

Young Children's Knowledge about Visual Perception: Hiding Objects from Others

John H. Flavell, Susan G. Shipstead, and Karen Croft

Stanford University

FLAVELL, JOHN H.; SHIPSTEAD, SUSAN G.; and CROFT, KAREN. *Young Children's Knowledge about Visual Perception: Hiding Objects from Others*. CHILD DEVELOPMENT, 1978, 49, 1208-1211. Children of ages 2½, 3, and 3½ years were tested for their understanding of object hiding, believed to reflect an early developmental level of knowledge about visual perception. Even the youngest subjects could nonegocentrically hide an object by placing it on the opposite side of a screen from another person, even though placing it there necessarily left it unhidden from themselves. In contrast, there was a significant increase with age in the ability to achieve the same physical end state by placing the screen between the other person and the object. Most subjects at each age level correctly indicated that the other person could see the object when the experimenter interposed the screen between the child and the object but that the other person could not see the object when she placed the screen between the other person and the object. These and other recent findings indicate that children of this age can be both nonego-centric and skillful at estimating what other people do and do not see under various viewing conditions.

Knowledge about visual perception can be regarded as one type of social or psychological cognition. Young children may give evidence of elementary forms of such knowledge by means of percept production, deprivation, and diagnosis activities (Flavell, in press; Lempers, Flavell, & Flavell 1977). For example, children could intentionally produce visual percepts in another person by a variety of showing or showing-like activities, such as turning a picture card so that the picture side faces the person or getting her to look at an object by pointing, verbalizing, or even physically turning her around. Likewise, they could intentionally deprive her of a preexisting percept by a variety of hiding or hiding-like activities, such as interposing a vision-blocking obstacle between her and an object or moving the object behind or beneath the obstacle. Finally, they could diagnose rather than alter (i.e., either produce or deprive) the other person's current visual experience—for instance, by

showing that they know whether she does or does not presently see a particular object. There is hardly any published evidence on young children's knowledge of hiding (Lempers et al. 1977; Hughes, Note 1). We know little about how able they are, under various task conditions, either to deprive another person of the sight of an object through their own action or to diagnose whether it is already nonvisible to her. A series of tasks were used in the present study to assess such knowledge and abilities.

The subjects were 48 children from a middle-class nursery school, eight boys and eight girls at each of ages 29-35, 36-41, and 42-48 months.

Materials consisted of a scarf, a 15-cm (height) × 20-cm (width) portable wooden screen with attached base, four 4 × 6.5 × 14-cm blocks, a low 120-cm (width, from where the subject sat) × 60-cm table, and

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two toys. The toys were a small puppet that could be covered by the scarf and a lying-down Snoopy dog small enough (roughly $17 \times 10 \times 8$ cm) to be concealed by the screen.

In all tasks, the child and one of the two experimenters sat around the table. To maintain equivalent eye levels this experimenter sat on the floor and the child sat on one or two large blocks. The tasks were always administered in the sequence given below, because pilot work suggested that it would come closest to optimizing subjects' comprehension, interest, and attention over the entire set of tasks.

The pretraining was meant to convey the general task requirements without teaching the child the difference between hiding something from another person specifically (nongocentric hiding) and hiding it from self or from undifferentiated self-other (egocentric hiding). This was accomplished by concealing an object from both. The pretraining was also meant to convey that one still "sees X" when X is only partly visible. The experimenter placed the puppet on the table, covered it with the scarf, and said: "My eyes are open and I'm looking. Do I see the puppet?" She repeated the question as she partially uncovered then fully uncovered the puppet.

On the first trial, the experimenter sat directly opposite the child across the table, placed the wooden screen upright on its base within reach of the child, handed the child the Snoopy dog, and said: "Now it is your turn. Put Snoopy someplace on the table so I [emphasized] don't see him." Three more trials of this kind were given, with the experimenter seated 90° to the child's right, 90° to his or her left, and at 180° again, in that order. On all trials the screen was placed broadside to the experimenter; it was therefore edge side to the child on the two 90° trials. On the two 180° trials, a placement was scored "correct"

if the experimenter could not see Snoopy, "egocentric" if the child could not, and "other" otherwise; only "correct" and "other" scores were possible on the two 90° trials, since the screen was edge side to the child. One more 180° trial was given in which the child was asked to put Snoopy where the child (emphasized) does not see it.

Two move-screen trials were given, the first 180° and the second 90° . The experimenter said: "Now it's your turn to use this board [hands board to child]. I'll put Snoopy here [within child's reach]. Put this board some place on the table so I [emphasized] don't see Snoopy." Responses were scored as in the first four move-object trials, except that egocentric errors could be scored on both move-screen trials.

The child and the first experimenter sat side by side; the second experimenter faced them across the table (180°). Snoopy was placed on a platform of small blocks on the table so that it was at eye level for both the child and the second experimenter. On each of four trials, the first experimenter held the screen in a certain position and then asked the child if the second experimenter saw Snoopy. On the first (All) trial, the screen completely blocked the child's own view of Snoopy; on the fourth (None), it completely blocked the second experimenter's. On the second (Top) and the third (Bottom) trials, only the top and bottom thirds of Snoopy, respectively, were visible to the second experimenter. Thus, the correct responses in this sequence of four trials were yes, yes, yes, and no, in that order.

Table 1 shows the number of subjects at each age level who responded correctly to each task. No sex differences were evident in the data. The first four columns of the table show that even the youngest subjects knew how to deprive another person of the sight of

TABLE 1
SUBJECTS IN EACH AGE GROUP ($N = 16$) RESPONDING CORRECTLY TO EACH TASK

| AGE (Years) | DEPRIVATION TASKS | | | | | | | | DIAGNOSIS TASKS | | | |
|----------------|-------------------|------------|------------|-------------|------|-------------|------------|----|-----------------|-----|--------|------|
| | Move Object | | | | | Move Screen | | | All | Top | Bottom | None |
| | 180° | 90° | 90° | 180° | Self | 180° | 90° | | | | | |
| $2\frac{1}{2}$ | 13 | 13 | 13 | 15 | 8 | 5 | 4 | 14 | 13 | 10 | 14 | |
| 3 | 15 | 16 | 16 | 16 | 14 | 10 | 9 | 14 | 7 | 9 | 15 | |
| $3\frac{1}{2}$ | 16 | 16 | 16 | 15 | 15 | 14 | 12 | 13 | 7 | 6 | 14 | |

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an object by placing it on the side of a screen opposite the other. Only one of the five incorrect responses made on 180° trials took the form of egocentric hiding (i.e., hiding from self rather than from the experimenter); it was produced by a 2½-year-old on his first trial and was followed by three correct trials. The 2½-year-olds actually appeared to perform more poorly when asked to hide Snoopy from themselves rather than from the experimenter (fifth column). The fact that five of the eight incorrect responses here consisted of continuing to hide Snoopy from her suggests that inattention or perseverative tendencies may partly explain this unexpected result.

In contrast to the move-object data, there were significant increases with age in correct responding on each of the move-screen trials: $\chi^2(2) = 10.61$, $p < .01$ for the 180° trial; $\chi^2(2) = 8.16$, $p < .02$ for the 90° trial. Sign tests were used to compare the difficulty level, within the entire sample, of corresponding move-object and move-screen trials, that is, of the 180° move-screen trial compared with each of the two 180° move-object trials and of the 90° move-screen trial compared with each of the two 90° move-object trials. Performance was significantly ($p < .001$) poorer on the move-screen trial in each of these four comparisons. On each move-screen trial and at each age level roughly half the incorrect responses consisted of egocentric hiding (i.e., interposing the screen between self and object).

The diagnosis tasks were inherently poorer assessment procedures than the move-object and move-screen ones, since a correct yes or no answer could more easily be the result of random responding. Nonetheless, the fact that 12 of the 16 2½-year-olds correctly said both yes on the All trial and no on the None trial suggests that their ability to tell when an object was placed where another person could not see it may have been about as good as their ability to place it there themselves (move-object trials). Correct responding actually decreased with age on the partial-hiding tasks, significantly so in the case of the Top trial, $\chi^2(2) = 6.09$, $p < .05$. We can find no convincing explanation for this peculiar result.

The most important finding of this study was that 2½–3½-year-old children possess some genuine knowledge about hiding or percept deprivation. This finding accords with other recent evidence (Lempers et al. 1977; Hughes, Note 1). There are several grounds for believ-

ing that our subjects' knowledge was in fact genuine, that is, neither egocentric nor unrelated to cognition about another person's perception.

As to egocentrism, the pretraining provided experience in which hiding an object from another person was confounded with hiding it from oneself. A subject who had an egocentric or semiegotric conception of hiding could readily have extracted from that experience the self-instruction to hide from himself on the four move-object trials which immediately followed the pretraining, especially since hiding the object from the other person on those trials could only be accomplished at the expense, so to speak, of leaving it unhidden from himself. We had expected that a number of the younger children would in fact hide egocentrically on the move-object trials, but this did not happen. On the contrary, half of the 2½-year-olds continued to hide from the other person even when explicitly asked to hide from themselves. It is of course possible that children younger than 2½ would exhibit an egocentric conception of hiding if an effective method of assessment could be devised.

It is also unlikely that our subjects' good performance was mediated by something other than percept cognition. The fact that subjects did about equally well on 180° and 90° trials (see table 1) shows that they could not have been following a simple rule like "Put the object on my side of the screen." It is also doubtful that they could have been using the rule "Put the object on the opposite side of the screen from the other person," unaccompanied by any ideation about what she does and does not see. Had they been doing that, they should have consistently said that she could not see the object when it was on the opposite side of the screen but only partly hidden (Top and Bottom diagnosis trials), just as they said she could not see it when it was completely hidden (None trial). They showed no such consistent responding, however. In sum, the results indicate that these young children could conceptually distinguish what they saw from what another person might see, could think about what the other person saw rather than what they saw when asked to do so, and could both produce and recognize at least some physical situations where the other person did not see something. How able they were to recognize partial-hiding situations as such is less

clear. Likewise, additional research would be needed to explain why the move-screen tasks proved to be so difficult for the younger subjects.

Reference Note

1. Hughes, M. Egocentrism in preschool children. Unpublished doctoral dissertation, University of Edinburgh, 1975.

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