experimenter tells the child that "dress up" is over and the same baby is now wearing its own clothes. The child is again asked whether the baby looks like a boy or a girl, whether the baby is really a boy or a girl, and what makes the baby a boy or a girl.

A key question involves knowing the true sex of the boy or girl when gender-consistent and gender-inconsistent photographs are presented. Bem (1989) found that 40% of preschoolers conserved the baby's gender across perceptual transformations.

Pictorial methodology in this instance allows experimenters to examine very young children's gender concepts, particularly their understanding of the immutable and unchangeable properties of biological gender. Photographs are used to prompt verbal discussions of gender categories as well as the underlying reason for that knowledge.

Q SORTS TO ASSESS CONCEPTUAL CATEGORIES: GENDER ACTIVITIES

Although the biological roots of gender are poorly understood during early childhood, sex typing in toy play is well underway by age 2 (Huston, 1985). Based on biological gender, children are initially given different toys. Differential play with toys, in turn, may lead to different concepts about gender activities.

Vygotsky (1987) argued that activity generates thought. That is, actions on objects become privatized as conceptual thoughts and categories. If Vygotsky is correct, one might expect children to create differential toy categories if they receive differential practical experiences with toys as a function of their biological gender. For example, boys who are given trucks, balls, and guns to play with may acquire conceptual categories in which these objects are seen as appropriate for themselves and for members of their own gender. Similarly, girls who are given dolls may acquire concepts of these objects as appropriate for themselves and for members of their own gender.

Ultimately, differential play activity could lead to the development of different personality characteristics, what we have traditionally referred to as masculinity and femininity (Huston, 1985). For example, dolls are likely to encourage nurturant play, whereas guns are likely to encourage aggressive play. Repeated participation in sex-stereotyped activities may thus lead to the development of personal-social attributes like aggression or nurturance. That is, as one plays with "nurturant" toys over time, one comes to see oneself as increasingly nurturant. Similarly, as one plays with "aggressive" toys over

time, one comes to see oneself as increasingly aggressive. If this thesis is correct, then differential play activities by boys and girls can lead to different actions, toy concepts, and personality characteristics.

One method that can access these initial gender-activity categories is a Q sort where a child places pictures of toys in different groups. For example, a child can be shown pictures of such toys as a ball, doll, truck, and baby buggy. The child is then asked to put the pictures together that belong together. The child can be asked to explain why he or she put the pictures in those groups. Inferences can then be made about the child's underlying conceptual categories based on his or her groupings and verbal explanations. Based on cultural definitions of gender-appropriate activities, this type of measure can index the development of sex typing in a child's construction of toy categories.

Gender construction may well be important for both children and adults because we often use such information to define our sense of selfhood (Harré, 1991; Martin & Halverson, 1981). To test this hypothesis, children could be asked to sort pictures of toys into groups that are "for me" or "not for me," an index of self-relevance. Children could then sort these pictures into toys that are "for boys" or "for girls," an index of gender-activity stereotypes. By comparing the groupings and the rationales for those groupings, the degree of stereotyping in the child's self-concept can be compared to his or her overall gender stereotypes of activities. Children may well allow themselves more leeway in their own personal choices than they would allow groups of children. This hypothesis should be particularly true for girls, who have more flexibility in gender-activity choices than do boys.

Latency scores can be used to analyze the strength of gender-based groupings. Specifically, the shorter the latency times for placing gender-stereotyped toys into categories, the more sex-typed the child may be (Bem, 1981). This has been inferred because information is categorized around the concept of gender mindlessly, with little thought to other relevant attributes such as "Am I good at this activity?" or "Do I like this activity?"

In summary, the interplay between gender concepts and gender-related activities is a dynamic one, where repeated physical and linguistic actions may strengthen and broaden children's gender constructions. Initial participation in sex-typed activities occurs before the child has any notion of his or her biological gender. Early toy play is simply encouraged or discouraged by adults. What one does (i.e., actions) may thus result in the acquisition of concepts that one links to gender. Knowledge of one's biological gender (i.e., gender identity), which emerges around age 2, is sufficient for children to label activities by gender appropriateness. These verbal concepts, in turn, may come to define and to regulate one's future actions. As children increas-

ingly participate in gender-appropriate toy play, avoid gender-inappropriate toy play, and learn the reason for such actions, they construct a sense of who they are. Gender construction can be tapped through pictorial methodologies.

PICTURE IDENTIFICATION AND SEQUENCING: ONE'S KNOWLEDGE OF SELF

Knowledge of one's selfhood, as a distinct person within a particular body, gradually emerges during the toddler and preschool years. In one assessment method (Lewis & Brooks-Gunn, 1979), children are shown pictures of themselves. Researchers examine the point in development when children understand that the picture is of them. Initially, children point at themselves. Quickly, they master the use of pronominal grammar, referring to themselves with a word like "me." When personal pronouns emerge, they are never used incorrectly (Muhlhausler & Harré, 1990). Pictorial assessments, then, can tap the early acquisition of a sense of self. The child knows him- or herself as a person whose being emanates from a particular physical body (Harré, 1983).

Selfhood involves an ongoing sense of personal continuity over time (Harré, 1983). To examine this sense of self, children could be shown pictures of themselves performing activities at various points in history. Children could then sequence these personal events from early to later parts of their life. As children tell a story about their life, a narrative autobiography emerges, based on these pictorial events. Linguistic comments about oneself, including one's gender or age, can be used to index attributes that a person selects to construct a sense of self.

This type of story analysis can be repeated at various points over time. By using a longitudinal strategy, one can understand how a person constructs his or her particular life story at various points in development.

CONCLUSIONS

The method presented here emphasizes the role of pictures both as a discursive practice in its own right, by means of which a narrative can be "told," and as a means to elicit children's verbal "retellings," their conceptual knowledge, and their memory organization. Both the process of thought and the product of thought can be examined through pictorial means because both are in the public domain. Process analyses highlight how development happens, a key problem in developmental research. Longitudinal analyses of

such processes provide an important avenue for understanding ontogenesis: the development of each person over the course of the life span.

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