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Egocentrism and Interactive Style Related to
Differential Peer Experience in Day Care,
Nursery School and Home-reared Children

Day care is an area of concern of current research because of the increasing demand for such caretaking facilities by the general public, especially with the growth in the number of North American women entering the work force. The majority of earlier investigations of day care have concentrated on demonstrating that there were no deleterious effects on cognitive and affective development in children as a result of such a group caretaking experience. This orientation stemmed from earlier findings of gross cognitive and affective abnormalities and retardation in infants reared in institutions. Such deficits are attributed to maternal deprivation and subsequent failure to form the mother-infant attachment bond thought necessary for normal development (Ainsworth, 1962; Bowlby, 1953; Bowlby, 1958). However, with evidence that such detrimental effects are not necessarily associated with short-term daily separations characteristic of day care, research has been shifting to investigations of possible advantages such group experience might have for the child.

One feature of the group milieu of a day care attender is the extensive exposure to peers. One area in which peer experience is thought to make an important contribution to social development centres around the concept of egocentrism, the inability to take another person's point of view. Piaget (1928) postulates that ex-

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tensive social interaction is necessary for the decline of egocentrism. He furthermore contends that peer interaction is more necessary than interaction with adults in this decline. This paper therefore investigated this contention with respect to day care and nursery school, where peer contact is achieved in varying degrees through an early group experience, and home care, where there is no organized group experience.

A second feature of the day care setting is that it requires the child to constantly share adult attentions with many other children. This lower adult : child ratio raises an interesting question in terms of whether day care children evolve a different style of interaction with adults than the home-reared children. The present investigation attempted to determine whether specific interaction variables had different frequencies in children from these backgrounds. Such differential attention could have implications for theories of the development of dependency-autonomy as a result of environmental variations.

The following review of the literature on day care research and studies of egocentrism is presented to acquaint the reader with the basis from which the present investigation drew its hypotheses and design.

Day Care Research

Almost all major theories in psychology stress the importance of the early preschool years in development. Psychoanalytic theories trace deviant adult behavior to childhood experiences;

behavior theory stresses behavior as learned, with early learning experiences being critical in the child's development (Evans & Saia, 1972). The direction of research indicated by this emphasis on the early years is to define the nature of the optimal environment for learning and development, whether in a home or a more organized educational setting.

What, then, is the nature of the more organized educational setting referred to by the term day care? The common reference to this term approximates the following definition: "Any privately or publicly sponsored program which provides for the care of preschool or school-age children (when not in school) by someone other than adult members of the child's own family in whatever setting it takes place, whether an institution, family day care arrangement, day care centre, etc." (Frost, 1973, p. 24). Although there are several names and definitions accorded the various day care settings, three types of day care arrangements defined by Frost (1973) and Ryan (1972) are family day care, where a person acts as caretaker in her own home of not more than about six children; group day care, involving older children in some modified type of family arrangement such as after-school care; and day care centre, which constitutes large groups of children cared for during the greater part of the day. In addition, there are two major orientations of day care - custodial, giving the child care with no special developmental or educational component, and comprehensive, incorporating the physical as well as the social, emotional and intellectual needs of the child (Roby, 1973). The

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bulk of the research on day care directs itself at the day care centre with a comprehensive orientation.

The history of North American day care centres has been based on the primary objective of meeting national needs rather than the concern for the child's welfare. During the two world wars, when women were required in the labor force, the U.S. Federal Government funded day care. In the 1930's, during the depression, day care centres were again opened through federal funding in order to provide employment for unemployed teachers and nurses (Frost, 1973). Today, priorities are shifting towards a concern for the children, although the major emphasis is still often to free women to work if they desire to or if they must. In the United States, approximately one-third of the mothers with preschool children are in the labour force (Keyserling, 1973). In 1971, statistics indicated half of the 540,000 working mothers in Canada had children under six, and of these, 56% were cared for in the home while 41% were enrolled in paid-care institutions (Ryan, 1972). With such a large number of families requiring and utilizing day care arrangements, the need for evaluating such arrangements in terms of their effects on the child is emphasized.

Because early research in day care stemmed mainly from findings from institutional studies of maternal deprivation, the investigations performed to date have been mainly comparative studies involving home-reared versus day care children on measures of intellectual and affective development. Results of cognitive research

have generally indicated favourable implications for day care, revealing no cognitive deficits and often significant gains in intellectual development for disadvantaged children (Caldwell & Richmond, 1964; Doyle, 1975; Fowler, 1972; Robinson & Robinson, 1971). Several of the earlier gains have not been found on follow-up research (Doyle & Somers, 1978; Frost, 1973; Starr, 1971; Fowler & Khan, Note 1), but these studies still maintain that there is no evidence of cognitive deficit.

As in cognitive research, data on emotional development and attachment behavior of children in day care have reported none of the striking deleterious effects found in institutional studies (Caldwell, Wright, Honig & Tannenbaum, 1970; Doyle, 1975; Doyle & Somers, 1978). Some interesting differences, however, have been revealed on comparing day care to home-reared children. Caldwell, Wright, Honig and Tannenbaum found no differences between these groups of 30 month-olds on their behavioral measures with respect to child-mother attachment, but did find greater dependency (i.e. proximity-seeking) behavior on the part of the day care group in child-other relationships. Blehar (1974), in one of the few studies that have found negative effects associated with day care, reported that day care children seek less proximity and are more resistant to a stranger than home-reared children. More specifically, children enrolled in day care at 35 months of age showed less exploration, more distress at separation, and more proximity-seeking to mother than same age home-reared children. In contrast, children enrolled in day care at 25 months of

age showed greater proximity-avoidance behavior with their mother upon reunion than same age home-reared children. Although Blehar and Caldwell et al. employed different operational definitions of their measures (e.g. proximity-seeking) within different investigation paradigms, this disparity in results should not be overlooked. In discussing Blehar's results, authors have suggested explanations other than day care versus home care, including variations within day care settings themselves, such as quality of the specific day care (Blehar, 1974), staff : child ratios (Doyle, 1975) and age of entry into day care (Blehar, 1974; Schwartz, Strickland & Krolick, 1974). Prescott (Notes 2 and 3) attempted to evaluate the effects of specific environmental variations by investigating differences in children's experience in "open" (child-centred) day care, "closed" (teacher-directed) day care and "family" day care, and compared this to the experience of children with "home care + part time nursery school". She found that the frequency of various child behaviors in the settings differed significantly by the type of care. More relevant to the present investigation, Prescott found that a child's direction of attention differed by the type of care, being highest towards adults for the home care + nursery school group, and lowest for the open structure day care group. One explanation for these differences revolves around the development of dependency-autonomy. While the home care + nursery school children are least required of the groups to share adult attentions, this may result in a decreased need to develop autonomy and consequently the tendency to direct

bids to the adult. The closed day care centre requires more autonomy on the part of the child than the above but still maintains some degree of dependency due to its "closed" nature. Finally, the open day care centre requires the most autonomy and consequently nurtures the least attention towards adults. A similar explanation comes from a Swedish study conducted by Cochran (1977), where children reared in the home with the natural mother and children reared in the home of a "day mother" (akin to family day care) were found to explore their surroundings more than children in full-time day care. This greater exploration was found to lead to more interactions with adults, specifically revolving around the caregiver behaviors related to restricting or directing the activity of the child. The present study attempted to elaborate on these differences in attention towards adults, utilizing four dependency-type behavior categories, and comparisons were made among day care, nursery school and home-care children in a neutral setting, i.e. outside of their respective child-care arrangements.

Research on Egocentrism

The concept of egocentrism in childhood originates from Piaget's theory of intellectual development. The egocentric child is unaware or unable to acknowledge that other people have viewpoints differing from his own. Piaget and Inhelder (1956) postulated three stages of development, extending from ages 4 to 11, and taking the child from an egocentric attitude to sociocentric ability. This developmental sequence referred both to speech and to social behavior.

The first level, ranging from 4 to 6 years old, is characterized by the child's inability to take another person's viewpoint and, consequently, attributing his own view to the other person (Laurendeau & Pinard, 1970). Similarly, in speech behavior, the child is seen to talk to himself, for the most part unaffected by the comments of others. At age 6 or 7, the child begins to understand that there are viewpoints other than his own, but he is unable to specify these viewpoints (Shantz & Watson, 1970). It is not until stage 3, entered at age 9 to 11, that he develops the ability to specify these different viewpoints. This "progressive discrimination and coordination of perspectives" (Piaget & Inhelder, 1956, p. 213) is what takes the child from egocentrism to socialization. Others have investigated this concept and developed models, often with similar sequence to the above, but extended and defined by data (de Vries, 1970; Flavell, Botkin, Fry, Wright & Jarvis, 1968; Selman, 1971). In particular, it has been found that the particular ages at which these stages are reached can be much lower than specified by Piaget, depending on the familiarity and complexity of the task. This will be elaborated further on in the text.

As Kohlberg, Yaeger and Hjertholm (1968) point out, Piaget contends that egocentrism is a defect of both social and cognitive skills, but he does not delineate how or how much each contributes. He simply proposes a social learning theory to explain the shift from egocentric to socialized speech and morality. Whereas, in Piaget's view, from birth to approximately five years old, a child's

life revolves almost entirely around his parents, from age six he attends school and thus has a great deal of contact with his peers. In this way, he is exposed to ideas and opinions that are perhaps divergent from those of his parents, and he begins to see that his parents' views are not the only ones. Flavell (1963) espouses a similar view in his statement: "In the course of his contacts (and especially, his conflicts and arguments) with other children, the child increasingly finds himself forced to reexamine his own perceptions and concepts in the light of those of others, and by so doing, gradually rids himself of cognitive egocentrism" (p. 279). It is this progression of extensive social interaction that Piaget postulates as necessary for the decline of egocentrism. Furthermore, Piaget (1928) contends that peer interaction is more necessary in this decline than is interaction with adults. However, Piaget presents no evidence to support his speculation. It was the purpose of this investigation to attempt to determine whether early peer interaction contributes to the early decline of egocentrism.

An alternate view derives from Vygotsky's interpretation of this stage in the child's development. Vygotsky, referring to the speech aspect of Piaget's egocentrism as private speech, claims that this private speech is not indicative of a "presocial lack of intent to communicate [n] or an egocentric lack of awareness of the auditor's perspective" (Kohlberg et al., 1968, p. 695); rather, it serves the function of cognitive self guidance. Thus, where Piaget predicts a decline in egocentric speech monotonically with cognitive

and social maturity, Vygotsky claims private speech has a curvilinear course of development due to its purpose in bridging the developmental gap from outer speech to thought. Vygotsky's view also suggests that children who are active participants in peer interaction should employ at least as much or more private speech as children who do not engage in peer interaction during the stage where private speech is functioning as a transition from outer speech to thought (Kohlberg et al., 1968). Piaget's view suggests a negative relation between participation and egocentric speech.

Some indirect support for Piaget's position that egocentrism is broken down by the socialization process comes from a study by Neale (1966) looking at egocentrism in institutionalized versus non-institutionalized children. According to Neale, one aspect of the syndrome of the emotionally-disturbed child consists of extremely poor socialization, and he therefore hypothesized that the emotionally-disturbed children would show greater egocentrism than a normal control group. Matching subjects on I.Q., Neale found a significant difference in the number of egocentric responses, supporting his hypothesis.

Hollos and Cowan (1973) investigated the effects of social isolation on cognitive development. They drew their 7 to 9 year-old sample from three social settings in Norway which "varied primarily on the dimension of relative physical isolation of family dwellings, resulting in variation in the amount of verbal communication with peers and adults" (p. 631). Comparing the performance of the groups

on both logical operations and role-taking scores, they found that the setting affected the latter measures. The highest isolation group differed significantly from both the medium and the low isolation groups, but no significant differences were found between the latter two groups. This offers some support for Piaget's premise that interaction is important in the decline of egocentrism. Interpreting their results, Hollos and Cowan suggest a threshold of verbal stimulus above which "the sheer amount of interaction does not affect the development of role-taking skills" (p. 40). Hollos (1975) found similar results with children from three comparable settings in Hungary. Although West (1974) found no significant difference in the role-taking ability of children from three Israeli settings providing differing amounts of peer interaction experience, she concluded that the three environments may all have exceeded the threshold level hypothesized by Hollos and Cowan. Nahir and Yussen (1977), on the other hand, did find that Kibbutz and city children (the groups in West's study corresponding to the greatest and least peer experience respectively) differed significantly in role-taking ability, the Kibbutz children performing less egocentrically.

A second line of investigation of the contribution of peer experience to the decline of egocentrism looks at this ability as related to the sociometric status or social participation of the child. Rubin (1972) found a negative relation between communicative egocentrism as measured by Glucksberg and Krauss (1967) and popularity as determined by the number of times a child was named by his peers as a chosen playmate. This finding was true for kindergarten and

grade 2, but not for grades 4 and 6. Similarly, Chaplin and Keller (1974) reported a positive relationship between sociometric status and role-taking ability, as measured by Feffer's Role-Taking Task, for grade 3 but not for grade 6 subjects; no significant relationship was found on Piaget's three-mountain task for either grade. Contradictory evidence supporting Vygotsky's approach comes from Kohlberg, Yæger and Hjertholm (1968), who found a positive correlation between egocentric speech (vis-à-vis Piaget) and popularity for 4 year-olds, the latter rated by teachers on a seven-point scale. Furthermore, O'Connor (1976) reports no significant correlation between the absolute frequency of peer interaction and four role-taking tasks for 3 to 5 year-olds. The validity and comparability of these studies are not yet established in light of evidence from Deutsch (1974) that there is no relation between popularity as measured by asking the child to name his first two choices of playmate and popularity as measured by observing how many children played with him. In an attempt to clarify the relationship between peer interaction and role-taking ability, Rubin (1976) looked at social participation in terms of Parten's categories. He found that empathic role-taking correlated negatively with parallel play and onlooker-unoccupied activity, and positively with associative play, supporting Piaget's view that active involvement with peers is related to the ability to take another person's viewpoint.

A final area of investigation into the egocentrism-peer experience relationship involves attempts at training perspective-

taking. Chandler (1973) developed an intensive program for chronically delinquent boys, who were found on pre-test to be more egocentric than normal boys. The program produced improvement in role-taking abilities for the intervention group when compared to both no-treatment and placebo groups. Van Lieshout, Leckie and Smits-Van Sonsbeek (1975) also developed a social perspective-taking training program for 3, 4, and 5 year-old preschool children. When compared to a control group receiving a nursery school program without training, the 3 and 4 year-olds in the training group scored significantly higher in role-taking ability. This was not the case for 5 year-olds. They therefore concluded that "the 'normal' development of role-taking ability in young children can also be stimulated by letting them experience specific social interactions" (p. 15).

As can be seen from the above review, many of the studies investigating the egocentrism-peer experience relationship have taken an indirect approach, looking at sociometric status or the effect of intervention training. The community studies (Holloos, 1975; Hollos & Cowan, 1973; Nahir & Yussen, 1977; West, 1974) have been more directly aimed at this relationship, but it is yet to be determined whether these differences remain when looking at various degrees of peer contact within the same community. It was the purpose of the present investigation to examine this relationship by measuring the egocentrism of children at three levels of amount of naturally occurring peer contact - day care, the highest level; nursery school, representing a moderate level; and home-reared, receiving a minimal

amount.

In scanning the growing literature on egocentrism, there is a great deal of debate revolving around the tasks employed in the measurement of egocentrism. The large variety of such methods may, in part, be contributing to the polarity of results presented thus far (e.g., Kohlberg et al. versus Rubin). Methods range from recording the incidence of egocentric utterances in naturalistic settings (e.g., Piaget, 1926) or in laboratory settings (e.g., Garvey & Hogan, 1973), to arranging a myriad of tasks to assess the child's ability to adapt to the viewpoint of others (e.g., Rubin, 1973; Urberg & Docherty, 1976). This reflects the several modalities to which the construct of egocentrism has been applied.

Mossler, Greenberg and Marvin (Note 4) distinguish between perceptual role-taking, involving inferences about what another person sees or hears, and conceptual role-taking, involving inferences about what another person feels, thinks or knows. The bulk of the research in perceptual role-taking comes from tasks of spatial perspective-taking, investigating the ability to discriminate various points of view of a spatial display (Borke, 1975; Flavell et al., 1968; Piaget & Inhelder, 1956; Shantz & Watson, 1970). Conceptual role-taking has been investigated under several research paradigms. The first, empathic egocentrism, involves the ability to apprehend another's emotions in certain situations (Borke, 1971; Burns & Cavey, 1957; Sheehan Watson, Note 5). Story analysis investigates the ability of the child to retell a story from the points of view of various

characters in the story (Chandler & Greenspan, 1972; Mossler, Greenberg & Marvin, Note 4). Cognitive egocentrism is what Piaget refers to as egocentrism in speech, involving the classification of the child's verbalizations in terms of a category system to determine the level of egocentric speech (Kohlberg, Yaeger & Hjertholm, 1968; Piaget, 1926; Rubin, 1973). Finally, communicative egocentrism measures the ability to communicate to another person in a task requiring communication for its successful completion (Glucksberg & Krauss, 1967; Maratsos, 1973).

The original task employed in assessing spatial egocentrism was designed by Piaget and Inhelder (1956) and is popularly known as the three-mountain experiment. Piaget tested 4 to 12 year-olds and found, up to age 7, there existed a lack of discrimination between various points of view, whereas from ages 7 to 11 he found a progressive discrimination and coordination of perspectives. However, Aebli (1967, cited in Garner & Plant, 1972) claimed that the egocentrism observed in the younger children was a consequence of the experimental design. He postulated that the problem is insoluble to the child, who therefore resorts to a response known to be acceptable to the experimenter. Since Piaget's task requires him to give his own view first, and this is accepted by the experimenter, the child then resorts to giving his own view at subsequent responses. Aebli tested this claim by asking ~~the~~ group of subjects to give their own view first while a second group selected their own view only after giving the views of others. Results indicated a higher proportion of egocentric responses in group one. Garner and Plant (1972) replicated this with a task more

closely resembling Piaget's three-mountain task, and obtained results similar to Aebli. They therefore claim that the high rate of egocentric responses is an artifact of the difficulty of the task, reporting their results as indicating "... most clearly that the experimental arrangements for the former [own view first] group produced [his italics] egocentric responses" (p. 82). Cox (1975) utilized as the "other observer" a doll and a person, and found the mean correct response to be significantly higher when the observer was a person; however, this group still emitted 30% egocentric responses. Performance has also been found to be influenced by the perspective (0° , 90° , 180°) to be compensated in spatial tasks (Pufall, 1975), i.e., the greater the perspective to be compensated, the greater the amount of egocentrism. However, these data also do not deny the existence of egocentrism as there are still a significant number of such responses. Rather, the data stress that the young child's thinking is not exclusively egocentric, and social behavior (in this case, taking the other's visual perspective) does occur in 3½ to 5 year-olds (Fishbein, Lewis, & Keiffer, 1972; Garvey & Hogan, 1973; Pufall & Shaw, 1973).

Investigations have recently looked at the effects on performance of single versus multiple object arrays, reporting that stimulus complexity leads to a decrement in performance when the child is required to reconstruct the other's view (Flavell et al., 1968), but there is no decrement found when the response required is recognizing a photograph (Brodzinsky, Jackson & Overton, 1972)

or turning a duplicate array composed of toy objects (Borke, 1975).

Another aspect that may contribute to the difficulty of the task is whether it is a rotation or perspective problem. In a rotation task, the child must anticipate the appearance of the array of objects that is rotated under cover; perspective tasks involve him anticipating how a fixed array appears to an observer who is rotating about the array. Rotation has been found to be easier than perspective problems, a possible explanation being the incongruity between observer and ego in the latter task (Huttenlocher & Presson, 1973). Shielding the array during the choosing of the photograph representing the perspective has also been found easier for older children (Brodzinsky, Jackson & Overton, 1972). A variation similar to rotation requires the child to rotate a duplicate array so that he sees the same view as an observer positioned around the first array. Data here indicate less egocentric performance than on the traditional perspective-taking three-mountain experiments (Borke, 1975). Thus, the ability to coordinate perspectives seems at least to some extent a function of mode of presentation and response requirement.

Another methodology employed in investigating egocentrism is empathic role-taking (e.g., Borke, 1971; Burns & Cavey, 1957; Chandler & Greenspan, 1972). Role-taking here refers to "... the process by which the individual somehow cognizes, apprehends, or grasps... certain attributes of the other person" (Flavell et al., 1968, p. 5). Burns and Cavey (1957) studied empathic egocentrism by requiring subjects to recognize emotions of pictorial representations of

incongruous cue situations. For example, in the picture of a birthday party scene, the child depicted would be crying, contrary to the expected association of a happy face with a birthday party. Children younger than 5 years old gave fewer empathic responses than subjects older than 5. Burns and Cavey's methodology has been criticized, as facial-expression cues were presented in only the visual mode while situation cues were presented in both the visual and auditory modes (Sheehan Watson, Note 5). Testing 3 to 8 year-olds, Borke (1971) presented a series of stories and asked the subjects to select a face from pictures showing happy, sad, afraid and angry expressions to correspond to how the child in the story felt. Significant differences with age, decreasing linearly, were found, supporting Piaget. However, Borke found that even the youngest children displayed empathy by often choosing the correct expression, and interprets this as indicating that young children are not completely egocentric. Rather, previous investigations found evidence of egocentrism by requiring responses that were beyond the capabilities of their subjects, and when given a method of responding without having to utilize words, children exhibit empathy. Similar results were found in a later cross-cultural study comparing Chinese and American children (Borke, 1973). However, it is important to note that all of Borke's subjects attended either preschool or elementary school, furnishing them with the extensive peer interaction that Piaget claims contributes to the decline of egocentrism.

One possible fault with Borke's investigation lies in its

application of "taking another's viewpoint". According to Chandler and Greenspan (1972), "... non-egocentric thought implies the ability to anticipate what someone else might think or feel precisely when those thoughts and feelings are different from one's own" (p. 105) and thus involves simultaneous decentering (Urberg & Docherty, 1976). Otherwise, the child might simply project himself into the situation and determine how he would feel, a procedure involving sequential decentering (Urberg & Docherty, 1976). To account for this in Borke's procedure, Chandler and Greenspan added a sequel to the stories in which a bystander arrived to witness the affect-laden behaviors but not the antecedent events which gave rise to those behaviors. Egocentrism was determined by whether the child, in describing the bystander's viewpoint, included information which he himself had but not the bystander. While finding similar results to Borke's on the first portion of the procedure (pre-sequel), they report younger children attributed privileged information they had to the bystander. Chandler and Greenspan report a significant number of egocentric responses, decreasing systematically with age from 85% for 6 year-olds to 4% for 13 year-olds. Although conceding Borke's claim that verbal measures may have inflated the number of egocentric responses obtained, Chandler and Greenspan conclude that this explanation cannot account for all the egocentric responses given by young children. Also, Mossler, Greenberg and Marvin (Note 4) presented short videotaped stories requiring the informed child to make yes-no inferences

about the knowledge of another person with a limited viewpoint. They conducted their investigation under more naturalistic conditions by doing it in the child's home and with his own mother as the 'other person'. The findings, indicating differential performance on the task by children of different ages, pointed to four years old as the age of the most dramatic change from egocentric to non-egocentric responding. Both the Chandler and Greenspan and Mossler, Greenberg and Marvin studies are examples of the story analysis paradigm of investigating conceptual role-taking.

Bringing the various role-taking tasks into perspective, Urberg and Docherty (1976) tested 3 to 5 year-olds from day care centres utilizing five progressively more difficult tasks, including Borke's short stories, Burns and Cavey's facial incongruity drawings and Chandler and Greenspan's short stories and sequel tasks, which are in increasing order of difficulty. Children as young as five years old (35% of Ss, mean age 5 years 4 months) were able to succeed at even the more complicated role-taking tasks requiring simultaneous decentering, such as Chandler and Greenspan's, as long as the content was not too complex. Simultaneous decentering was also revealed to be more difficult than sequential decentering. Only 14.2% of the Ss passed none of the tests, mean age 3 years 5 months. However, all subjects were attending day care, thereby exposed to extensive peer interaction. As is the hypothesis of this paper under the contention of Piaget, this experience may contribute to the early decline of egocentrism and account for some of Urberg and Docherty's results.

Cognitive egocentrism has been investigated by recording the child's speech in some situation - e.g., during free play (Piaget 1926) or during a puzzle task (Rubin, 1973) - and classifying the utterances within a category system. Piaget identified eight categories of speech. The first three, which are considered egocentric, include echolalia or repetition, monologue - where the child is alone yet talks aloud to himself, and collective monologue - where others are present yet the child clearly talks aloud to himself. The five categories of socialized speech are adapted information - an exchange of information with a listener, criticisms, commands and threats, questions, and finally, answers. Thus it is seen that speech which is not adapted to a listener is regarded as egocentric.

Kohlberg, Yaeger and Hjertholm (1968) have devised a more detailed classification system of private speech based on their research. However, investigations utilizing their system (Rubin, Hultsch & Peters, 1971; Meichenbaum & Goodman, Note 6), report problems with low reliabilities or low occurrence of some levels of classification, resulting in confusion in analyzing and interpreting some of the data. More recently, Meichenbaum and Goodman have devised a system built upon the work of Kohlberg et al. Their category names and descriptions "reflect more directly the phenomena than the underlying theoretical assumptions" (p. 21). The category system and descriptions are presented in Appendix A.

Apart from the method of categorization of speech utterances, one controversy that is apparent when reviewing the literature

dealing with egocentrism concerns the incidence and frequency of egocentric responses and speech forms. Piaget (in Looft, 1972) reports that 40%-70% of the utterances of five to six year-olds are egocentric. Others also found a significant incidence of private speech or egocentric utterances (e.g., Garvey & Hogan, 1973; Kohlberg et al., 1968), but less so than Piaget's original data (32% and 40% respectively). Still others present data illustrating little if any evidence of these speech forms (McCarthy, 1930, in Looft, 1972). These discrepancies can partially be accounted for by Kohlberg et al.'s finding that the amounts of egocentric or private speech varies widely from one situation to another, with a lower coefficient of egocentrism found in a task situation (18%) than in a free play situation (32%). In addition, Zahn-Waxler, Radke-Yarrow & Brady-Smith (1977) found a large range of ability to take perspectives depending on the task, reporting 15-72% for 3 year-olds, and 41-100% for 6 year-olds.

The final type of conceptual role-taking to be discussed is communicative. Glucksberg, Krauss and Weisberg (1966) developed a methodology for investigating egocentric communication by having children communicate about novel graphic stimuli. In this referential communication task, children were found to be unable to take account of a listener's view. Indeed, when the subjects served as listeners only, and were issued their own reference phrases (obtained previous to the test trials), performance was almost errorless. Their referents, then, were idiosyncratic, only understandable to themselves.

In a subsequent study, Glucksberg and Krauss (1967) report young children's failure to modify their reference messages according to the feedback of a listener, served by the experimenter. In a referential task of facial expressions, egocentric communication was found to decrease with age, with a greater percentage of 6 year-olds using ambiguous descriptions than 8 year-olds, and similarly for 8 year-olds compared to 11 year-olds (Alvy, 1968). However, familiarity with the referent (maze) has been found to contribute, to some extent, to communication effectiveness of kindergarten and grade 3 children (Goldstein & Kose, Note 7). Evidence that young children may be able to take into account some aspects of a listener's situation is reported by Maratsos (1973). Children as young as 3 years old were found to be more verbally explicit in a referential task when communicating to a "blind" listener than to a "seeing" listener.

There thus appear to be many approaches to investigating egocentrism, each directed at different aspects of the concept. Until recently, few studies had attempted to deal with or relate the various aspects, and findings have been disparate. Spatial and communicative egocentrism have been found to correlate positively for 8, 9 and 10 year-old males (Cowan, 1966). He reports children who were successful on the three-mountain task produced significantly less egocentric speech when working in pairs in a game-task than unsuccessful subjects. Kingsley (Note 8) found significant intercorrelations among spatial, communicative and perceptual tasks for older (grade 3) but not for younger (kindergarten) subjects. Rubin (1973)

examined the correlations between four types of egocentrism - cognitive, spatial, communicative, and empathic - in children from kindergarten, grades 2, 4, and 6. Factor analysis revealed high intercorrelations for the latter three types, but not for cognitive egocentrism. Van Lieshout, Leckie and Smits-Van Sonsbeek (1975) also found significant intercorrelations among eight of the nine role-taking tasks investigated for 3 to 5 year-olds. Shantz (Note 9) on the other hand, found no significant interrelationship on tasks measuring spatial egocentrism, communicative egocentrism or social-perceptual inference-making with children in grades 1 through 4. As well, in a later study by Rubin (Note 10) using two empathic-type and four cognitive-type tasks, little evidence was found for the convergent or discriminant validity of role-taking tasks for children in preschool, grades 1, 3 and 5. The disparity of results is difficult to explain and points out the problems in comparing results across studies. It can be concluded, however, that this "ability to take another person's viewpoint" is not an all-or-none phenomenon, and may develop at different rates depending on the modality in which it is being discussed.

With the unitary aspect of the various forms for measuring egocentrism still under controversy, it seems necessary for any study of egocentrism to include several measures in order to ensure a generalization of results to the various modalities of the concept. As Piaget and Vygotsky base their theories on the spontaneous verbalizations of children, and as Rubin did not find cognitive egocentrism

to interrelate with other egocentrism measures, this seemed an important measure to include. The second measure, spatial egocentrism, also forms the basis for Piaget's theory and its inclusion provided a more direct route of comparison of results. Finally, the vast literature on empathic role-taking supported the inclusion of this measure appropriate to the 3 year-old age group viewed in this study.

The Present Investigation

The present study was designed to examine whether a difference in egocentrism exists for children with different amounts of peer experience. Three points on a continuum of early peer experience were chosen - day care, where the experience is most extensive; nursery school, where there is partially organized peer experience; and home-reared, where no organized peer experience occurs. The nursery school group also served as a control for parental role differences as day care mothers mostly worked while nursery school and home-reared mothers did not. Based on the finding of Mossler, Marvin and Greenberg (1976) that there is an abrupt change in role-taking ability between age 3 and 4 years old, it was decided to conduct the present investigation with children between 36 and 48 months old.

As discussed previously, the concept of egocentrism involves several different modalities, and whether these tap a "unitary construct" is questionable. For this reason, the present investigation utilized three tasks - spatial, empathic and cognitive - as measures of egocentrism.

Due to the early peer interaction engaged in by the day

care children, it was hypothesized that there would be a difference in the measures of egocentrism between the three groups. If this difference was in the direction of less egocentrism for the day care subjects, this finding would lend support to Piaget's contention that peer interaction is a major ingredient in the transition from egocentrism to socialization. For cognitive egocentrism, a finding of more egocentrism for day care children would lend support to Vygotsky's hypothesis that children who engage in peer interaction should exhibit at least as much or more egocentrism as non-participants. Finally, if there were no differences between the groups, this would provide inconclusive evidence, with possible interpretations ranging from support of the threshold hypothesis of Hollos and Cowan to lack of support for Piaget's contention that peer experience contributes to the decline of egocentrism.

In addition to evaluating egocentrism in speech, the cognitive task afforded the opportunity to assess whether there are differences of interactive style with an adult during a free play situation between the same three groups of subjects. Based on Prescott's (Note 3) finding that a child's direction of attention is different in different types of child care arrangements, the present investigation sought to determine whether type of care would be related to four dependency-type behaviors in a neutral situation. Specifically, the number of times a child looked at, smiled at, talked to or sought help from an adult during a puzzle solving task was measured. It was felt these frequency measures would provide

Further information and direction on the possible effects that environmental variables may have on the child.

Method

Subjects

The subjects consisted of 54 children between the age of 3-4 years old ($\bar{X} = 42.8$ months, S.D. = 3.37), 18 each in day care, nursery school, and at home with mother. It was expected that 3 year-olds outside of day care would generally have limited peer contact in an urban setting and therefore would represent a contrast to the extensive peer experience of the day care group. A nursery school group would provide a middle level of peer contact while maintaining comparable parental contact to the home-reared group, both having non-working mothers.

Day care subjects had been attending five day care centres in the greater Montreal area for at least five months previous to testing. Nursery school subjects were selected from five nursery schools in the same communities as the day cares and similarly had been attending the schools for at least five months previous to testing. Home-reared subjects were drawn from waiting lists of four nursery schools and day cares in the same communities and did not attend any long-term organized peer group. Each group was composed of nine males and nine females. Groups were equated as closely as possible on age, total number of siblings, number of older siblings, and socio-economic status as measured by the Hollingshead educational and occupational scales (Bonjean, Hill & McLemore, 1967). Children were included in the study only if there was more than eighteen months difference in age between the subject and his sibling. This

was done in order to ensure the child did not have a "peer" within his family as this would inflate the measure of peer contact hours. In addition, parents were asked to estimate the number of hours per week their child played with other children. Children in day care were required to be attending for a minimum of 25 hours per week. Nursery school subjects were selected on the basis of 4-8 hours school attendance and a maximum of 20 hours per week total peer contact. Home-reared subjects were screened for maximum 8 hours per week peer contact, with no long-term organized peer group experience.

In view of the cognitive requirements of the tasks, the three groups were equated as closely as possible on receptive language ability (vis-à-vis Peabody Picture Vocabulary Test (PPVT)) and spatial ability (vis-à-vis Preschool Children's Embedded Figures Test (PCEFT)). While it is a moot point whether matching on spatial ability is at all important, i.e., whether the very ability tapped by the embedded figures is not the same "decentration" aspect that is required in the ability to take another's viewpoint, nonetheless it was decided to include a non-Piagetian task to assess whether the groups differed on this measure.

Experimental Measures

Spatial egocentrism. Spatial egocentrism was measured by a task developed by Borke (1975), fashioned after Piaget's three-mountain experiment. This was used rather than Piaget's original task as outlined by Laurendeau and Pinard (1970) as subjects were found on earlier testing to have a great deal of difficulty responding

and to lose interest early in the session. The apparatus consisted of two identical plastic firetrucks, a Grover puppet (Sesame Street character) in a mobile toy dune buggy, and two identical farm-like arrays. The firetrucks had a ladder on the left side and a hose diagrammed on the right side. The arrays were approximately 43 cm. x 43 cm. cardboard on which was affixed a house, a sailboat on a lake, and a cow (see Figure 1).

Four instruction trials were given in which the child was presented with the firetrucks, one on a table directly in front of him and one on a table to his right. Grover circled the former firetruck, stopping at positions 0° , 270° , 90° and 180° in fixed order. The task required the child to turn his firetruck (on his right) so that he could see the same orientation as Grover. When the child made an error in the instruction trials, he was asked to stand behind Grover to "see what Grover sees", then returned to his seat and tried again. If an error was committed on this second try, the experimenter corrected the child's orientation with a brief explanation. Twenty-three of the subjects performed the instruction trials without error, while 22 subjects committed errors but were able to correct them on the second try. Nine subjects made errors on the first try of the instruction trials and did not correct them on the second attempt. However, these subjects were not eliminated from the test trials as 50% correct was sought on the second try for all subjects.

Following the four instruction trials, the farm arrays were placed in the same positions as were the firetrucks. The test

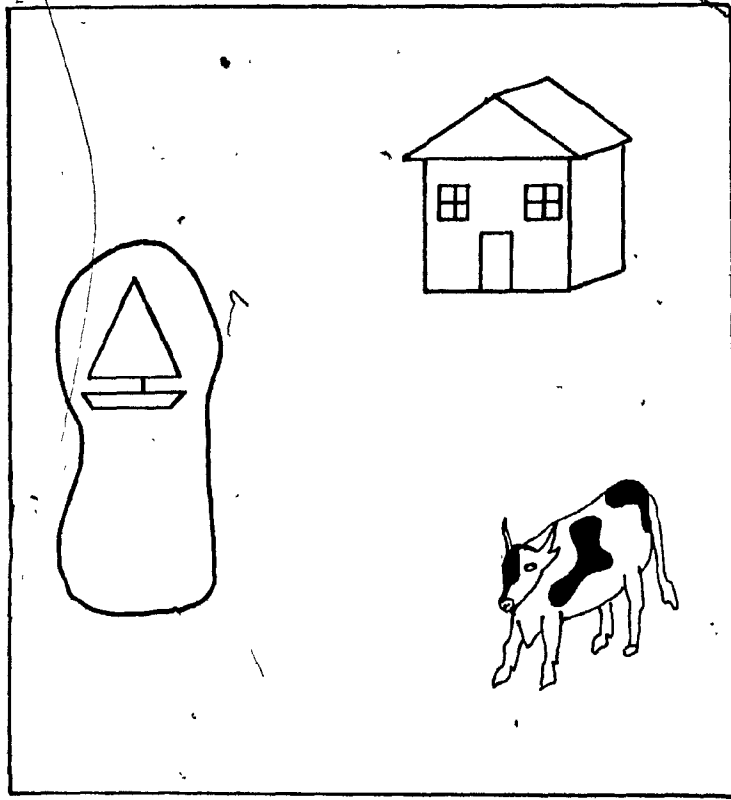


Figure 1. Layout of array for spatial perspective-taking task

trials proceeded similarly as described above, except no feedback was given. The order of presentation was randomly chosen from four sets (Set 1. 0° , 90° , 180° , 270° ; Set 2. 90° , 180° , 270° , 0° ; Set 3. 180° , 90° , 0° , 270° ; Set 4. 270° , 90° , 180° , 0°) and counterbalanced across groups. Egocentrism in this task was operationally defined as the child's selecting his own view and attributing it to Grover. Random errors were also recorded.

Cognitive egocentrism. The method employed in measuring egocentrism in speech involved recording, under the category system developed by Meichenbaum and Goodman (Note 6) (Appendix A), the child's spontaneous verbalizations during a puzzle task. The child was told that the experimenter had some work to do and would he play with the puzzles for a few minutes. The experimenter was seated opposite the child and acknowledged any communication initiated by the child but did not initiate any himself. This task continued for ten minutes. There were two hardboard puzzles provided, the second one being presented only if the first was completed before the required ten minutes.

During the task, the child's speech was recorded both on a cassette tape and verbatim by the experimenter. The experimenter also recorded behavioral information necessary to later categorize the utterances, i.e., eye contact, repetition relevant to social speech, and whether the utterance preceded, accompanied or followed the activity to which it referred.

Determination of the egocentric level of speech for each

child followed the time-sampling method of Schachter, Kirshner, Klips, Friedrichs and Saunders (1974). Under this procedure, the child's speech protocol was divided into ten one-minute intervals. The number of such intervals in which a speech category occurred was then summed and divided by the total number of such intervals, or 10. This procedure was used to look at differences in both the two larger categories (social vs. private speech) and the seven more defined categories of private speech. This "interval" score is an alternative to raw frequency scores (e.g., Piaget, 1926), which tend to give excess weight to the scores of a talkative child, and also to percent conversion (e.g., Kohlberg et al., 1968), which tends to give excess weight to the scores of a quiet child. While Schachter et al. defined their interval as three minutes, this was for the convenience of manual scoring and was deemed too long an interval for the present ten-minute task. As the use of mechanical as well as manual scoring allowed speedier recording, a one-minute interval was used in the present research.

Reliability was determined by a blind rater simultaneously recording the utterances of randomly selected subjects.

Empathic egocentrism. This aspect of egocentrism was measured by the method designed by Burns and Cavey (1957). Materials included a set of pictures depicting children in familiar situations. Male subjects were shown a set of pictures in which the stimulus child was male, female subjects were shown a female set. This paralleled Burns and Cavey's procedure and followed from results

indicating that similarity between the sex of the subject and the sex of the stimulus facilitates empathic vicarious behavior in children (Feshbach & Roe, 1968). Each set contained six pairs of test items and four filler pictures (Appendix B). Burns and Cavey's original two pairs of test items were used as well as four other sets designed by the present experimenter. For example, one pair of test items consisted of a drawing of an empty chair and a doctor standing beside it holding a needle, and an identical drawing except the addition of a boy (girl) sitting in the chair smiling. Upon presentation of the "empty" test picture, the subject was asked how he would feel if he were in the picture, whereas for the corresponding "filled" picture the question asked how the person depicted felt. A response was scored as egocentric when the child failed to perceive the incongruous expression of the face in the second picture, attributing his own feelings in that situation to the child in the drawing. Questions were asked for the filler pictures in order to maintain continuity, but their answers were not utilized in the calculations.

In a departure from Burns and Cavey, for those cases where the child did not give the expected response for an empty picture (e.g., he responds "Happy" rather than the expected "Sad" for the picture of a broken bicycle), the corresponding filled picture was not used in calculating the level of egocentrism. The scores were therefore prorated for the analysis.

The Burns and Cavey task was selected as a measure

of empathic egocentrism because the study of Urberg and Docherty (1976) suggests that it represents a moderate level of difficulty between Borke's and Chandler and Greenspan's tasks. Burns and Cavey's design is similar to Borke's as it involves sequential decentering, but it is more difficult as it includes the aspect of conflicting viewpoints. Furthermore, it is not as complex as the simultaneous decentering required by Chandler and Greenspan's task, which would be too difficult for children of the age used in the present investigation.

Measure of interactive style. During the puzzle task designed to measure cognitive egocentrism, several other measures were taken simultaneously to assess the interactive style of the subjects. These included recording on a checklist the number of times the child LOOKED AT (no speech), SMILED AT (no speech), TALKED TO (no request for help), or ASKED HELP FROM the experimenter. These were designed to investigate any gross differences in interactive style or attention-seeking behavior between the three groups. It should be noted that these measures were not mutually exclusive from the measure of cognitive egocentrism as the latter two categories - TALKED TO and ASKED HELP FROM - were also categorized as social speech-relevant.

The reliability of observations was also assessed by a blind rater assigned to randomly selected subjects.

Procedure

The two tasks measuring spatial and receptive-language abilities and the three tasks measuring egocentrism were administered

individually in two sessions in a mobile laboratory or other unfamiliar setting nearby the day care or nursery school such as a church or community centre. The child's mother did not remain in the laboratory during testing unless the child showed obvious intense distress at her leaving. This occurred in only two cases, one a day care child and the other a home-reared subject.

The child was introduced to the tasks by presenting them as games. In the first lab session, the PPVT, PCEFT and empathy tasks were administered. Each task lasted approximately five to ten minutes. Thus, the total time for the session was between 15 and 30 minutes.

The second testing session was conducted in the same setting and at least one week apart from the first (\bar{X} = 9 days, range = 7-22 days). At this time, the tasks measuring spatial and cognitive egocentrism were administered. Total time for the session was approximately 20 minutes. The cassette recorder used to record the utterances was positioned on the table but concealed so as not to influence the child's conversation. This was used as a crosscheck and source for filling in any missing utterances manually recorded, for example in the case of a very talkative child.

Results

Control and Independent Measures

Six of the matching variables (mother's education, father's education, father's occupation, age of subject, PPVT scores and PCEFT scores) were subject to individual two-way (group x sex) analyses of variance to ensure that the groups were equated on these measures. Group means for these control measures are presented in Table 1. Criteria for educational and occupational levels followed the Hollingshead (in Bonjean, Hill & McLemore, 1969) scales; the educational scale modified slightly (Appendix C) to apply to the local educational system. There were no significant differences between the three groups on mother's and father's educational level, or father's occupational level. Table 2 summarizes the analyses of variance.

Insert Tables 1 and 2 about here

Although there were no significant main effects for age, as summarized in Table 2, there was a significant group by sex interaction, $F(2, 48) = 3.52, p < .05$. A post-hoc Scheffé analysis for simple effects revealed that home-reared males were significantly younger than nursery school males, $F(5, 48) = 112.50, p < .10$. The detailed breakdown of age means by group and sex is presented in Table 3. No other age comparisons were significant. The analyses of the dependent measures were therefore interpreted with this in mind.

Table 1
Means and Standard Deviations of the
Control and Independent Measures

	Day Care	Nursery School	Home-Reared
	\bar{X} (SD)	\bar{X} (SD)	\bar{X} (SD)
Age of Subject	42.67 (2.38)	44.17 (3.49)	41.72 (3.80)
Mother's Education	2.28 (1.36)	3.17 (1.62)	2.83 (1.34)
Father's Education ^m	1.61 (0.85)	2.22 (1.31)	2.17 (1.42)
Father's Occupation	1.63 (1.09)	2.33 ^m (1.61)	2.11 (1.08)
Peabody Vocabulary	113.89 (11.87)	116.83 (9.14)	113.89 (11.35)
Embedded Figures	7.83 (1.79)	8.00 (1.57)	7.28 (2.11)
Peer Hours	41.50 (6.84)	13.72 (3.36)	5.56 (1.69)

Table 2

Analysis of Variance Summary F-Ratios for the
Control and Independent Measures

	Group (G) df = 2,48	Sex (S) df = 1,48	G x S Interaction df = 2,48
Age of Subject	2.82	1.50	3.52*
Mother's Education	1.72	.43	.98
Father's Education	1.32	.00	.32
Father's Occupation	1.29	.25	.08
Peabody Vocabulary	.43	.31	.80
Embedded Figures	.86	1.58	3.94*
Peer Hours	310.49***	1.04	.61

* $p < .05$

** $p < .01$

*** $p < .001$

Insert Table 3 about here

Peabody Picture Vocabulary Test scores and Preschool Children's Embedded Figures Test scores were subject to separate two-way ANOVA's. No significant main effects were found, as summarized in Table 2. However, for the embedded figures scores, a significant interaction effect was found, $F(2, 48) = 3.94, p < .05$. On post-hoc analysis for simple effects, the Scheffé found no significant differences. Table 4 presents the means of the embedded figures scores by group and sex.

Insert Table 4 about here

The total number of siblings and the number of older siblings were subjected to the non-parametric median test, the medians being 1.0 and 0 respectively. No significant differences were found for analyses by group (siblings: $\chi^2 = .33, N.S.$; older siblings: $\chi^2 = 2.91, N.S.$) or by sex (siblings: $\chi^2 = .66, N.S.$; older siblings: $\chi^2 = .08, N.S.$).

Finally, an ANOVA was performed on the number of hours of peer contact (see Table 1 for means). The three groups differed significantly from each other on this measure, with day care children having a significantly greater amount of peer contact hours than nursery school children who in turn had significantly greater hours than home-reared children, $F(2, 48) = 310.49, p < .001$. (see Table 2 for

Table 3

Breakdown of Age Means by Group and Sex

	Day Care	Nursery School	Home-Reared
	\bar{X} (SD)	\bar{X} (SD)	\bar{X} (SD)
Males	43.78 (1.99)	45.67 (2.06)	40.67 (3.28)
Females	41.56 (2.30)	42.67 (4.06)	42.78 (3.28)

-Table 4

Breakdown of Embedded Figures Means by Group and Sex

	Day Care	Nursery School	Home-Reared
	\bar{X} (SD)	\bar{X} (SD)	\bar{X} (SD)
Males	8.78 (1.79)	8.56 (1.33)	6.67 (2.06)
Females	6.89 (1.27)	7.44 (1.67)	7.89 (2.09)

Analysis of Variance summary).

Dependent Measures

As there is no consistent evidence for the unitary construct of egocentrism, analyses of variance were performed on the spatial and empathic scores separately. Furthermore, although the data indicated a ceiling effect, with subjects in all groups exhibiting few errors, the analysis of variance was considered appropriate over a non-parametric statistic as the data for all groups were skewed in the same direction (Bonneau, 1960).

For the spatial task, three scores were obtained - number of correct responses, number of egocentric responses, and number of random errors for the three non-frontal sides. The frontal view was not included so as to eliminate confusion of scoring a frontal response as egocentric or correct. Analyses of variance were performed on the first two, as the third score could be derived from the others, and are summarized in Tables 5 and 6 respectively. There was no difference found for the groups on spatial perspective-taking ability.

Insert Tables 5 and 6 about here

Only 22% of all responses were egocentric. This figure is lower than that reported by Piaget, a similar finding to research in various modalities of egocentrism (Cox, 1975; Garner & Plant, 1972; Garvey & Hogan, 1973). However, of the errors made, 59% were ego-

Table 5

Analysis of Variance Summary Table for Spatial-Correct

Source	<u>df</u>	<u>Mean Square</u>	<u>F-Ratio</u>
Group (G)	2	.24	.15
Sex (S)	1	.46	.28
Group x Sex	2	1.13	.69
Error	48	1.63	

Table 6

Analysis of Variance Summary Table for Spatial Egocentric

Source	<u>df</u>	<u>Mean Square</u>	<u>F-Ratio</u>
Group (G)	2	.57	.74
Sex (S)	1	.30	.38
G x S	2	.02	.02
Error	48	.77	

centric, more than expected by chance, while 41% were random.

As mentioned earlier, although the empathic score was out of a possible six, prorating was necessary as most of the subjects did not give the expected response for one or more of the empty pictures. Seventy-five percent of the subjects made between one and three such errors, with mean error rate being 0.7. As can be seen from Table 7, analysis of variance revealed a significant main sex effect, with males performing more egocentrically than females, $F(1, 48) = 9.72, p < .01$. Means by group and sex are summarized in Table 8. However, an interaction effect for group by sex was also found, $F(2, 48) = 4.55, p < .05$. Subsequent Scheffé analysis for simple effects indicated that home-reared males performed more egocentrically than nursery school males and home-reared females, $F(5, 48) = .35$ and $.61$, respectively, $p < .10$. This finding may be partially due to the significant group by sex age effect discussed earlier.

Insert Tables 7 and 8 about here

A closer examination of the numerous inappropriate responses to the empty pictures revealed that three of the items account for 76% of inappropriate responses. The three items (B1, C1 and D1 in Appendix B) were those that involved the emotion 'SAD'.

For the category system used to evaluate cognitive egocentrism, inter-rater reliability was obtained by having a blind rater present at testing and scoring 13 of the 54 subjects, approx-

Table 7

Analysis of Variance Summary Table for Empathic-Correct.

Source	<u>df</u>	<u>Mean Square</u>	<u>F-Ratio</u>
Group (G)	2	.06	1.75
Sex (S)	1	.32	9.72**
G x S	2	.15	4.55
Error	48	.03	

*p < .05

**
p < .01

Table 8

° Breakdown of Empathic Correct Means by Group and Sex

	Day Care	Nursery School	Home-Reared
	\bar{X} (SD)	\bar{X} (SD)	\bar{X} (SD)
Males	.84 (.26)	.91 (.15)	.63 (.27)
Females	.90 (.17)	.95 (.10)	1.0 (0)

imately an equal number of subjects in each group. Reliability was determined by the number of category agreements by interval and not by each utterance. For example, the experimenter might have recorded in a one-minute interval one PA, two PC, four PE and two S utterances, but the interval score would reduce to one each of PA, PC, PE, and S. Similarly, the blind rater might have recorded in that same minute two PA, one PB, three PE and three S utterances, and this would reduce to one each of PA, PB, PC, PE, and S. The agreement between the two raters for this interval would therefore be four of the five entries. This procedure was followed as it was the reduced record and not the total utterances that were used in the final analysis of cognitive egocentrism. Under this procedure, the inter-rater reliability was 84.7%.

Cognitive egocentrism was analyzed by reducing the main scores (total private interval score and total social interval score) to a ratio, where $\text{PRIVATE RATIO} = \frac{\text{TOTAL PRIVATE INTERVAL}}{\text{TOTAL PRIVATE} + \text{TOTAL SOCIAL INTERVAL SCORES}}$, and similarly for the social scores. Rather than looking at the absolute number of intervals in which the speech occurred, this conversion permitted the analysis of the number of private intervals relative to the number of social intervals and vice versa. This was done as a further measure to control for the absolute talkativeness of the child. No significant differences between groups were found, as summarized in Tables 9 and 10 for private and social speech scores respectively.

Insert Tables 9 and 10 about here

Individual categories of private speech were subjected to a similar conversion as described above. For example, PA ratio = $\frac{PA}{PA + PB + PC + PD + PE + PC}$. A Kruskal-Wallis non-parametric test was performed on each of the six category scores as some frequencies were very low, and is summarized in Table 11. This was done to examine whether differences existed between the groups in the type of private speech emitted. Only one category - comments to absent others (PC) - approached significance, $H = 4.70$, $p < .10$, and this was not felt to be indicative of a trend due to the number of such analyses performed.

Insert Table 11 about here

Inter-rater reliability for the interaction variables was calculated for 13 of the 54 subjects. The reliability was 91.9%, 84.9% and 90.7% respectively for 'LOOKS AT', 'TALKS TO', and 'ASKS HELP'.

A multivariate analysis of variance was performed on the interaction variables and is presented in Table 12. Due to the infrequency of the 'SMILES AT' variable, this category was combined with 'LOOKS AT'. Although the univariate F indicated a group x sex interaction effect for the absolute frequency of 'TALKS TO', $F(2, 48) = 3.44$, $p < .05$, the multivariate F using the Wilks Lambda criterion was not significant. It was therefore not determined by

Table 9

Analysis of Variance Summary Table for
Cognitive Egocentric (Private) Speech

<u>Source</u>	<u>df</u>	<u>Mean Square</u>	<u>F-Ratio</u>
Group (G)	2	.08	1.38
Sex (S)	1	.02	.26
<u>G x S</u>	2	.14	2.50
Error	48	.06	

Table 10

Analysis of Variance Summary Table for Cognitive Social Speech

Source	<u>df</u>	<u>Mean Square</u>	<u>F-Ratio</u>
Group (G)	2	.14	2.58
Sex (S)	1	.16	2.81
G x S	2	.16	2.97
Error	48	.06	

Table 11
 Kruskal-Wallis Analysis of Variance Summary Table
 for Cognitive Speech Categories by Group

	Day Care		Nursery School		Home-Reared		H-corrected for ties
	Median	(range- raw scores	Median	(range- raw scores	Median	(range- raw scores	
Social-Relevant (S-R)	1.0	(0-10)	.7	(0-9)	.9	(0-10)	2.19
Social-Irrelevant (S-I)	0	(0-5)	.1	(0-8)	0	(0-4)	1.12
Word Play (PA)	0	(0-3)	0	(0-4)	0	(0-4)	1.42
Description (PB)	0	(0-3)	0	(0-2)	0	(0-3)	.40
Comments (PC)	0	(0-6)	.1	(0-5)	0	(0-4)	4.79*
Questions (PD)	0	(0-5)	.1	(0-7)	.2	(0-6)	.98
Verbalizations (PE)	.3	(0-8)	.3	(0-8)	.3	(0-7)	2.11
Expletives (PF)	.2	(0-7)	.1	(0-6)	.1	(0-4)	.46

* $p < .10$

post-hoc analysis where the difference was.

Insert Table 12 about here

All the dependent measures were subjected to a Pearson Product Moment Correlation. A total interaction variable was included, obtained from the sum of the three interaction variables. In addition, three independent measures were included - age of S, Peabody score, and Embedded figures score. Results are summarized in Table 13.

Insert Table 13 about here

General spatial ability (PCEFT) and receptive language ability (PPVT) were not found to correlate significantly with any of the dependent measures. Although the Peabody score is based on age norms, the PCEFT scores are absolute and as such are expected to correlate positively with age, as was the case in the present study, $r = .43$, $p < .001$.

Age was significantly correlated with two of the three egocentric measures. For the spatial task, age was positively correlated with the number of correct responses, $r = .36$, $p < .01$, and negatively correlated with the number of egocentric responses, $r = -.28$, $p < .05$. The correlation of age with empathic responses was positive, $r = .33$, $p < .05$. As age was therefore found to correlate with two of the egocentrism tasks, and a significant inter-

Table 12

Multivariate Analysis of Variance Summary Table
for the Interaction Categories

Source	Hypothesis <u>df</u>	<u>Eigenvalue</u>	<u>Wilks Lambda</u>	<u>F-Ratio</u>
Group (G)	6	.09	.91	.73
Sex (S)	3	.07	.94	1.05
G x S	6	.17	.80	1.79

Table 13

Pearson Product Moment Correlation Summary Table

Age of Subject	Pea- body Vocab- ulary	Embed- ded Figures	Spatial Correct	Spa- tial Egocen- tric	Empa- thic Correct	Cogni- tive Private	Cogni- tive Social	Looks At	Total Inter- action
Peabody Vocabulary	-.22								
Embedded Figures	.43**	-.03							
Spatial Correct	.36**	.20	.15						
Spatial Egocentric	-.28*	-.05	-.18	-.63**					
Empathic Correct	.33**	.22	.08	.19	-.10				
Cognitive Private	-.05	.10	.13	.05	.10	.14			
Cognitive Social	-.12	-.15	-.11	-.20	.01	-.15	-.71***		
Looks At	-.11	.18	-.02	-.03	.04	.05	-.09	.23	
Total Interaction	-.14	.02	-.23	-.01	-.04	.07	-.07	.31*	.70***

* $p < .05$

** $p < .01$

*** $p < .001$

action effect had been found for age, the analysis of covariance was considered to partial out any age effect that may be obscuring the results for the two egocentrism tasks. Although it has been suggested that covarying out in these instances may not always be the correct procedure (Lord, 1969; Werts & Linn, 1969), analysis of covariance was performed on the spatial and empathic measures to explore the possibility of an age effect in these results. There were no changes in the significance of any of the results.

One finding that was striking was that none of the three measures of egocentrism correlated with each other. Furthermore, there was no relationship between the subjects' total interactions and his level of spatial or empathic egocentrism. There was a correlation between total interactions and cognitive social ratio, $r = .31$, $p < .05$. The child who therefore exhibited a greater ratio of social speech also had a greater absolute amount of interaction with the experimenter. However, the social ratio and total interaction scores are not mutually exclusive categories, and as no significant relationship was found for social ratio score and 'LOOKS AT' score (the only mutually exclusive interaction category), this finding was not considered meaningful.

Discussion

On none of the three egocentrism tasks were significant differences between the groups found. Although a group x sex interaction was found in empathic role-taking, with home-reared males performing more egocentrically than both nursery school males and home-reared females, this may be at least partially attributed to the significantly lower age of the home-reared males; the positive correlation between age and empathic role-taking supports this conclusion.

The only main effect of group that approached significance ($p < .10$) was in the cognitive task, where the proportion of utterances which were social in nature tended to be greater for the day care than for the nursery school and home-reared subjects. Further testing would be necessary to determine whether day care children do indeed adapt their speech to the presence of a listener more so than do nursery school and home-reared children. Some support for this comes from Mashal (Note 11) who found that 4 year-olds in nursery school for 1½ years were better communicators in a referential task than 4 year-olds in nursery school for only ½ year. An interesting question that follows from such a conclusion is whether this same adaptation exists when the listener is another child versus an adult, and whether it is in the same direction for both listeners, i.e., more social speech for children with greater peer experience. Preliminary support for these hypotheses comes from the present study, where an adult served as listener, and the Mashal study, where

another child served as listener.

On the other hand, if the result discussed above was not replicated, the conclusion would be drawn that day care, nursery school and home-reared children do not differ on egocentric speech as a result of their varied amounts of peer contact. This conclusion may in turn be interpreted in terms of Vygotsky's theory, which claims that children with more peer experience should exhibit at least as much egocentrism (private speech) as children with less peer experience. While the amount of peer contact was vastly different between groups (mean number of peer contact hours 40, 14 and 6 hours per week for day care, nursery school and home-reared subjects respectively) a second possible interpretation of the results may refer to the threshold hypothesis of Hollos and Cowan (1973). Even the small mean of six hours per week for home-reared subjects, perhaps coupled with as yet undetermined contributing factors such as quality of interaction or parental contact, may contribute to the decline of egocentrism sufficiently to erase any significant group differences. For example, absolute frequency of peer interaction was not found to correlate with four role-taking tasks (O'Connor, 1976). Thus, in future research, a more detailed analysis of the quality of peer interaction may be necessary in order to learn to what extent it may be a contributing factor in the development of role-taking ability. Possible factors include active participation versus passive contact, positive versus negative interactions, etc.

The present results confirm other recent findings that

children as young as three years old do not exclusively respond egocentrically. Presented with tasks that are appropriate for their age and that require simple responses within their repertoire, 3 year-olds are often able to take another person's point of view.

With reference to spatial tasks, Liben (Note 12) reported that on a modified three-mountain task, 3 year-olds' responses resembled a random distribution. Borke (1975), however, using a rotation perspective-taking task adapted in the present study, reported that 3 year-olds accurately predicted Grover's perspective for all three positions over 80% of the time, a finding well above chance level. The present research supports Borke's finding that 3 year-olds' performance on the modified perspective-taking task is above chance level, finding that 63% of their responses were correct. However, in the present study only 35% of the subjects responded correctly to all three positions, i.e., 65% of subjects made at least one error. This discrepancy from Borke's results is difficult to explain as the subjects were of similar ages. Of the total errors on the task, Borke, pooling results across her three tasks (Piaget's mountain scene, three-toy scene, eight-toy scene), found 31% egocentric and 69% random compared to 59% and 41% respectively for the present study. In this research, then, a higher proportion of the subjects' responses was egocentric than those of Borke, with the percentage of egocentric errors well above the chance level for error-type. What seems to be happening, then, is that, in the present study, subjects found the task more difficult than Borke's subjects and, when unable to give

the correct response, tended to respond egocentrically rather than randomly. Others have similarly found that when confronted with more difficult tasks, younger children seem to revert to responding more egocentrically (Flavell, Botkin, Fry, Wright & Jarvis, 1968; Huttenlocher & Presson, 1973; Urberg & Docherty, 1976). In other words, younger children may be capable of role-taking at some levels of this ability, but at more complex levels they have been found to display a greater degree of egocentrism.

The empathic task, again, supported the view that children as young as 3 years old are sometimes capable of responding empathically. Eighty per cent of the responses for the target items - those where a child had a facial expression incongruous with the scene - were correct (not including those items where inappropriate responses were given for the corresponding empty picture). This is in contrast to the finding of Burns and Cavey (1957) that younger children respond more egocentrically to this task. They reported only 29% correct responses for children under 5 years old. One explanation for this disparity in results may be due to Burns & Cavey's use of two modes (visual and auditory) to present situation cues but only one mode (visual) to present expressive cues. For example, Burns and Cavey asked "How does the boy/girl at the birthday party feel?", auditorily presenting the situation, while presenting the target picture, illustrating visually the situation and the incongruous facial expression (e.g., 'HAPPY' in the above example). The present investigation controlled for this, presenting both cues visually only, by asking

the child simply "How does the boy/girl in the picture feel?", and thus may have reduced the number of egocentric responses.

It is interesting also to query why subjects gave inappropriate responses to the empty pictures. A look at the responses for the empty pictures shows 20% of the responses were inappropriate, and this was clearly more so for the items requiring the child to respond that he would be sad, yielding 76% of the inappropriate responses, versus that he would be happy, yielding 24% of the inappropriate responses. This is in line with Borke's (1971, 1973) findings that children have the least difficulty reacting to 'HAPPY'. On the one hand, these inappropriate responses may reflect a problem with the test pictures themselves, in that they may have been poorly drawn and hence the subjects were unable to recognize the situation as sad. On the other hand, it may be that these children were responding in an underlying egocentric manner as they were not apparently sad during the testing, and therefore this could be interpreted as an inability on the part of the subject to take his own point of view in a different situation from the present one. The former explanation cannot totally account for the results as most subjects did respond 'SAD' to these same scenes, with 70% of the responses to these empty 'SAD' scenes being correct. These results warrant further investigation - for example, having the child verbally describe the depicted scene at the end of the test session. This would aid the experimenter in interpreting whether an inappropriate response was the result of misunderstanding the picture. In this manner, one could determine

whether there is a level of egocentrism that reflects an inability to take one's own viewpoint when it differs from the present one.

In contrast to the above tasks, the cognitive task revealed nearly 60% of the children's speech was egocentric. In other words, these children did not take into account the presence of another person in their utterances. This is just slightly below the percentages reported by Goodman (Note 13). Goodman's analysis of children's speech revealed some interesting patterns, including:

1. Relevant social speech (SR) was the most likely verbalization to accompany success with orientation and trial-and-error success;
2. Process private speech (PE) was the most frequent verbalization to accompany immediate success, failures on the board, and failures returned to the table; and
3. Verbalizations tended to occur just before or just after a puzzle solving act, rather than accompanying the activity. Although this detailed observation of speech-behavior relationships was not performed in the present investigation, a similar finding to Goodman's was that four speech forms accounted for nearly 75% of the verbalizations. These were social relevant (SR) at 32%, process (PE) at 20%, questions (PD) at 10% and expletive (PF) at 12%. Goodman's four speech forms included the first three above, with descriptions (PB) as her fourth.

This study as a whole found no evidence for the concept of the unitary construct of egocentrism. There were no significant correlations between any of the role-taking tasks. This supports the findings of Kurdek and Rodgon (1975), Shantz (Note 9) and Rubin

(Note 10), and places doubt on the convergent validity of these tasks that purport to measure the same concept of egocentrism. It seems that findings of correlations are idiosyncratic, perhaps related to the age of the subjects and the tasks used, but there does not appear to be an explanation in terms of the concept of egocentrism.

In addition to the relationship between the various role-taking tasks, there have been some recent investigations into the relationship between role-taking ability and social behavior. O'Connor (1976) reported a negative correlation between spatial role-taking and social behaviors (interaction, proximity, and interest) towards an adult, while no such correlation was found for conceptual egocentrism. Measuring dependency and autonomous behavior towards adults, Wilson and Shantz (1977) found the former significantly related to perceptual role-taking skill for 3 to 5 year-olds. The contradictory results reported by these two studies may be attributed to the techniques utilized in the measurement of adult-directed behaviors. Whereas O'Connor had teachers rate dependency in terms of a rating scale, Wilson and Shantz used the actual number of observed interactions. As with peer interaction, there may not be a direct relationship between absolute interactions and teacher's ratings for adult-directed behaviors. No support for the relationship between social behavior towards an adult and role-taking ability was found with the present measures of interaction and egocentrism. Furthermore, the hypothesis that home-reared children would exhibit more dependency type behaviors during the puzzle task than day care children was not supported. This is in contrast to the finding of

Prescott (Note 3) that a child's direction of attention towards an adult differed by the type of child-care arrangement. One reason for this discrepancy may be due to the response demand characteristics of the situation in which the observations took place. Whereas Prescott conducted the observations in the child's care setting, the present investigation employed a neutral situation. The effects of environmental variables, then, may not generalize outside the care setting.

Although no differences were found between groups on role-taking ability, it should be noted that the empathic and spatial tasks resulted in a relatively low percentage of egocentric errors by all groups (20% and 22% respectively). The conclusion that may be drawn is that children as young as 3 years old are sometimes able to take the point of view of another person, especially in simple role-taking tasks. At this level, the varied amounts of peer experience do not appear to contribute to the level of role-taking ability. However, this does not eliminate the possibility of peer contact as a contributor to the decline of egocentrism in higher-level role-taking tasks. As discussed earlier, younger children have been found to display a greater degree of egocentrism at more complex levels of role-taking. It may be that it is these higher levels of role-taking ability to whose decline peer experience contributes. An essential direction of research, then, would be an investigation along the lines of the present study - with groups differing on amount of peer contact-- utilizing several role-taking tasks of various complexity levels. Furthermore, it would seem necessary to define the peer contact in terms of variables of quality of interaction.

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Appendix A

Cognitive Speech Categories and Their Descriptions

1. Social speech - utterances addressed to the E, distinguished by eye contact, reference to the E or repetition of a statement when the E does not respond.
 - a. relevant (SR) - comments or question referring to the task itself.
 - b. irrelevant (SI) - comments or questions not referring to the task itself.
2. Private speech - utterances not addressed to the E.
 - a. word play (PA) or singing, humming, repetition for its own sake.
 - b. description of activity (PB) - labelling and describing ongoing and/or immediately past activity. The description must occur simultaneously or following the action.
 - c. comments addressed to absent or nonhuman others (PC) - no eye contact or demand for response is present.
 - d. questions asked and answered by self (PD).
 - e. verbalizations of ongoing cognitive activity (PE) - speech precedes the activity and sounds like "thinking aloud".
 - f. expletive (PF) - expression of feeling about the task, expressing satisfaction, dissatisfaction, etc.

Appendix B

Themes of Drawings for Measuring Empathic Egocentrism

Filler Pictures

Boys' set:

1. Boy catching a fish.
2. A drawing board and paints.
3. Boy building a snowman.
4. Desk and chair in classroom.

Girls' set:

1. Girl pushing a doll carriage.
2. A drawing board and paints.
3. Girl skipping rope.
4. Desk and chair in classroom.

Test Pictures

- A1. Birthday party scene with cake and presents.
- A2. The birthday scene depicted in A1 with the addition of a boy (girl) with a frown on his face.
- B1. A doctor with a long needle in his hand standing behind an empty chair in his office.
- B2. The scene depicted in B1 with the addition of a boy (girl) with a smile on his face sitting in the chair.
- C1. A tricycle with a wheel broken off.
- C2. The scene depicted in C1 with the addition of a boy (girl) fallen beside the tricycle with a cut on his leg and a smile on his face.
- D1. A kitchen scene with a broken glass of spilled milk on the floor and a mother scolding an empty chair.
- D2. The scene depicted in D1 with the addition of a boy (girl) sitting in the chair with a smile on his face.
- E1. A beach scene with an empty towel beside a sand castle, pail and shovel.
- E2. The scene depicted in E1 with the addition of a boy (girl) sitting on the towel crying.
- F1. A merry-go-round.
- F2. The scene depicted in F1 with the addition of a boy (girl) sitting on one of the horses and crying.