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ABSTRACT

This paper reports two related experiments, the first investigating whether children 3-7 years old demonstrate Flavell's Level-2 perspective-taking in a cognitively simple task, and the second re-examining children's performance on a task comparable to the Piagetian 3-mountain perspective-taking task. The first experiment involved a task which eliminated the usual spatial and representational components of the classic 3-mountain task, but provided conflicting visual experiences for subject and experimenter. The second experiment was designed to examine the child's ability to choose a representation of his own view and views of the experimenter when the experimenter was seated opposite and to the side of the child. Task variables and types of errors were investigated. Also, response latencies were measured to check whether responses on task were meaningful or indiscriminate. Results indicate that the young child's difficulty on traditional perspective-taking tasks is related to his lack of an integrated Euclidean spatial system and not to a lack of awareness that others have different visual perspectives. (GO)

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According to Piaget, one of the characteristics of the preoperational child's cognitive and social behavior is its egocentric nature (Piaget, 1970; Piaget & Inhelder, 1969). One indication of this egocentrism is the young child's inability to take another's visual perspective in the now famous "three-mountain task." In this task, the child is seated on one side of a display consisting of three papier-mâché mountains, and is asked to show how the display looks to a doll seated in another location. Piaget and Inhelder (1956) found that children younger than seven or eight were generally unable to take the doll's perspective, and instead, egocentrically assigned their own viewpoint to the doll.

Subsequent investigators have argued that the three-mountain task taps perspective-taking skills at an unnecessarily advanced level, and that, with cognitively simpler tasks, perspective-taking should be evident well before the age of 7 or 8. Flavell has suggested a four-level classification system for these skills. In Level 0, the child cannot conceptualize or represent changes in prespective, but has the sensorimotor knowledge which enables him to take changes of position into account when manipulating his way through real space. In Level 1, the child can determine only <u>which</u> objects are seen from another person's perspective, while in Level 2 he can also represent <u>how</u> these objects appear. Flavell also suggests there may be a third level in which the subject would be called upon to represent the retinal experience of another person, even when that experience is not

consistent with the physical situation, for example, that the larger of two objects appears smaller because it is further away from the viewer.

Masangkay et al. (1974) have recently demonstrated Level 1 perspective-taking skills in children as young as 2- to 3-years old. One purpose of the present study was to determine whether young children (3 to 7 years) could also demonstrate Level 2 perspective-taking when given a cognitively simple task. The task which was developed for this purpose was one in which the subject and/or experimenter wore colored glasses while viewing a white card, and the subject was asked to describe how the card looked to him, and how it looked to the experimenter. This task, while eliminating the usual spatial and representational components of the classic three-mountain task, nevertheless did provide conflicting visual experiences for the subject and experimenter, and thus a correct response required that the child decenter from his own point of view.

The second purpose of this investigation was to examine more closely the young child's performance on a task comparable to the traditional three-mountain task. Several rather casual comments in past research have been made which suggest that the child has difficulty even in answering questions about his own visual experience. For example, in a study by Brodzinsky, Jackson, and Overton (1972), each subject was shown a stimulus array and was asked "to choose the picture which showed just what he saw from where he was sitting. The response was corrected if necessary [italics added]." Similarly, in a study by Fishbein, Lewis, and Keiffer (1972) the child was asked to "Point to the picture which looks like what you can see from where you are sitting. . . . If the child pointed to an incorrect photograph, the correct one was pointed out to him. [italics added]."

Typically these difficulties have been ignored in investigations of perspective-taking. Clearly, however, if the child cannot answer questions about his own view accurately, then the fact that he cannot answer questions about another person's view need not reflect his difficulties in perspective-taking. Thus, the present study systematically investigated the child's ability to choose a representation of his own view (the "self" view), as well as that of the experimenter who was seated opposite the child (the "opposite" view), or at the side of the child (the "side" view). Wooden blocks were used instead of mountains, and were arranged to permit investigation of task variables (e.g., number of blocks, symmetry of array) and types of errors (e.g., egocentric errors, left-right confusions).

In addition to recording the accuracy and errors on the blocks task, response latencies were also measured. If the child finds the task meaningless, or if he is responding egocentrically to all three questions, his responses should be relatively fast and indiscriminable across the three views. If, however, the child is responding meaningfully to the task, his responses should be slower for opposite and side views than for the self view since the former require preliminary inhibition of the more primitive, more accessible egocentric mode (Fishbein et al., 1972; White, 1965), and/or mental rotation of the display or ego (Huttenlocher & Presson, 1973; Shepard & Metzler, 1971).

The glasses and the blocks tasks were given to 100 children, 20 each at ages 3, 4, 5, 6, and 7. For the glasses task, a white card was held to one side of the experimenter and subject and the child was asked "What color does this card look like to you?" and then, "What color do you think this card looks like to me?" These same questions were repeated, in varied

order, under three conditions: first, when the subject wore glasses with yellow lenses and the experimenter wore no glasses; second, when the subject wore no glasses, but the experimenter wore green-colored glasses; and third, when the subject wore yellow glasses and the experimenter wore green.

For the blocks task, 16 arrays were made from red, blue, and green blocks. Half the arrays included all three blocks and the rest included two; half had all blocks visible to the subject (visible arrays) and half faced in the opposite direction (hidden arrays), and half were symmetrical while the rest were asymmetrical.

Arrays were always built at the child's eye level, from back to front. Immediately after the array was complete, five cards, each containing a colored, two-dimensional representation of the blocks, were shown to the child who was asked to point to the card which showed his view, the experimenter's view, and, in 12 of the 16 arrays, the experimenter's view from the side. Response latencies were measured from the moment the experimenter named the view required to the moment that the subject pointed to one of the five cards.

Preliminary analyses revealed no effects of sex or task-order, and thus, data were pooled over subjects. In the glasses task, when neither the subject nor experimenter wore colored glasses, all subjects were able to answer the questions "What color does the card look like to you? . . . What color do you think it looks like to me?" correctly. Children's responses under other conditions are given in the attached table. The matrices show that the glasses task was challenging for the youngest children, with 35%-50% of the 3-year-olds responding correctly, and

about 20%-30% committing egocentric errors. Errors of all kinds decreased with age such that by 6 years, performance was errorless. Data from the older subjects are omitted from the table for this reason.

The proportion of correct responses to the blocks task, by age and view, are shown in Figure 1. A two-way analysis of variance showed both main effects of age and view were significant, as was the Age x View interaction. Newman-Keuls comparisons showed that performance by 6- and 7-year-old children was significantly better than performance by 5-year-old children, which was in turn significantly better than 3- and 4-year-old children. All comparisons on view were significant, that is, performance on self was significantly better than on opposite, which was better than on side. The interaction, as indicated in Figure 1, results because in the 3-year-old group performance on self, opposite, and side views did not differ significantly, while in the 4-year-old group, self was better than opposite and side, and in the 5-, 6-, and 7-year-old groups, self performance was better than opposite which was in turn better than side.

The proportion of egocentric responses by age and view are shown in Figure 2. Note that for the self view these responses are correct, whereas for opposite and side views, they constitute errors. Again, all main and interaction effects were significant: older subjects gave more egocentric responses than younger (because of the high number of correct responses in the self view); more egocentric responses were given on self than on the other two views; with the interaction resulting because at age 3 there were no differences among the three views, wheras at the older ages there were large and significant differences.

The latency data are shown in Figure 3. Six-year-old children had longer response latencies than 3-, 4-, and 5-year-olds; responses to self

were faster than responses to opposite which were faster than responses to side. An interaction occurs because at the three younger age groups there were not significant differences in latencies among the views, whereas in the 6- and 7-year-olds, differences were highly significant.

The results from the glasses task support the hypothesis that very young children can demonstrate perspective-taking skills when the spatial and representational demands of the task are removed. About 75% of the 4- and 5-year-old children, and 100% of the 6- and 7-year-old children were successful on the glasses task. Even in the 3-year-old group, 35%-50% of the children were able to decenter from their own perspectives successfully. The fact that about 30% of the 3-year-old children did commit egocentric errors supports Piaget's contention that young children have difficulty in decentering. Nevertheless, their high success rate indicates that their perspective-taking abilities are not as poorly developed as their performance on more traditional tasks suggests.

The nonegocentric errors made by 3-year-old children raise the possibility that factors other than centration may also pose problems for the young child. In the condition in which the subject wore yellow glasses and the experimenter wore none, two subjects reported that the card looked yellow to the experimenter and white to themselves, the exact reverse of the actual situation. One possible explanation of this finding is that the child is confused by the pronouns "you" and "me." Findings by Strayer, Bigelow, and Ames (Note 1) provide some support for this hypothesis in that very young (18-30 months) children's performance on simple perspective-taking tasks was related to their spontaneous use of pronouns. This is not to suggest that the child's difficulty in perspective-taking is therefore "merely verbal." It is just as reasonable (and clearly more

consistent with Piagetian theory) to explain the difficulties with pronoun usage as a consequence, rather than as a cause, of egocentrism.

Insofar as young children were successful in describing how something looked to another in the glasses task, they may be said to have demonstrated what Flavell (1974) classifies as Level 2 perspective-taking. It might be argued that the child is simply "reading off" the color of the experimenter's glasses in this task, but even if this is the case, relatively good perspective-taking skills are demonstrated since the child could instead have named the color of his own glasses (yellow) the color of the card's current appearance (also yellow) or the actual color of the card (white). Our current work is directed toward determining the extent to which the child is "reading off" the color of the experimenter's glasses. For example, if the subject is asked how a white card looks to the experimenter when the subject wears yellow glasses and the experimenter wears blue glasses, a response of "yellow" would indicate egocentrism, "blue" would indicate perspective-taking, but "green" would indicate that the subject is reading off color, since the experimenter's blue lenses look green when viewed through the subject's yellow lenses.

Young children's performance on blocks, which does require spatial and representational abilities, was far inferior to performance on glasses. In the 3-year-old group, there were no significant differences among performance on self, opposite, and side views on the proportion correct, proportion egocentric, or response latencies. This pattern could reflect either that the child is responding egocentrically or randomly to all views. Since the distribution of responses in the 3-year-old group closely resembled the distribution expected by chance, the random description is probably most applicable. Thus, these children were apparently incapable of meeting

the spatial and representational demands of the task, even when asked about their own views, so that their difficulty in answering questions about the experimenter's view should not be attributed solely to inabilities to take another's perspective.

In the 4- and 5-year-old groups, the proportion of correct responses on the self view was significantly higher than expected by chance, and by 6- and 7-year-olds, performance was almost errorless; this suggests that difficulties encountered in answering questions about others' views at these ages are not due to an inability to understand the task, and thus, that spatial tasks are appropriate for testing perspective-taking in children 6 years of age or older.

There was no evidence for a gross form of egocentrism since subjects rarely attributed their own views to the experimenter. However, since left-right confusions were common on the opposite and side views but not on the self view, it does appear that a spatial egocentrism is operating in which the child assumes that the experimenter's left and right are in a position identical to his own left and right. Difficulties with understanding the relativity of left and right probably accounts for the finding that older children performed significantly better on the opposite view than on the side view, since the side views always involved some asymmetry as a consequence of the fact that the arrays were arranged to vary the hidden-visible dimension from the subject's perspective.

One of the variables suggested by both the glasses and blocks tasks as one which affects very young children's performance is a tendency toward "intellectual realism," that is, the insistence that physically present items be included in representations (the same tendency which

leads the child to draw both eyes on one side of a profile). This hypothesis is supported by the fact that young children gave significantly more egocentric responses in both the opposite and self views when all blocks in the array were visible to the subject than they did when all but one block was hidden from the subject, even though the latter case presented a perceptual simpler view. Data from the glasses task also support this interpretation, since when the experimenter wore green glasses and the subject wore none, about 30% of the 3-year-olds named the experimenter's visual experience as their own.

It is obvious, then, that many factors enter into the child's success on tasks in which questions are asked about another's visual perspective. On the basis of children's performance on the glasses task, it appears that it is not true that very young children are unaware that others have different visual perspectives. Rather, it appears that the child's lack of an integrated Euclidean spatial system (as described by Piaget & Inhelder, 1956) underlies the young child's difficulty on traditional perspective-taking tasks. For research concerned with the development of integrated spatial concepts, tasks such as blocks or the three-mountain task are appropriate. However, for research focused on the child's ability to recognize that others' outlooks differ from their own, it is better to use tasks such as glasses and as the tasks developed recently by Lempers, Flavell and Flavell (Note 2) which do call for nonegocentric behaviors, but which do not require complex spatial and representational skills for their solution.

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2. Lempers, J., Flavell, E., & Flavell, J. The development in very young children of tacit knowledge concerning visual perception. Paper presented at Society for Research in Child Development, Denver, 1975.

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Responses on Glasses Task

Glasses Worn:	S: Yellow E: None				S: None E: Green				S: Yellow E: Green			
S Sees / E Sees												
Age	Y	W	G	D	Y	W	G	D	Y	W	G	D
3 years												
Yellow (Y)	(6)	7	1	3	0	1	1	0	(4)	3	10	1
White (W)	2	1	0	0	0	(3)	7	0	0	1	0	0
Green (G)	0	0	0	0	1	1	6	0	0	0	1	0
Don't Know (D)	0	0	0	0	0	0	0	0	0	0	0	0
4 years												
Yellow (Y)	(4)	14	0	1	0	0	0	0	(0)	2	16	1
White (W)	0	0	0	1	0	(1)	17	0	0	0	0	0
Green (G)	0	0	0	0	0	1	1	0	0	0	1	0
Don't Know (D)	0	0	0	0	0	0	0	0	0	0	0	0
5 years												
Yellow (Y)	(1)	16	0	0	0	0	0	0	(1)	1	16	0
White (W)	1	1	0	0	2	(1)	16	1	0	0	1	0
Green (G)	0	0	0	0	0	0	0	0	0	0	0	0
Don't Know (D)	0	0	0	1	0	0	0	0	0	0	0	1

Note. Correct responses are underlined; egocentric responses are in parentheses.

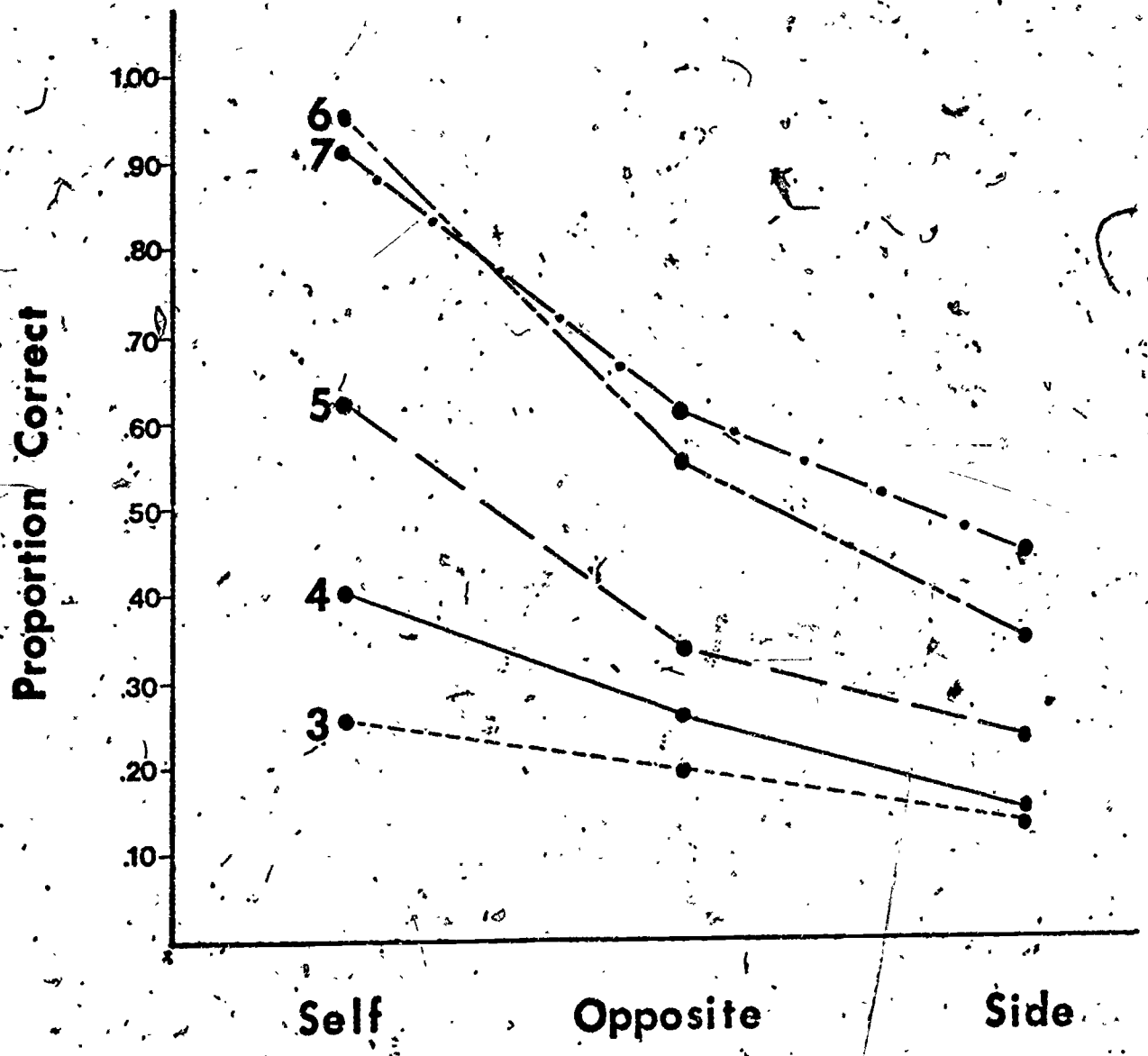

Figure 1. Mean Proportion of Correct Responses on Blocks Task by Age and View.

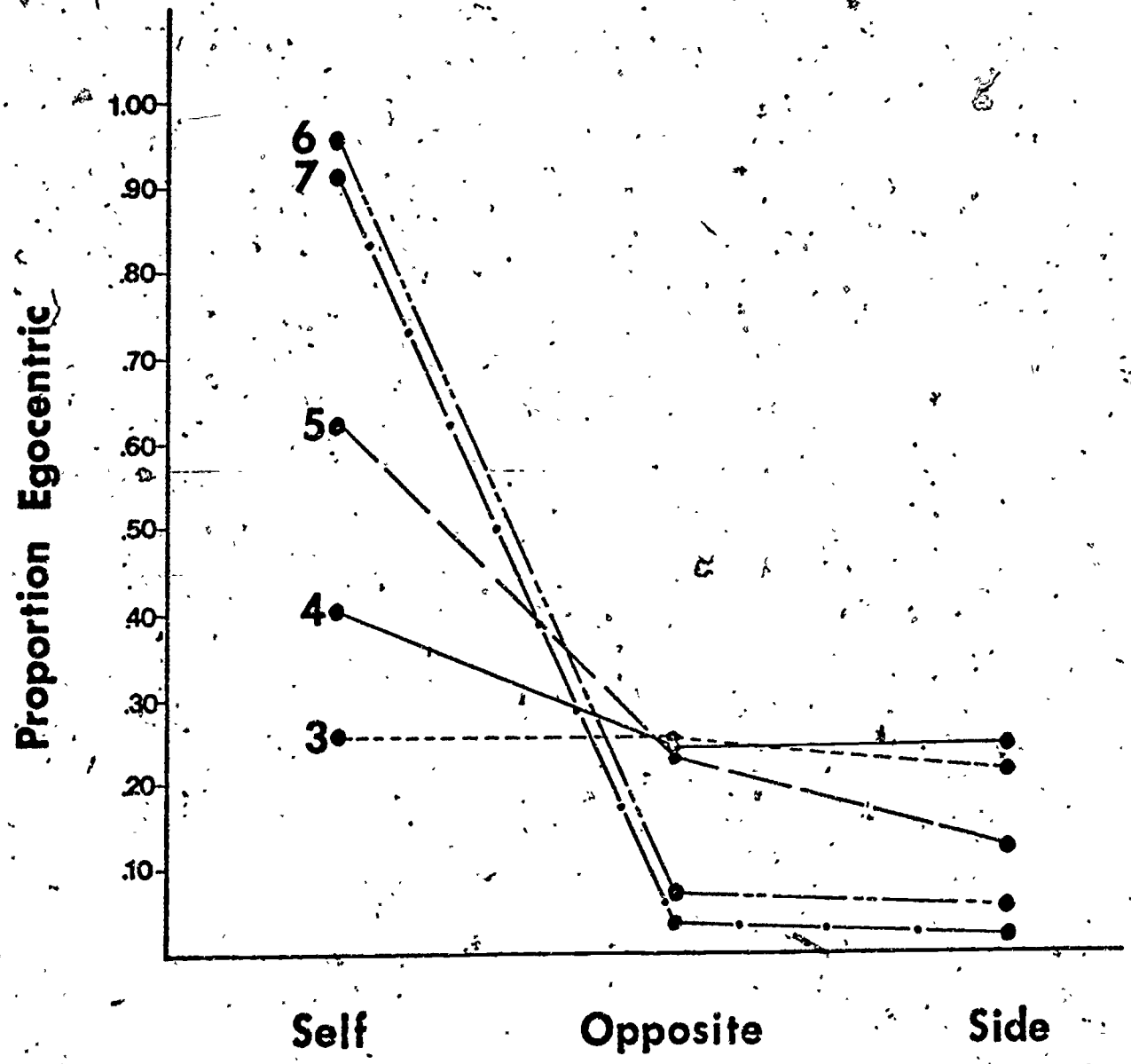

Figure 2. Mean Proportion of Egocentric Responses on Blocks Task by Age and View.

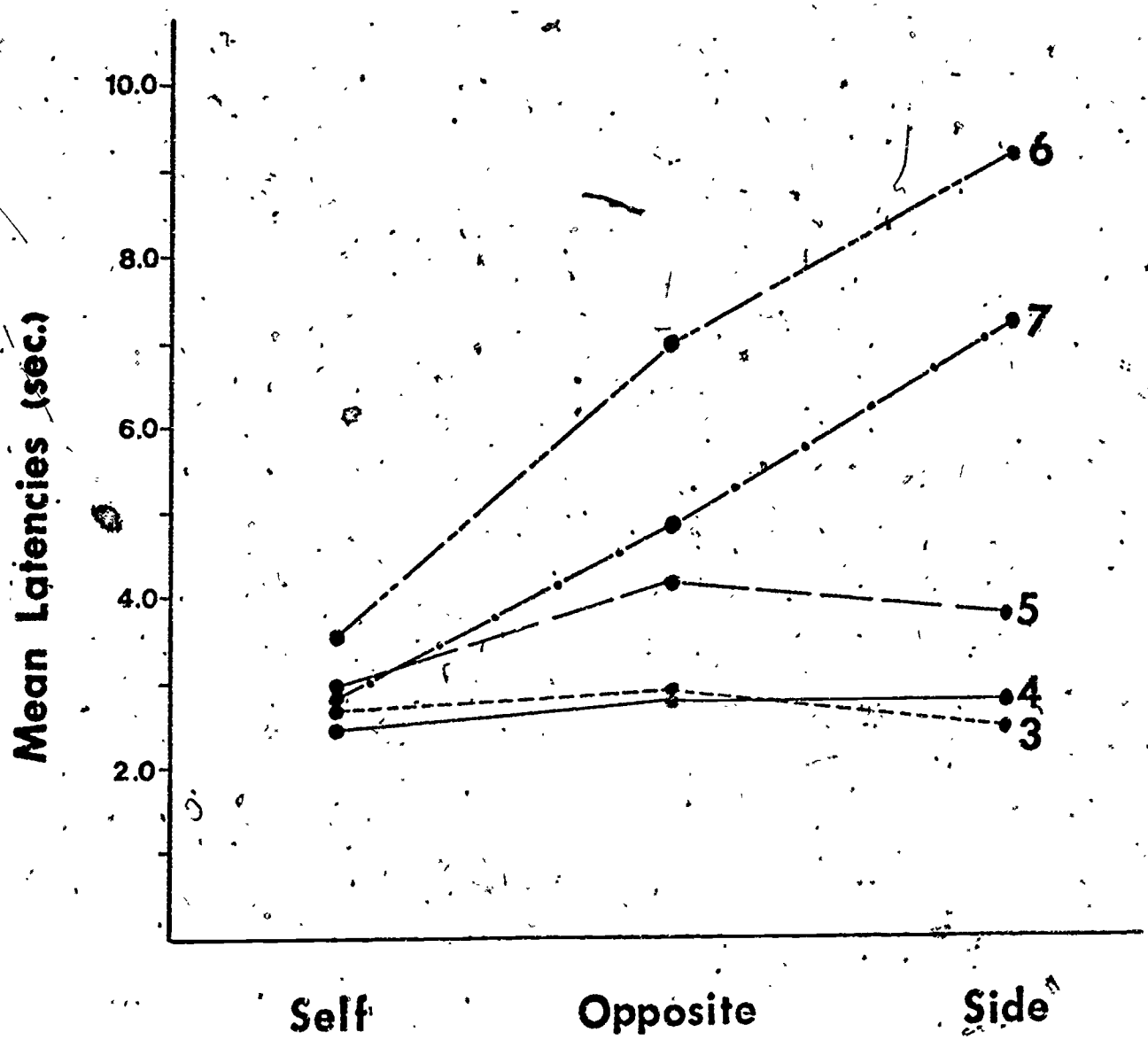

Figure 3. Mean Latencies on Blocks Task by Age and View.