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PRIVATE SPEECH: FOUR STUDIES AND A REVIEW OF THEORIES

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Similarities and differences in the views of private or egocentric speech held by Piaget, Vygotsky, G. H. Mead, and Flavell are examined. These views are related to previous findings and to four new studies of the effects of age, IQ, and task difficulty upon private speech in various natural and experimental settings. These studies support the "cognitive development" interpretation common to all the theorists in that mental age and task difficulty were found to be primary and regular determinants of private speech in contrast to such factors as sex, nationality, or chronological as opposed to mental age. The findings also support Vygotsky's belief that private speech has a curvilinear course of development (due to its functioning as a transition from outer speech to thought) as opposed to Piaget's view that it declines monotonically with cognitive and social maturity. 7 types of private speech are defined and evidence is presented suggesting that they form a developmental hierarchy consistent with Mead's view of the transformations of external communication to inner thought.

One of the most interesting, as well as one of the most controversial, of the phenomena examined by Piaget is that of egocentric or private speech. The present paper reports the findings of four studies on private speech as it relates to age, IQ, and task difficulty in various natural and experimental settings. The first two of these studies were designed to test contrasting implications of the views of Piaget and Vygotsky on such speech. Observations made in the first two studies led to the development of a less global point of view, in which egocentric speech was no longer thought of as a unitary phenomenon and in which the Piaget or the Vygotsky views were not conceived as directly alternative explanations of

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the phenomena. Accordingly, we have introduced our studies with a theoretical review of the rather complex issues involved in the Piaget-Vygotsky controversy from our own perspective, one heavily influenced by Mead (1934).

REVIEW OF THEORY AND RESEARCH ON PRIVATE SPEECH

The phenomenon under investigation, private speech, may be defined (following Piaget, 1926) as speech which is not addressed or adapted to a listener (other than the child) and which is carried on with apparent satisfaction in the absence of any signs of understanding by a listener. Piaget termed such speech "egocentric," but it seems advisable, following Flavell (1966), to restrict the term "egocentric" to Piaget's theoretical interpretation of private speech rather than to the phenomenon itself. As used by Flavell, "private speech" refers to speech when alone, as well as to the noncommunicative speech in social settings studied by Piaget and by Vygotsky (1962).

With regard to the phenomenon itself, Piaget (1926) found what he termed "egocentric" speech to be prevalent in the spontaneous conversations of children ages 5–6 (i.e., to constitute 40–70 per cent of such speech) and to decline sharply with age. While the present study represents the first systematic effort to examine or replicate the age trends reported by Piaget, naturalistic studies of children in free peer settings (Katz & Katz, 1928; Smith, 1935; Vygotsky, 1962) or alone (Klein, 1963; Weir, 1962) support Piaget's observations of considerable incidence of private speech in children of 3–7. No systematic studies of age trends in decline of private speech have been carried out. However, observations of adult conversations such as those of John and Soskind (1963) suggest that it is a rare or useless category of adult speech in social settings.

Piaget termed private speech "egocentric" because he conceived it to result from the young child's general inability to differentiate his own perspective upon events from that of others, one of the most basic cognitive inadequacies of the young child. Piaget (1926) documented the implication of this cognitive inadequacy for the child's social communication in a set of semiexperimental studies. In these studies he asked the child to communicate information to another child ignorant of the information. He reported numerous responses indicating that the child spoke as if his auditor already possessed the information which it was his task to convey to him. These observations of Piaget were systematically confirmed and extended by Flavell (1966) and Flavell, Botkin, Fry, Wright, and Jarvis (1968) in a set of studies indicating that young children when speaking confuse their own perspective with that of the auditor in communication situations and that this confusion declines regularly with age in the period from 6 to 9 years.

While Piaget's notions about the young child's confusion of perspective were clear and well documented, his application of them to private speech was much more ambiguous. Piaget (1926) stressed that, while the young child's private speech reflects a lack of cognitive skill in communicating, it more fundamentally reflects a lack of social will to communicate and to integrate social differences. While the young child desires to communicate to express desires or to move another person to perform a desired action, he does not desire to communicate in order to transmit or share information and attitudes with an auditor who does not have the information or attitudes.

One of Piaget's private-speech categories which includes both will and skill components is "collective monologue," in which "an outsider is always associated with the action or thought of the moment but is expected neither to hear nor to understand. The point of view of the hearer is never taken into account. His presence serves only as a stimulus. The child talks about himself without collaborating with his audience or without evoking a dialogue" (Piaget, 1926, p. 17). Piaget's characterization imputes a lack of will to share ("is expected neither to hear or to understand, talks about himself without collaborating with his audience") but also suggests some will to share attitudes or information without the skill of distinguishing attitudes which can be shared with those that can't or information that requires communication before it is shared from information that is already shared.

Both elements of collective monologue may be illustrated by the following exchange between David, a 3½-year-old boy, and Brian, another boy his age:[1]

Episode 1: Collective Monologue

BRIAN: I'm playing with this.
DAVID: A what's, a what's.
BRIAN: Oh nuts, oh nuts.
DAVID: Doodoodoo, round, round up in the sky. Do you like to ride a [toy] helicopter?
BRIAN: O.K. I want to play in the sandbox.
DAVID: Much fun. Do you want to ride the helicopter?
BRIAN: I'm going outside.

David seems to have a will to share activities or ideas but fails to differentiate perspectives in the sense of discriminating imagined sharing from real sharing. He persists in asking Brian to share ("Do you want to

[1] Four episodes representing various types of private speech are inserted in the text where relevant to particular theoretical issues. All were based on observations of the same child and were made in the course of a few days. This suggests that the varieties of private speech we define are universal to all children rather than that particular varieties of private speech are derived from particular types of child personality.

ride the helicopter?"), but the activity is private and imagined, since the toy helicopter cannot be ridden. In contrast, Piaget's characterization of a noncommunicative intent seems appropriate to Brian's responses, which describe what he is doing without actually inviting David to share the activity or to respond to it.

In contrast to collective monologue, other categories of private speech described by Piaget have little obvious connection to confusions of perspective. One such category is "repetition and echolalia," in which words and sound are repeated and varied for their own sake.

Episode 2: Repetition and Echolalia

(*Solitary play. Observer at desk at other side of the room.*) A fally, a fally, a poopy all over the house. A tomato poopy all over the house.

While there is some scatological symbolic-expressive value to such comments, it is unlikely that they reflect any desire to communicate with the auditor and hence cannot be said to be an egocentric confusion of perspective (though they seem to indicate a lack of awareness of the auditor's presence).

As our discussion has indicated, Piaget did not clearly distinguish the contributions of defects of social will and of cognitive skill to the production of private speech. His general view (Piaget, 1926, 1947) is sometimes stated as one in which cognitive and social dimensions are opposite sides of the same developmental coin and sometimes as one in which there is a "circular and perpetual interaction" between cognitive and social forces in development. The cognitive ability to be aware of differences is a necessary condition for a desire to communicate and integrate these differences. Such a desire to integrate differences leads in turn to a further differentiation of the self's perspectives from the perspective of the other. This differentiation is expressed in the further development of cognitive abilities. The social contribution to the decline of egocentricity is expressed in Piaget's postulation that extensive social interaction is necessary for social speech to displace private speech. Furthermore, Piaget claimed that peer interaction is more necessary than interaction with adults in this decline, because the child views the adults as omniscient and perceives the adult's goals and his own as identical. While adults are either serving the child's goals or constraining him to adopt theirs, peer interaction involves cooperation between goals, that is, a coordination of distinct and equally powerful goals. In line with this hypothesis, Piaget (1956, chap. ii) reported more egocentric speech in situations with adults than in situations with peers.

Piaget's characterization of private speech as reflecting "egocentricity" or a "presocial" absence of communicative desire raises a number of perplexing questions. We have stressed the issues of will and skill because they are critical to any conception of the functions of such speech. In one sense, Piaget seemed to assume that egocentric speech has a positive

social-communicative function or intent which the child is unable to realize effectively. As the child's communicative skill develops, egocentric speech drops out in favor of adequate social speech. This represents a change in cognitive form or adequacy of speech without a basic change in function. In another sense, Piaget seemed to offer a negative characterization of the functions of egocentric speech, as speech without communicative or cognitive function (or intent). Both formulations, but particularly the latter, have led to extensive criticism of Piaget and to a search for the positive functions of private speech.

The most comprehensive and profound criticism of Piaget's position, together with the clearest assertion of the positive function of "egocentric" speech, is that stated by Vygotsky (1962). Vygotsky accepted Piaget's observations of the existence of much private speech in children of 5–6 years and its subsequent decline with age. He also accepted Piaget's characterization of the cognitive perspective of the young child as undifferentiated in both task and communication situations. Vygotsky did not, however, view private speech as indicating a "presocial" lack of intent to communicate or an egocentric lack of awareness of the auditor's perspective. According to Vygotsky, the failure of egocentric speech to communicate does not indicate the child's lack of either intent or ability to communicate socially. Vygotsky claimed that the failure is due to the fact that "egocentric" speech has a different function from social communication, namely, that of cognitive self-guidance.

An example of the self-guiding function of "egocentric" speech can be seen in the following:

Episode 3: Self-guidance Combined with Monologue Description of Own Activity

DAVID (*engaged in solitary play with tinkertoy, observer at desk at other side of room*): The wheels go here, the wheels go here. Oh, we need to start it all over again. We need to close it up. See, it closes up. We're starting it all over again. Do you know why we wanted to do that? Because I needed it to go a different way. Isn't it going to be pretty clever, don't you think? But we have to cover up the motor just like a real car.

According to Vygotsky, the young child vocalizes such self-guidance because he cannot think (or linguistically direct his actions) in purely covert fashion, as can the older child or adult. According to Vygotsky, the age decline in self-directing egocentric speech indicates that it has "gone underground" as verbal thought, not that presocial speech has been replaced by more socially communicative speech.

Vygotsky's assertion of self-guiding functions of egocentric speech need not contradict Piaget's view that it indicates the incapacity of the young child for a genuinely communicative intent. The fact that some speech of children is self-guiding does not seem to specify anything about communicative capacities involved either in it or in other forms of speech. Vygotsky, however, did assume that self-guiding speech does reflect com-

municative intent of a special "parasocial" form. According to Vygotsky, egocentric speech not only has a cognitive-functional value but also reflects a capacity for communication in the sense that self-communication presupposes some (private) communicative ability or intent just as social communication reflects some social communicative ability or intent. The self is a more "intimate" and "understanding" auditor than another so that the dialogue can be abbreviated and short-circuited. In this regard, however, self-communication is not very different from social communication with people with whom one is intimate and sharing. Soliloquy or monologue may seem unintelligible to the outside observer because of its condensation and its lack of explicit statement of the speaker's referent, but in this it may differ little from the successful communication of intimates (like conversations between Tolstoy's Kitty and Levin). According to Vygotsky, then, there is a communicative intent behind the child's private speech, but this intent is not yet fully differentiated with regard to the distinction between communicating to the self as auditor and to the other as auditor. Piaget claimed that the speaking child was "egocentric" because he did not differentiate himself as speaker from his auditor in the room. Vygotsky claimed that the speaking child differentiates himself as speaker from an auditor but is "parasocial" in not differentiating himself as auditor from the external auditor, that is, in not differentiating self-guiding speech from social speech.

The difficult distinction between the "egocentric" and the "parasocial" stressed by Vygotsky may perhaps be clarified with reference to the cognitive self-guidance of Episode 3. Vygotsky insisted that Piaget's dismissal of such speech as noncommunicative monologue missed its realistic self-communicative intent. At the same time, however, it is apparent that the speech of Episode 3 is cast in the form of social communication. This parasocial confusion of self-guidance and communication makes the self-guiding function of egocentric speech both uneconomical and inefficient. Later in development, self-guidance is more condensed and has fewer of the characteristics of social communication which are irrelevant for self-guidance. According to Vygotsky, development leads to differentiation of self-communication from social speech, manifested objectively in the increasingly abbreviated form and decreased overtness of private speech and subjectively in the child's increasing awareness of the occasions appropriate for social speech as opposed to private speech. At points at which this differentiation is incomplete the child vocalizes private (self-communicative) speech most in situations in which social communication is also most possible. The parasocial child is sufficiently aware of the other to refrain from self-guiding speech where social communication is impossible. But his awareness of the other as an auditor distinct from himself is sufficiently confused to lead him to produce self-guiding speech in a social context.

This train of thought led Vygotsky to formulate an empirical hypothesis

regarding the social conditions that elicit egocentric speech which is almost the reverse of Piaget's. While Piaget held that children would manifest less egocentric speech with peers than with adults, Vygotsky held that children would display most egocentric speech when the auditor was most like the self or when the auditor was most able to understand the self. To support this hypothesis, Vygotsky reported the results of studies in which he found a decline in egocentric speech in experimental situations which declined in potential for full sociality, that is, in situations in which a child could not be understood by other children because the other children spoke a different language, were strangers or deaf mutes, or because of disturbing noise such as a loud band.

It should be noted that Vygotsky's hypotheses as to the conditions of occurrence of self-guiding speech were meant only to apply to the transitional developmental state he termed "parasocial." Common observation and interview studies of adults suggest that adults are most likely to talk to themselves when alone and unobserved, rather than when their vocalizations are likely to be overheard and understood. This fact seems to contradict Vygotsky's finding that self-guiding speech declines when the child's speech is drowned out by a band or when others present are deaf. The Vygotsky view implicitly suggests that, once the child has differentiated private speech from social speech, the situations eliciting private speech may be quite distinct from those Vygotsky hypothesized as eliciting private speech at the parasocial stage.

The more basic aspect of Vygotsky's view, his assertion of the functional equivalence of children's private speech and aspects of adult thought, is based on two types of evidence. First, he reported finding a positive relation between amount of egocentric speech and task difficulty (Vygotsky & Luria, 1930). Second, he reported a rise in percentage of egocentric speech in the 2–4-year-age period and suggested that it represents increasing cognitive development in this period.

In more recent years, Vygotsky's position has been further elaborated and documented in the Russian work of Luria (1961) and his colleagues and in the American work of Flavell (1966), Jensen (1963), Klein (1963), and others. This elaboration has come primarily in the course of experimental analyses of the role of private speech and "verbal mediation" in children's task performance.

Studies by Flavell and his students (Flavell, Beach, & Chinsky, 1966; Keeney, Cannizzo, & Flavell, 1967; Klein, 1963) support the postulated age increase in cognitive self-guiding private speech, the postulated increase in its internalization with age, and the postulated functional role of private speech in task performance.

In a naturalistic developmental study, Klein (1963) looked and listened for any detectable speech which 3–7-year-old children produced when left alone in an observation room with puzzle and drawing tasks. Children

were divided into those who talked and those who did not talk. There were no significant differences in the frequency of children engaging in private speech at each age. There were age increases in inaudible muttering and lip movements (the correlation of muttering with age was .26) and age decreases in audible-comprehensible speech ($r = -.44$). The audible-comprehensible speech that persisted with age became increasingly task relevant. Klein divided all comprehensible private speech into "task relevant" or "task irrelevant" units. While all audible-comprehensible speech declined with age ($r = -.44$), task-relevant comprehensible speech increased with age ($r = .38$). In other words, private speech became both increasingly covert and increasingly self-guiding, suggesting its growing differentiation from social speech. Private speech of all forms did not decline with age in this period, however, which indicated that it did not disappear with the child's declining egocentricity.

In addition, the Klein study suggests the effective functional role of private speech in cognitive performance. Children who successfully completed a puzzle produced over twice as many task-relevant speech units as children who failed to complete the puzzle, although the two groups did not differ in amount of task-irrelevant private speech. Some qualification of this conclusion, however, is required. More task-relevant speech may have been caused by a more task-oriented attitude which aided solution rather than directly aiding task solution.

The findings of the Klein study have received further amplification from a series of experimental studies by Flavell and his colleagues. Flavell et al. (1966) found a regular increase in the task-relevant use of private speech in a sequential memory task from kindergarten through fifth grade. They also found some evidence of an increase in the internalization of such speech. No kindergarten children reported "inner speech" who failed to provide observable evidence of private speech, whereas about 25 per cent of the older children did so. (It should be noted, however, that the majority of children even in fifth grade produced some external sign of private speech.) Similar age increases in spontaneous use of private speech in a memory task were found by Gratch (1966) and Jensen (1963), and a similar increase in covertness of private speech was also found by Gratch.

In addition to confirming these developmental trends, the studies mentioned also indicate that such private speech actually serves task functions, that is, that it facilitates performance in the situations studied. Flavell et al. (1966) found that spontaneous rehearsers performed better than nonrehearsers on their rote-memory tasks. Keeney et al. (1967) found that brief training induced most nonrehearsers to rehearse, and in consequence their recall scores became almost indistinguishable from those of the spontaneous rehearsers.

The experimental studies indicated that use of private speech is a teachable and effective strategy of rote learning. They also indicated, how-

ever, that direct teaching of the strategy does not lead to its continued use. When the children taught to rehearse were retested, they failed to maintain the strategy, whereas the spontaneous rehearsers did. The age increases in spontaneous use of task-relevant private speech, then, do not seem to be the result of experience of direct instruction to solve problems in this fashion.

Finally, the set of studies cited suggests that the age increase in use of self-stimulating behavior in task situations is not linguistic. Corsini, Pick, and Flavell (1968) found that first-grade children were more likely to make visual models to aid them in a sequential recall task than were kindergarten children, both with and without suggestions by the *E* that they could make such models.

The American studies cited indicate an age increase in the use of task-relevant private speech and in its decreased overtness. A series of Russian studies inspired by Luria (1961) indicate qualitative developmental changes in the types of task-relevant private speech used by the child. According to Luria, there are two interlocking dimensions in the development of the self-directive functions of speech. The first dimension is a growing internalization which proceeds from responding to other's speech to overt self-directives to covert self-direction (or inner speech). This development was documented by the American studies cited. The second dimension is the increased capacity to use speech (*a*) to guide or discriminate alternative actions (rather than to directly trigger response) and (*b*) to plan or precede action (rather than to accompany it). With regard to guiding functions, Luria's (1961) studies indicate that for younger children (aged 2–4) verbal directives (whether administered by adult or by the child) trigger action regardless of their semantic reference (e.g., if "blue" means "press the button" and "red" means "don't press," red will trigger pressing as much as blue). With regard to planning functions, studies by Traugott (1959) and Gan Kova (1960) indicate that children aged 6–7 can use verbal planning and task solution before overt action in the task, whereas children aged 3–4 can only verbalize in accompaniment with or following overt task solution.

The findings reviewed indicate the truth of Vygotsky's contention that (some) private speech in task settings serves self-guiding functions and that such speech has a curvilinear course of age increase and then of interiorization. The findings reviewed also indicate the truth of Piaget's basic contention that the young child's cognitive and communicative orientation is one in which his own perspective and that of others are often egocentrically confused. In themselves, these two well-established contentions are not in direct opposition, as Piaget (1962) suggested.

Before considering the sense in which there are empirically meaningful conceptual differences between the two theorists, it will be well to consider the implications of an eclectic position suggested by Piaget (1962) and

elaborated by Flavell (1966). Flavell (1966; Flavell et al., 1968) simultaneously engaged in two programs of research, one experimentally documenting the growing differentiation of perspective of the young child's social conversation, the other experimentally documenting the growth and internalization of self-guiding speech in task situations. Flavell's documentation of Piaget's basic thesis (that social speech progressively becomes more differentiated with age) did not lead him to deny that some nonsocial speech has a cognitive self-guiding function. Flavell's documentation of Vygotsky's basic thesis (that some nonsocial speech reflects the partial interiorization of thought) did not lead him to deny that some private speech is social speech that fails because of egocentric defects of communicative will or skill.

In Flavell's eclectic view, neither theory is really compelled to explain all the functions and developmental characteristics of all the observable types of private speech.

Piaget's notions of early egocentricity of perspective and its decline did not depend on the adequacy of his detailed interpretation of "egocentric" speech, nor did Vygotsky's notions about the internalization of speech depend on the adequacy of his detailed account of the self-guiding functions and "parasocial" orientation of such speech. It is sufficient for Piaget's general theory to point out that some forms of private speech decline with age (like the repetition of Episode 2 and the collective monologue of Episode 1) while true social speech is increasing; and it is sufficient for Vygotsky's theory of internalization to point out that some parasocial speech has obvious self-guiding functions (Episode 3). It is roughly compatible with both views to suggest that much private speech fits neither formulation and is to be explained in terms of functions and factors having nothing to do with a theory of cognitive development.

Klein (1963) and Flavell (1966) advanced a number of reasons for adopting the eclectic position just outlined. Flavell pointed out that the observations of private speech cited do not clearly suggest a highly age-specific incidence of private speech, as would be expected if all private speech were determined by the definite stages suggested by Piaget and Vygotsky. More basically, observations of speech in solitude indicate much private speech which is neither "egocentric" in the Piaget sense nor self-guiding in the Vygotsky sense. The Klein study of children 3–7 years old and the Weir, (1962) study of children still younger indicate that "while much of the speech could be described as mediative or regulative, much was of a different sort. The child would sing, chat, endlessly repeat real and nonsense words, engage in verbalized fantasy and express a variety of affective states such as uneasiness about being alone, frustration and triumph at task failure and success and even imminent needs to go to the bathroom" (Flavell, 1966, p. 13). These observations suggested to Klein that private speech fits into two functional categories, cognitive self-

guidance and affect expression. While affect expression does not fit the Vygotsky formulation, a Piaget characterization of it as "egocentric" is simply a denial of function rather than a functional categorization. Particularly in situations where no auditor is present, there can be little clear meaning to explaining noncognitive forms of private speech as representing an egocentric or parasocial confusion of self and auditor. Klein even went on to suggest that his findings of age trends toward an increasingly cognitive self-guiding character of private speech and its increasing internalization need not imply Vygotsky's hypothesis that private speech is a necessary way station toward inner thought. It may be that linguistic thought is directly internalized as verbal concepts are learned through adult verbal instruction, without overt self-communication being necessary for such internalization. Instead of having such a cognitive-developmental function, cognitive forms of private speech may be "expressive" of thought which could be carried on silently but which is more effective in certain contexts when overtly expressed.

The thrust of Klein's argument can be clarified if we consider the private speech of older children and adults. Informal questionnaire studies by J. H. Flavell, J. B. Higgins, and W. Klein (unpublished manuscript, "Interview Study on the Speech of Self of a Sample of Faculty Children," 1963) and by others indicate that a large proportion of adults admit to sometimes speaking to themselves in solitude. Such private speech clearly does not serve a developmental function as a way station toward inner thought. Some of this speech is expressive of affective dispositions. In the planning and execution of a project with wood, the solitary adult's self-stimulation will be silent thought, but when his hammer bangs his thumb, his inner speech will be quite audible. Even more cognitive forms of thought, however, are more likely to be vocalized if such vocalization serves certain functions. While abstract inferential functions are most efficiently or economically carried out in the form of pure inner speech or thought, the "rote" or noncognitive memorizing tasks used in the experimental studies of private speech are often more efficiently handled when some overt detectable self-stimulation is employed (e.g., repeating verbal or numerical lists overtly). It is perhaps for this reason that Flavell et al. (1966) still found extended signs of private speech among 10-year-olds.

The implication of Klein's and Flavell's analysis is that there is no special theoretic problem of private speech and no distinctive or unitary developmental significance to such speech. Since children reproduce in solitude most of the types of speech they use in society, private speech is a negatively defined wastebasket category including any utterance occurring in the absence of a responsive listener. This suggested to Flavell (1966) that private speech has as many functional meanings and causal antecedents as social speech and that many of the causes and functions found for social speech (social-reinforcement parameters or traits of de-

pendency or emotionality) will be found to influence private speech. Insofar as the determinants of private speech are distinct from those of social speech, they are those determinants which make the overt expression of self-stimulating trains of "inner speech" more satisfying or efficient than carrying them on at a covert or silent level.

In contrast to the eclectic position outlined, the basic assumption of the present set of studies is that agreed upon by both Piaget and Vygotsky, that is, the view that private speech has a distinctive developmental significance. This implies (*a*) that "egocentric speech" is a phenomenon distinctive to a particular age-development period, (*b*) that it has a limited and distinctive set of functional and situational determinants, (*c*) that it has a limited and distinctive set of forms or functional varieties instead of being a wastebasket category, and (*d*) that it reflects a special social orientation of the child (whether labeled "egocentric" or "parasocial") which involves a failure of differentiation of the self and the external auditor.

Before we present our rationale for these assumptions (based on Mead's views) it should be pointed out that they are reasonable to apply to the private speech in social settings studied by Piaget and by Vygotsky but that they are not reasonable to apply to the speech in solitude studied by Klein. While solitary speech may mirror all the forms of social speech, the forms of private speech in public will include only forms whose intention appears to be primarily self-stimulation rather than the stimulation of others. The solitary individual may engage in need-expressive speech which would be considered directed social speech if he could have an audience. As a result, the varieties of speech in solitude may be expected to be more numerous and diverse than those of private speech in social settings.

For the reason just mentioned, then, speech in solitude also can not be expected to be characteristic only of young children, as Piaget and Vygotsky asserted. Interviews and common observation indicate that adults quite commonly engage in speech in solitude but not in private speech in public settings (a common indicator of schizophrenia in adults). At the other end of the scale, Weir (1962, 1966) found speech in solitude at an age younger than that fitting either the Piaget or Vygotsky notions.

Adult or infant speech in solitude is relatively unintelligible in terms of either Piaget's or Vygotsky's explanations of egocentric speech in social settings. Talk when alone cannot be explained by the hypothesis of an undifferentiated feeling of sharing with a physically present auditor, whether this lack of differentiation is termed "egocentric" or "parasocial." The fact that adults vocalize inner speech most when alone squares neither with Piaget's notion of presocial communication nor with Vygotsky's notion of maximal private speech in situations of easy communication. Furthermore, the adult or older child alone is probably least likely to

outwardly vocalize a train of thought if it has the abstract cognitive functions stressed by Vygotsky. With regard to infant speech in solitude, considerable evidence has accumulated for Mowrer's (1950) "affect conditioning" or "anaclitic identification" notions that infants (like birds) talk to themselves when there is no one better to talk to them (or to talk to), as well as for practice toward language mastery. In summary, then, speech in solitude cannot be expected to have a developmental course or to have situational antecedents or functions similar to those of private speech in public.

As we stated earlier, the basic assumption tested in the present studies was that private speech in social settings has a distinctive course of development (in terms of chronological and mental age) and has a unitary functional significance. While compatible with both Piaget's and Vygotsky's views, our own rationale for this assumption comes from Mead's (1934) theory of the development of language and thought. This theory also starts with some of the major assumptions of the Vygotsky-Luria theory (as does that of Watson, 1930), that is, that thought and self-control are the internalization of the language and controlling gestures of the child's speech community and that private speech (representative of Mead's "play stage") is a way station between outer speech and internal thought and self-control. However, Mead made a number of additional theoretical assumptions not made by the Russians. In particular, Mead made the assumption that speech and thought always have implicit, if not explicit, dialogue forms and functions. This assumption clarifies some of the major puzzles as to the forms and functions of private speech. The main problem for the Vygotsky-Luria theory is to account for forms of private speech which do not have cognitive self-guiding functions, such as the "collective monologue" illustrated in Episode 1. Luria placed these forms at a lower developmental level than self-guiding speech, but it is not clear why Vygotsky or Luria believed that self-stimulating speech without self-directive functions should occur at all. The Russians saw the child as progressively internalizing external adult speech labels and directives. Early forms of private speech, in this view, should be forms in which the child mimics the external commands and comments of the adult upon his activity. With development, these replications of the adult's responses should become more internalized, that is, silent, more guiding of action, and less dependent upon the physical presence of another person. As Episode 1 suggests, however, early forms of private speech like collective monologue do not appear to be imitations of external guidance by adults, nor do they seem to serve any clear cognitive self-guiding function.

Mead's point of view does suggest that such monologues have clear self-stimulating or self-orienting functions, because it assumes that self-stimulation is not one way. Collective monologue is a running stream of

commentary upon the self's activity to an auditor who is neither clearly the self nor clearly the other. Such commentary was "egocentric" or noncommunicative to Piaget because it conveys no information about the self to the listener not apparent to the listener from watching the child. From Mead's view, however, it is communicating information to the self, is communicating the meaning or nature of the child's activity to the other, and hence is establishing the meaning for the self. From Piaget's view, the child already has an awareness of the meaning of his action to himself prior to communicating this awareness to others. The child's speech is egocentric if the child ignores either the fact that the auditor already has the awareness of the child's action (i.e., he can see what the child is doing) or the fact that the auditor is not listening to the child's communication of this awareness. From Mead's view, however, the young child does not have an awareness of his own action prior to communicating about it to others. Such prior awareness only develops later when the child can first communicate to himself (causing self-awareness) prior to communicating to others. For the young child, the awareness of the meaning of his action to himself arises in the process of communicating it to the other. When the young child's communication to others is primarily focused upon eliciting the child's own awareness of the meaning of his action (rather than upon eliciting a response from the other), it appears egocentric.

The interpretation just advanced follows from Mead's general treatment of the development of linguistic meanings. The mere imitation of a language gesture by another does not establish the meaning of the gesture. This meaning is established when the child's use of the gesture calls out implicitly in himself the response he overtly calls out in the other by the gesture. When the child's language gesture to "get the ball" calls out implicitly in himself the attitude of getting the ball he desires to overtly call out in the other, the gesture has communicative meaning. When language is used for self-stimulation purposes (rather than for eliciting action in others), the child makes speech acts to elicit in himself the implicit responses which he attempts explicitly to call out in the other when engaged in social speech. The child can only see himself (or establish the meaning of his activity) from the perspective of another, and he can at first only take this perspective on himself by describing his activity to the other and so calling out in himself the implicit response of another to his description. Even when the social dialogue has been internalized as thought or inner speech, Mead claimed, the speaking self and the self talked to are both social roles in a complementary relation, and the continuation of a train of thought depends upon replying to the self in the role of the other.

This rather abstruse notion of Mead's may be illustrated by the following example of David's speech in solitude:

Episode 4: Dialogue with an Absent Other

(*Alone in bed, after having been put to bed.*) Do you know what this model plane is, Brian? It's a Cessna. Now you can have it but you can't take it home or break it or I'll get mad. Now can I go to your house and play? O.K.

It is apparent that this dialogue is not egocentric in the Piaget sense, since it involves a clash of viewpoints between the child and his imaginary auditor. It is also apparent that it is not cognitive self-guidance in the Vygotsky sense. While it may have a self-guiding function (as a rehearsal for action), it is directed toward an absent other, not toward the self. While vocalization is primarily in the self's role, there is an occasional overt response in the role of the other, a role covertly guiding the self's vocalization.

These samples of vocalized self-dialogue represent what Mead (1934, pp. 150–151) termed the "play stage" of social development. "The child plays that he is offering himself something, and he buys it; he gives himself a letter and takes it away; he addresses himself as a parent, as a teacher; he arrests himself as a policeman. He has a set of stimuli which call out in himself the sort of response they call out in others. A certain organized structure arises in him and in his other which replies to it, and these carry on the conversation of gestures between themselves."

The example of Episode 4 is one of a dialogue between the self and an absent other different from the self. Structurally, however, it is very similar to private-speech dialogue in which the child questions and answers himself without dramatizing or without clearly differentiating a "self" and an "other" role in the dialogue. In Episode 3, for instance, David says, "Do you know why we wanted to do that? Because I needed it to go a different way. Isn't it going to be clever? But we have to cover up the motor."

Now it is evident that the answers David gives to himself represent the standard self-guiding speech stressed by Vygotsky and Luria.[2] It is also evident that pure cognitive self-guidance (answers without questions) is more economical and hence more developmentally advanced than the overt dialogue form. Pure cognitive self-guiding speech eliminates the step of questioning or defining the problem in order to directly give the self the answer. It is apparent that, in the sense of economy, thought (inner speech) is a still-higher level. Just as it is uneconomic to ask a

[2] The fact that these self-guiding comments are in the role of the (parental) other is suggested in the quoted comments of Episode 3 by its social "We" form and its occurrence in a situation with an adult in the background. Both Mead's and Vygotsky's views would lead to the testable hypotheses of a greater proportion of self-directive private speech with an adult present (and in the background of parasocial awareness) than alone or with peers. In the latter situations, more peerlike commentary on the self's activity would be expected.

question if you have the answer, it is uneconomic to tell yourself what to do since, if you can tell yourself, you already know.

It also seems implicit in the Mead view that collective monologue, describing one's own activity in nondialogue form, is an earlier step in development than overt use of the dialogue form. The function of such speech was said to be the establishment of the meaning of the self's action to the self as an auditor. Some structural development of the self or an auditor is required before the self as auditor can talk back, reply, or elicit a dialogue. In part, the structural development of the self as auditor required by this step entails an increased differentiation of the listening self from a physically present other. As was pointed out earlier, the Mead view assumes that self-stimulating speech is never genuinely "egocentric" in the sense that it always involves some dialogue between speaker and listener. It is consistent, however, with Vygotsky's notion of a parasocial confusion between an external and an internal auditor. Questions answered by the self represent less of a parasocial confusion than does the outward-directed commentary on the self' activity. Suppressing the question and supplying only the answer (cognitive self-guidance) involves an even clearer differentiation of the self as auditor from the external auditor. Mead's view, however, suggests that the differentiation of the listening self from the external auditor is only one component in the structural development of the self as auditor. This developing organization was termed by Mead "the generalized other." Fully internalized thought, according to Mead, depends upon the "play stage" dialogue between two roles developing into the "game stage" generalized other in which the perspectives of many roles are simultaneously occupied (e.g., the perspectives of all the other members of the team in thought about baseball). At this stage, the difference between self as auditor-director and self as speaker-actor is not a difference between two roles (e.g., child and adult) but the difference between the "Me" and the "I."

In summary, then, Mead's view suggests that different types of private speech represent different developmental structures having common self-defining or self-communicative functions. In particular, it suggests that the child should (*a*) describe himself and his activity to present or semi-present others with his own response in the role of the other being implicit and unvocalized, (*b*) then carry on both parts of the dialogue, and finally (*c*) only vocalize the active directing or guiding response of the other to his own activity. This sequence represents a movement from the "outer direction" to the "inner direction" of private speech. The central hypothesis suggested by Mead is that children should always go through an intermediate dialogue phase before emphasizing cognitive self-guiding speech.

The assumption of a developmental hierarchy derived from this analysis provides a solution to the thorniest problem for the actual study of

private speech. This problem, raised by Klein and Flavell, is that "private speech" includes a multitude of forms with no clear common functional meaning. As we suggested, however, the diversity of forms of private speech is less in social settings than it is in solitude. Observations of private speech in a standard situation (described in our second study) permitted us to define six manifestly different types of private speech which seemed to be exhaustive. These six types, however, were extremely diverse in manifest characteristics. It was clear that they did not constitute a functional unity in the factor-analytic sense; that is, children tending to use one type of private speech did not necessarily use the other types of speech. In our view, however, the assumption of a developmental hierarchy provides a testable rationale for our assumption that there is a functional unity to the different forms of speech. While word play, collective monologue, self-descriptions, and self-guiding forms illustrated in our example have little face similarity (except in not transmitting information), they all do have self-communicating functions, and hence a certain unity. The assumption of a developmental hierarchy is that the apparent diversity of these forms is the result of their representing different developmental levels or forms of this function rather than categorized differences in function itself. The unity of these forms, then, is the unity of a single developmental hierarchy in which later forms of self-communication replace earlier forms.

Our hypothesis that these forms constitute a developmental hierarchy has two testable empirical implications. The first is that the lower forms of private speech should have an earlier age curve of development and of decline than the higher forms of speech (a hypothesis examined in our third study). The second is that this order is not only an order of group age trends but is an order found for each individual. As a first approximation, a test of such an order within individuals is provided by a Guttman (1954) simplex analysis of the intercorrelations between the forms of speech (an analysis conducted in Study 4).

The hypothesized developmental hierarchy of private-speech forms observed in Studies 3 and 4 is as follows:

Level I. Presocial Self-stimulating Language

1. *Word play and repetition.*—Repeating words or phrases for their own sake (e.g., Episode 2: "A whats, a whats. Doodoodoo, round up in the sky.")

Level II. Outward-directed Private Speech

2. *Remarks addressed to nonhuman objects.*—For example, "Get back there," addressed to a piece of sticky paper clinging to the child's finger.

3. *Describing own activity.*—Episodes 1 and 3. Remarks about the self's activity which communicate no information to the listener not apparent from watching him, that is, describing aspects of the self's activity which are visible to the other person whose attention does not need to be directed to it. The

description is in a form which has no task-solving relevance or planning function. It is present tense rather than past tense. (Similar to Piaget's 1926 category of "collective monologue.")

Level III. Inward-directed or Self-guiding Private Speech

4. *Questions answered by the self.*—For example, Episode 1: "Do you know why we wanted to do that? Because I need it to go a different way?"

5. *Self-guiding comments.*—Episode 1: "The wheels go here. We need to start it all over again." (Somewhat similar to Piaget's 1926 category of monologue, "The child talks to himself as though he were thinking aloud. He does not address anyone.") The difference between this category and 3, describing own activity, is that these comments are task or goal oriented. Speech precedes and controls activity rather than follows it. Such speech often involves cognitive analysis or inferring, for example, reasons for action, analysis of the situation, or reference to nonvisible attributes of the activity.

Level IV. External Manifestations of Inner Speech

6. *Inaudible muttering.*—Statements uttered in such a low voice that they are indecipherable to an auditor close by.

Level V. Silent Inner Speech or Thought

This hierarchy is generated by superimposing the Meadian hierarchy (the order of Categories 3, 4, and 5) and the Vygotsky-Luria-Mead hierarchy (the order of Categories 1, 2, 3, 5, and 6). The latter order is based on the increasing functional use of speech to guide action and the increasing interiorization of speech elaborated in our discussion of the Vygotsky-Luria theory. While the requirement that all forms of private speech fit a developmental-hierarchy model in a somewhat more rigorous requirement than Mead's or Vygotsky's theories suggest, it provides a useful guide in the empirical examination of their theories.

AIMS AND HYPOTHESES OF THE PRESENT STUDY

The theoretical viewpoints on private speech compared in the preceding section are summarized in Table 1.

Our studies were designed both to examine the cognitive-development assumptions shared by Piaget, Vygotsky, and Mead (and only in part by Flavell) and to examine differences between the theorists. While the interpretations of Piaget and Vygotsky are sufficiently different to generate a number of conflicting empirical hypotheses, Mead's interpretation does not diverge sufficiently from that of Vygotsky to generate hypotheses which genuinely conflict with those of Vygotsky.

The major questions for study, then, were the following:

A. Were Vygotsky and Piaget (and presumably Mead) correct in their shared assumption that private speech is a distinctive aspect of the child's cognitive development?

TABLE 1

THEORIES OF PRIVATE SPEECH

	Piaget	Vygotsky	Mead	Flavell
Age-development course:	Straight age decline and replacement by social speech	Curvilinear increase and decline—goes underground as thought	Curvilinear	Cognitive self-guidance curvilinear, expressive uncertain
Relation to cognitive maturity:	Negative	Curvilinear	Curvilinear	Unspecified
Functions and functional types of private speech:	Functions uncertain	Cognitive self-guidance	Functional hierarchy from self-description to dialogue to self-directing speech	Multiple functions, self-guiding, social-substitutive, affect expression
Social orientation of private speech:	"Egocentric" lack of differentiation of self as speaker and other as listener	Parasocial lack of differentiation of self as listener and other as listener	Parasocial dialogue of self as speaker and self as listener	Partly substitution for absent other
Social situations arousing private speech:	Situations where self and other undifferentiated—with adults	Situations where other can listen like the self-comprehending peers	Situations requiring taking role of an absent other	Alone or socially "deprived"
Task situations arousing private speech:	Unspecified	Task situations with obstacles	Unspecified	Tasks requiring verbal mediation

This assumption implies the following empirical hypotheses as to the antecedents or determinants of variations in amount of private speech:

1. Age is a regular and major determinant of private speech, which is a common feature among young children (4–6) but is practically absent among older children (8–10). (Examined in Studies 1 and 2.)

2. The age development of private speech is primarily a function of the cognitive level or mental age of the child rather than of other physical or environmental correlates of chronological age. (Examined in Studies 1 and 2.)

3. Incidence and age trends for private speech should be similar in different social or national groups. (Examined in Study 4.)

4. Situational variations in private speech should be primarily determined by the cognitive and communicative requirements of the situation as analyzed by Vygotsky and Piaget. (Examined in Study 4.)

B. Were Vygotsky and Piaget correct in their shared assumption that private speech in social settings is a relatively unitary or meaningful category?

This assumption seemed best phrased in terms of the following hypotheses:

1. The age trend in incidence of various types of private speech is one expected if these types formed a developmental hierarchy. (Examined in Study 3.)

2. The intercorrelations among categories in children of a given age form a Guttman simplex order. (Examined in Study 4.)

C. We have considered shared assumptions of Piaget and Vygotsky concerning private speech. The major divergence of the two is that Piaget did not postulate a mature self-communicative function for private speech and hence thought it disappears with development, whereas Vygotsky (and Mead) viewed it as a transitional stage toward mature inner self-guiding thought.

The Vygotsky-Mead view leads to the following empirical hypotheses (contrasting with those derivable from Piaget):

1. Amount of private speech should show a curvilinear relation to cognitive maturity (in contrast to the monotonically declining relation postulated by Piaget). (Examined in Studies 1 and 2.)

2. Much private speech should have a manifest self-guiding function. Such speech should have a particularly manifest curvilinear (or increasing) relation to mental age. (Study 3.)

3. Disappearance or decline of private speech should be preceded by a tendency toward muttering or inaudible speech, indicating that the decline of private speech does not indicate its disappearance but only its "going underground." Muttering, then, should have a curvilinear developmental course later than all other forms of private speech. (Study 3.)

4. Even forms of private speech with no obvious task self-guiding

function may be looked at as precursors of self-guiding private speech; that is, they should fit into a lower level of the developmental hierarchy outlined. (Studies 3 and 4.)

5. If private speech serves a self-guiding function, it should increase in task situations of increasing cognitive difficulty. (Study 4.)

D. The preceding hypotheses center on agreements and differences in the views of Piaget and Vygotsky and Mead on the cognitive determinants and functions of private speech. Piaget's view of private speech as resulting from "presocial" egocentric orientation suggests that the tendency to use private speech should negatively relate to efforts to engage in cooperative social participation and to use social speech. The Vygotsky-Mead view of private speech as "parasocial" implies that self-communication and social communication should develop and function in parallel. With regard to individual differences the Vygotsky-Mead view suggests:

1. Children using much social speech should also use much private speech (whereas Piaget's view seems to suggest a negative relation between the two). (Study 1.)

2. Children who are active and cooperative participators in peer interaction should use at least as much or more private speech as isolated children (whereas Piaget's view suggests a negative relation between participation and private speech). (Study 1.)

With regard to situational differences, Vygotsky suggests:

3. Situations of easy peer interaction (or of realistic similarity of perspective) should elicit more private speech than situations with adults. (Piaget predicts the reverse.) (Study 2.)

FIRST STUDY

This study had the following purposes:

1. To replicate Piaget's (1926) findings that there is a high incidence of egocentric speech in young children's peer conversations and that it rapidly declines in the early school years. Both the frequency of egocentric speech in young children and its decline with age have been questioned by American observers of children's language (McCarthy, 1954). As an example McCarthy (1930) reported only 2–3 per cent egocentric speech in preschool children, and Davis (1937) reported about the same amount in school-age children.

2. To assess the relation of private speech to cognitive maturity or intelligence at two ages (4 and 6–7). The Vygotsky curvilinear hypotheses suggested more private speech among bright than average children at the younger age and a reverse relation at the older age. The Piaget hypothesis suggested less private speech among the bright children at both ages.

3. To assess the relation of incidence of private speech to amount and

maturity of the children's interaction with peers. Piaget's interpretation suggested less egocentric speech among the more participating children of a given age, whereas Vygotsky's and Mead's did not.

Subjects

The Ss were 28 children between the ages of 4 and 7; in each group half were middle class (college-educated parents) and half were working class.

Design

The Ss were divided into four equal groups: bright 4's, average 4's bright 6's, and average 6's. The mean Stanford-Binet IQ of the bright Ss was 129, of the average Ss, 104. At both ages slightly more (60–66 per cent) of the bright Ss were in the middle-class groups and more of the average Ss in the working-class group.

Procedure

The measure of private speech was derived from behavior narratives obtained by students as part of the first author's child-psychology course project. Each child was followed about by the *O* for two morning school or preschool sessions. Intensive records were kept of all recordable speech and behavior for a period of 2 hours. About one-third of each narrative was devoted to outdoor play, one-third to indoor free play, the remainder to adult-structured activities. The rules for observation and write-up of the raw narrative were those developed by Barker and Wright (1958). The child's speech was thus recorded together with a description of its behavioral and social context.

Scoring

Speech was scored as egocentric, following Piaget, if it did not appear to be addressed or adapted to a listener (other than the child) and if it appeared to be carried on with satisfaction in the absence of any signs of understanding by a listener. In this study, the categories of speech defined followed Piaget's 1926 definitions of repetition, monologue, and collective monologue.

Piaget and Vygotsky found it necessary to use a high "coefficient of egocentrism" rather than high raw frequencies of egocentric speech as a measure of tendency to use private or egocentric speech. The "coefficient of egocentrism" is simply the percentage of total comments made in a situation which were classified as egocentric. This procedure is devised to control for the personality and situational factors leading to general talkativeness

in the situation. The need for such a procedure is suggested by the fact that incidence of egocentric speech and incidence of social (all remaining) speech correlated .68 in our sample, a correlation commented on below.

Difficulties arose in using the Piaget quotient, because some of our children made few or no comments at all in the observation situation. These children would be assigned egocentrism coefficients of zero according to the Piaget system. Accordingly, we used "corrected" coefficients of egocentrism based on dropping children in any of our groups who made fewer than six spontaneous remarks of any sort.

Reliability

The first author scored all records, and each student independently scored his own record, for egocentricity. The product-moment correlation between the two sets of scores was .85. Other researchers using the Piaget categories obtained similar reliability correlations (McCarthy, 1930).

Ratings of Peer-Group Participation

The Ss were scored on a behavioral measure of social participation. The scoring was based on Parten and Newhall's system for coding behavior observations (1943). The 2 hours of behavior narrative were divided into 20–50 episodes following the criteria of Barker and Wright (1958). Only episodes in which the child has the potentiality of engaging in play or interaction with peers were scored. Each episode was assigned a weight for social participation, in terms of the following levels: −3, unoccupied behavior; −2, solitary play; −1, onlooker behavior; +1, parallel play; +2, associative play; and +3, cooperative play.

These levels are behaviorally defined in Parten and Newhall (1943). A child's total score for social participation was derived by multiplying the percentage of episodes at each level by the weight for that level; for example, the total score for a given child might be (−3 × 0 per cent) + (−2 × 10 per cent) + (−1 × 20 per cent) + (2 × 30 per cent) + (3 × 20 per cent) = 1.00.

The Ss were also rated by one or two of their teachers on the following 7-point scale of popularity, adapted from a scale developed by Walker (1962):

1. Unpopular with the other children. Is not sought out or chosen by others as playmates. Has few or no friends.
3. Is not avoided. Some other children like to play with him, though he is not actually sought out by other children.
4. Has one or a few friends who actively choose him.
6. Is quite popular.
7. Outstandingly chosen or sought out by the other children as a playmate. Has many friends.

Results

Our first interest was the incidence of egocentric speech in our two age groups, presented in Table 2. While the percentage of egocentric speech among the preschool children (32 per cent) is substantially less than that Piaget reported for somewhat older children (40–60 per cent), it is still substantial. Table 2 also indicates a marked age decline in percentage of egocentric speech. While the observation settings were not really comparable for preschool and first-grade Ss, this decline is consistent with Piaget's observations and hypotheses.

TABLE 2

PERCENTAGE EGOCENTRIC SPEECH OF BRIGHT AND AVERAGE CHILDREN AT TWO AGES IN FIRST STUDY

	Bright	Average	Total
Age 4.....	32.2	31.4	31.8
Age 6.....	5.0	17.7	11.4

Our next interest was the relation of egocentric speech to intellectual maturity. Table 2 indicates that there are no differences between the bright and average children at age 4. The bright children, however, show a lower corrected coefficient of egocentrism at age 6 ($t = 2.3$, $p < .05$). This finding is more consistent with Vygotsky's view of egocentric speech as having a curvilinear relation to cognitive development than it is with Piaget's view of a straight-line decline. These findings (as well as those of the age trends in Table 2) are discussed in more detail in connection with related findings in Study 2.

The third purpose of the study was examination of the correlations between a communicative or cooperative attitude and incidence of private speech. In the method section, we noted that we found a product-moment correlation of .68 between "egocentric" and "social speech," a correlation necessitating Piaget's use of a percentage "coefficient of egocentrism." Such a correlation itself casts doubt on the notion that private speech represents a preschool orientation distinct from that engendering social speech. If private speech were presocial, it should reflect an incapacity or disinterest in social communication leading to a low output of social speech. The positive correlation between the two suggests that private speech is "parasocial" in the Vygotsky sense.

While the use of Piaget's "coefficient of egocentrism" raises the issue just described, it was used to examine the hypotheses derived from Piaget as to a negative correlation between social participation and egocentric speech. It seemed appropriate to control for chronological and mental age in considering this relation, as the younger children tended to

be higher on egocentric speech and lower on social participation than the older children. (We found a correlation of .57 between age and social participation, similar to that found by Parten and Newhall, 1943, in a younger sample.) The partial correlation between the Parten and Newhall behavioral measure of social participation and the coefficient of egocentrism was .01 with chronological age controlled and .05 with mental age controlled.

When ratings of popularity were correlated with egocentric speech, a positive correlation of .30 was found, indicating that the popular children engaged in slightly more, rather than less, egocentric speech. With mental age controlled, the partial correlation of popularity and egocentrism was .25. The positive relation between popularity and egocentric speech held mainly for the younger children. Among 4-year-olds, the correlation was .50. Among the six-year-olds, the correlation was .14.

These findings are difficult to square with Piaget's notion that egocentric speech reflects a lack of social awareness or a lack of cooperative orientation. This is especially the case for the Parten and Newhall measure of social participation, which is definitely a variable of social age development. In addition, situations used in assessing egocentric speech and social participation were essentially the same, that is, both assessments were made from the same sets of observation episodes. Thus whether a high level of social participation is viewed as determined by personality or situation, it is not inconsistent with a high usage of egocentric speech. Together with the finding that at the younger age egocentric speech is positively ($r = .50$) correlated with popularity, the findings on social participation suggest that private speech reflects a "parasocial" rather than a "presocial" orientation.

SECOND STUDY

The aims of the second study were to establish the trends suggested by the first study concerning relations of egocentric speech to chronological age and intellectual maturity. In addition to having a larger sample of a single social class and more adequate age coverage, the study allowed more meaningful age comparisons by use of a standardized situation for observing egocentric speech. Finally, a subsample was followed up 1 year after first testing to compare cross-sectional with longitudinal trends.

Subjects

The Ss for the study were 112 middle-class children (college-educated parents) between the ages of 4 and 10. The egocentrism measure was obtained in the course of a study designed to assess the sex typing of dependency and imitation among our subjects (Kohlberg & Zigler, 1967). Ninety-six of the Ss were selected to fill a 4 × 2 × 2 × 2 factorial de-

sign involving school grade or age (4, 5, 7, and 10), IQ ($\bar{x} = 106$, $\bar{x} = 131$), sex of child, and order of interacting with the male and female *Es*. In addition, 16 6-year-olds were later included in the study, half of whom were of lower socioeconomic status than the rest of the sample.

Follow-up Subjects

We conducted a follow-up on the *Ss* who had been 4, 5, and 7 years old at the time of the initial study. We did not attempt any follow-up on the 6- and 10-year-olds in the initial study. A minority of the *Ss* in the second grade or "7-year-old" sample were actually age 8 at first testing. These constituted a large enough proportion of the available follow-up *Ss* to define an additional longitudinal age group (age 8 at first testing, age 9 at second testing). In the target age groups, there were 72 *Ss* in the original study, of whom we were able to study 26 in our follow-up (7 in the 4–5 cohort, 5 in the 5–6 cohort, 5 in the 7–8 cohort, 9 in the 8–9 cohort).

Intellective Measures

Intelligence groups were determined by Stanford-Binet performance. In addition, *Ss* were assessed for correlational purposes on three Piaget tasks of cognitive maturity. The first, the conservation of mass, is the familiar task employing deformations in the shape of two Plasticine balls, used in a large number of conservation studies. The second, concept of the dream, is the author's adaptation (Kohlberg, 1966) of the Piaget interview on the external reality of the dream. The third, magical causality, involves the child's resistance to believing that a real transformation has been performed in a conjuring demonstration (Kohlberg, 1963).

Procedure

The measure was obtained from the verbal responses initiated by the child in two 10-minute individual sessions, one with a male and one with a female *E*. The child made sticker designs while the adult sat beside him and also made designs. The adult did not initiate conversation but acknowledged communication in a friendly but minimal fashion. The *E* made a check for each sentence-like verbal remark of the child. The checks were located in one of four categories as follows: egocentric speech, statement of information, question, and request for help or approval. The experimental situation is described in more detail elsewhere (Kohlberg & Zigler, 1967).

Coding Egocentric Speech

Egocentric speech was defined in the same terms used in Study 1. In addition to the categories of Piaget, the following category was added: in-

audible remarks (statements muttered in such a low voice that they were undecipherable by the *E*). This category had not been used in the first study because such speech could not be registered at a distance.

Reliability

In order to determine the degree of interjudge agreement in coding egocentricity, sessions with 28 of our children were tape-recorded. Three different *Es* coded egocentricity (and our other three categories of response), each for a third of the children, during the experimental session. A research assistant then listened to the tapes and coded them for egocentric and other verbal responses. The product-moment correlation between the research assistant's scoring of the number of egocentric responses and the *Es'* scoring was .92. This measure of correspondence represents both the agreement in classifying responses and the agreement in observing and unitizing them.

Since the children participated in two sessions, once with a male *E* and once with a female *E*, we were able to obtain a test-retest measure of usage of egocentric speech. The overall correlation between the two sessions for the "coefficient of egocentrism" was .43. This correlation varied at varying ages, ranging from .85 at age 5 to .38 at age 4.

Correlation between Egocentrism Measures.

Both controlled (Study 2) and naturalistic (Study 1) observations of egocentrism were available for 11 *Ss* in the preschool and first-grade groups. The rank-order correlation between the measures was .44, roughly the same as the correlations just reported between the two experimental measures of egocentrism.

Results

Our first concern was clarification of the age trends suggested by our first study. Figure 1 presents the age trends in coefficients (percentages) of egocentric speech. Lines representing smoothed-curve age trends for the bright and average groups have been inserted in the figure. (These curves minimize the 6-year-old group, which was smaller, from a different school system, generally less talkative, and largely of a lower socioeconomic status than the rest of the sample.)

Figure 1 indicates a substantial ratio of egocentric speech at age 4 (18 per cent), though considerably less than that (32 per cent) found in Study 1. Figure 1 also indicates a substantial decline in ratio of egocentric speech. Most of this decline is between ages 7 and 10.

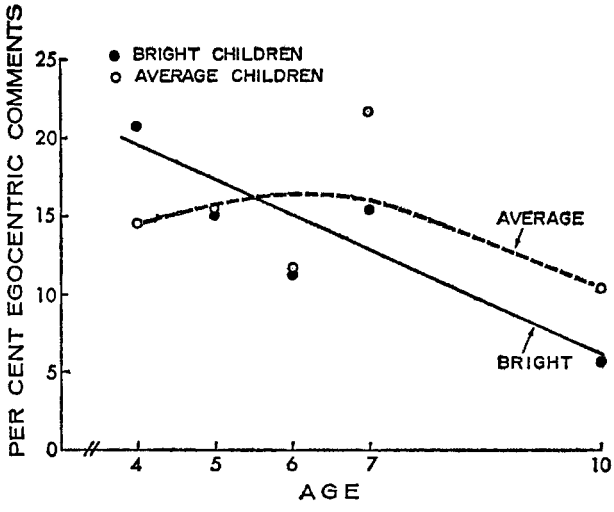

FIG. 1.—Cross-sectional trends in percentage egocentric speech for bright and average children.

The age trend suggested by Figure 1 was supported by an analysis of variance of the coefficient of egocentrism measure. This analysis included the effects of age, IQ, sex of *E*, and order of session. Age and the interaction between IQ and age were significant ($p < .05$) effects. The only other significant effect was an uninterpretable interaction between session, age, sex, and sex of the *E*.

Figure 1, based on the coefficient (percentage) of egocentric speech, does not suggest any marked age decrease in egocentric speech before age 7. If absolute amount of egocentric speech is considered, a more marked and earlier age decline is noted. These trends are indicated in Figure 2. Figure 2 indicates a marked decline in frequency of egocentric comments from ages 4–6, especially in the bright group. The discrepancy between the age trends in Figures 1 and 2 is due to the fact that social speech, as well as egocentric speech, is declining rapidly in the age period mentioned, so that the denominator as well as the numerator of the coefficient of egocentrism is declining with age. These age trends in social speech are presented in Table 3. This age decline in social speech is obviously not a decline in expression of a mature social orientation but probably reflects a greater task orientation and a greater social awareness of the boundaries of communication with strange adults in the older children. There is a sense in which even Piaget's "social speech" in a task situation with a strange and minimally responsive adult may be said to be based on an "egocentric" or "parasocial" confusion between the interests and perspectives of the self and of the other, and hence should decline with age.

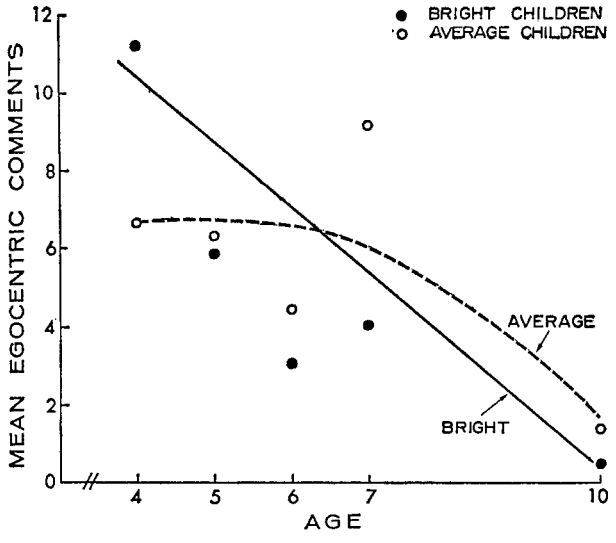

FIG. 2.—Cross-sectional trends in absolute amount of egocentric speech for bright and average children.

If the data on both raw and percentage egocentric speech are considered, and integrated with the data from Study 1, the following tentative conclusions about incidence at various ages can be drawn:

1. Preschool and kindergarten children engage in substantial amounts of egocentric or private speech in social settings, though this amount varies widely from one situation to another. A lower coefficient of preschool egocentrism was found in Study 2's "task" situation (18 per cent) with a minimally responsive adult than in Study 1's free-play situation primarily with peers (32%). These findings are consistent with Katz's (1928) and Smith's (1935) reports of almost as high coefficients of egocentrism as ours in preschool's free play with peers and are consistent with Davis' (1937) and McCarthy's (1930) reports of very little (2–3 per cent) egocentric

TABLE 3

MEAN NUMBER OF SOCIAL COMMENTS IN EXPERIMENTAL SITUATIONS AT FIVE AGES

	Bright Children	Average Children
Age 4.....	55.5	44.5
Age 5.....	22.8	23.4
Age 6.....	14.8	18.3
Age 7.....	18.1	16.2
Age 10.....	6.9	9.8

speech in a structured situation with a responsive adult. The fact that we found more egocentric speech with an adult than did McCarthy is probably to be explained by the fact that our adult *E* was less directive and responsive than hers. Our adult *E* engaged side by side in a task parallel to that of the child and was minimally responsive to bids for attention and help; for example, he acted much like another child engaged in parallel play. McCarthy's *E* acted much more like a parent or teacher, presenting toys and other stimuli to the children rather than engaging in parallel activity with them. Our findings, and those of other American researchers, then, are more consistent with Vygotsky's notion that egocentric speech is highest with highest awareness of similarity with the auditor than with Piaget's (1956) hypotheses and observations of greater egocentrism with adults than with peers.

2. There is a decline in egocentric speech after about age 5. Somewhere between the ages of 7 and 10, egocentric speech in the settings observed seems to have essentially disappeared. Such an age period for disappearance of such speech is suggested by either the Piaget or the Vygotsky interpretations.

In addition to providing evidence on relations to chronological age, Figures 1 and 2 suggest a relation of private speech to mental age. The bright young (age 4) children use more private speech than the average children, whether such usage is measured absolutely (Fig. 2) or relatively (Fig. 1). In contrast, the average older children use more private speech than the bright older children. The previously mentioned analysis of variance of the coefficient of egocentrism indicated that the interaction between age and IQ was significant ($p < .05$).

The trends just mentioned are consistent with Vygotsky's hypothesis of a curvilinear development of private speech, timed in terms of mental rather than chronological age. As the smoothed trend lines in Figures 1 and 2 suggest, the average children appear to show some increase from age 4 to age 7 in usage of private speech and a decline in its use thereafter. In contrast, the bright children appear to have already reached a peak in usage of private speech at age 4 and to decline steadily thereafter in such usage. The 4-year-old peak of usage by the bright children occurs at about the same mental age as the peak between 5 and 7 found in the average group.

The cross-sectional trends just discussed are hardly clear enough to support the claim that private speech has a curvilinear development timed by mental age. Some further support for this interpretation comes from our follow-up study. The trends in raw number of egocentric comments made by the 26 children studied at the two time periods are presented in Figure 3. As the smoothed trend lines indicate, the longitudinal data quite clearly suggest a curvilinear trend for the average group and a straight-line decline for the bright group. There is a tendency for the average children to increase in private-speech usage on retest at all ages until the 6–8 period,

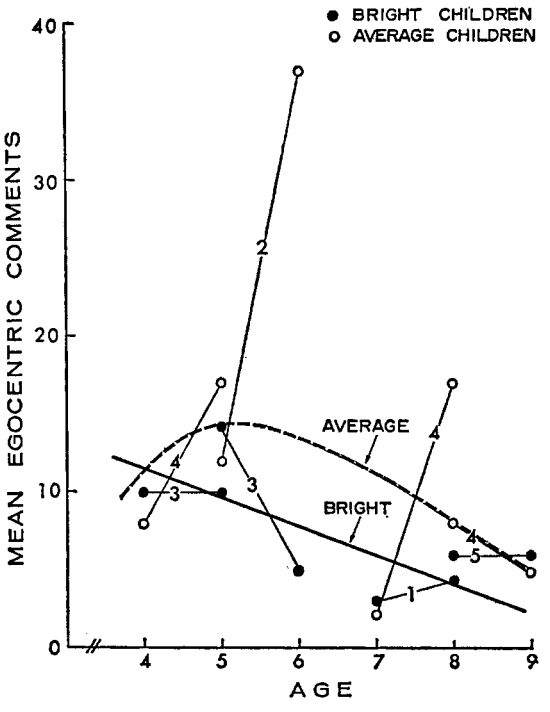

FIG. 3.—Longitudinal trends for bright and average Ss in amount of egocentric speech. Solid lines connect identical groups retested after 1 year. Numbers indicate number of subjects in given group.)

whereas the bright children remain the same or decline on retest throughout the age span studied. The average children's increase in egocentric speech on retest does not simply represent an increased talkativeness in the situation, as roughly similar trends were found using the coefficient-of-egocentrism index. (More detailed consideration of the coefficient is not warranted, since about half the scanty number of Ss in the longitudinal sample are lost due to the requirement of six comments of total speech for calculation of this index.)

It may clarify these results to discuss them in correlational terms. Partial correlations between cognitive measures and egocentric speech were calcuated separately for younger (4–5) and older (6–7) Ss, controlling for total speech. The results are presented in Table 4.

It is apparent that at the early age cognitive maturity (IQ) is possitively ($r = .40$), not negatively, associated with egocentric speech. This correlation is substantial, since it is of the same magnitude as the correlations we found between one egocentric-speech assessment and another. The

TABLE 4

PARTIAL CORRELATIONS BETWEEN AMOUNT OF EGOCENTRIC SPEECH AND COGNITIVE TASKS WITH TOTAL SPEECH CONTROLLED

	Younger *Ss* (4–5)	Older *Ss* (6–7)
IQ	.40	−.04
Mental age	.12	−.19
Conservation of mass	−.14	−.02
Belief in magical causality	−.08	−.09
Dream concept	.10	−.12

positive correlation disappears with further development. Table 4 suggests mental age has a negative relation to egocentric speech at the older age and IQ no relation at all.

It might be argued that the early positive correlations with IQ do not rule out the Piaget interpretation, however, since it might be argued that psychometric mental age is not a good index of socialization of thought. Accordingly, we also calculated correlations between egocentrism of speech and performance on the three Piaget tasks. As Table 4 indicates, these correlations are no more supportive of Piaget's interpretation than are those with psychometric intelligence.

Confidence in the curvilinear relation to mental age suggested by the cross-sectional and longitudinal data is strengthened by their consistency with the data of Study 1. Study 1 indicated that bright and average Ss were essentially equivalent in the coefficient of egocentrism at age 4 (the bright Ss being 1 percentage point higher) but that the bright Ss were lower on the index at ages 6–7. The data from the present study differ principally in also suggesting a higher usage by bright children at the early age, a difference appearing more clearly in the raw egocentrism than the coefficient-of-egocentrism measure. The Vygotsky interpretation would suggest that the relatively greater amount of egocentric speech by the young bright group in Study 2 was due to the greater cognitive "pull" toward egocentric speech of the more task-oriented situation of Study 2 and to the inclusion of muttering self-guidance among the categories observed.

Besides the findings of Studies 1 and 2, the only other data relating private speech to IQ are those of Klein (1963). Klein compared the IQ's of those who talked and did not talk across the 3–7 age range and found no significant difference between the two. This is consistent with the present finding that IQ interacts with age rather than represents a main effect.

The relations of private speech to intelligence found in our studies suggest two conclusions (in addition to those previously listed).

3. The relations of private speech to both chronological age and to IQ

are to be explained as the result of the impact of cognitive development upon such speech rather than as the result of the host of factors associated with age or IQ which are not factors of cognitive development. The logic underlying acceptance of this "cognitive development" interpretation of age and IQ trends is elaborated elsewhere (Kohlberg & Zigler, 1967). The interpretation implies that the correlation of IQ with another behavior is not a fixed trait-trait relation but a shifting relation based on early cognitive development causing an earlier appearance of the other behavior. Because private speech has a curvilinear course of development while mental age has a monotonic course, the correlation of intelligence to private speech shifts at varying age periods. The result is a significant interaction between age and IQ without an IQ main effect.

In parallel fashion, the cognitive-development interpretation implies that the chronological-age effect is a primarily cognitive maturity effect, rather than an effect resulting from the other physical and environmental correlates of age. The significant Age $\times$ IQ interaction represents partial support for this interpretation. Even clearer support for this interpretation comes from comparison of our age trends in the bright and average groups. The average group seem to show a curvilinear trend with a decline in private speech commencing at ages 6–7. The age decline in the bright group appeared to be at an earlier chronological age but at the same mental age. In other words, the shifts from a developmental increase to a developmental decrease in private speech appeared to be timed by mental, rather than chronological, maturity factors.

The fact that timing of age trends appears to be based on mental-age status is of considerable interpretive import. It is quite plausible to view egocentric speech as a somewhat inappropriate form of "social dependency" rather than as having distinctive cognitive-development determinants and functions. From this latter view, the negative relation of egocentric speech to age and intelligence in older children is readily explained by the facilitating role of age (chronological or mental) in learning the cultural inappropriateness of such behavior. Indeed this is the interpretation advanced by Watson (1930) for the internalization of private speech. The curvilinear relation of private speech to mental age constitutes a distinct difficulty for this point of view, however. It is easy to understand why the bright older children should use less private speech than the average children if it is socially inappropriate, but the fact that the bright younger children use more private speech than the average seems to require Vygotsky's hypothesis of a spontaneous developmental increase of private speech. Vygotsky's notion of a spontaneous decline in egocentric speech due to its transformation into inner speech is supported by the fact that the point of decline of private speech seems determined by mental rather than chronological age. The tendency for school-age average children to increase in private speech (in both the age and test-retest sense) while bright children

are decreasing does not suggest that bright children are simply learning faster the expectations of a new environment to which both are exposed.

In summary, the relations of private speech to age and IQ suggest that it does reflect something distinctive about the child's cognitive status or his functioning, as Piaget and Vygotsky assumed.

4. With regard to the differences between Piaget and Vygotsky, Vygotsky's curvilinear interpretation is supported. Piaget's notion that private speech is an indication of a less intellectually mature orientation is only true at older ages (6–10). At younger ages, intellectual maturity seems to be related to a greater usage of private speech. Vygotsky's hypothesis that private speech serves a cognitive function and so increases with intellectual development until such development leads to its "going underground" is directly supported by a trend toward a curvilinear relation of private speech with age in average children and a monotonically declining relation in bright children.

THIRD STUDY

After completing the cross-sectional data collection of Study 2, we became aware of the importance of considering the developmental course of subcategories of egocentric speech. As detailed in the general introduction, the following developmental hierarchy of forms of private speech was postulated and operationally defined: Category 1, word play and repetition; Category 2, remarks to nonhuman objects; Category 3, describing own activity; Category 4, questions answered by the self; Category 5, self-guiding comments; and Category 6, inaudible muttering.

In the follow-up study of 26 *Ss* described in Study 2, this category system was applied to our observations. "Study 3," then, is not an independent study but a report of preliminary findings on age trends in use of these categories as applied to the follow-up of Study 2.

Results

The age trends in distribution of egocentric speech among the categories just described are presented in Figure 4. The presumed highest category, 6, inaudible muttering, increases regularly with age, becoming the most used category at ages 8–9. The trends for Category 5, self-guiding speech, are those expected from its postulated place as the next highest form in the hierarchy. Figure 4 suggests a curvilinear development in which self-guiding first displaces lower forms of speech (becoming the dominant form at age 6), and then is displaced by muttering. Figure 4 indicates "mirror image" trends for self-guidance and muttering and suggests that muttering takes the place of self-guidance.

Our theoretical analysis attached considerable importance to 4, self-answered questions, as the Meadian dialogue component of the transition from outwardly directed to inwardly directed forms of private speech. Its infrequency at all ages in Figure 4 casts some doubt on its significance in this regard as well as makes any definition of its developmental course difficult. Insofar as one can postulate trends in "self-answered questions," the category does appear to be an intermediate one, peaking at age 8 and declining thereafter. The next category, 3, describing own activity, clearly and steadily declines with age, as expected for this age range. The notion that it is a transitional form toward self-guidance suggests that it should increase at an earlier age (e.g., from 3 to 5) than that studied in the follow-up. The fact that "describing own activity" serves some self-informing function, rather than reflects sheer egocentric expression, is suggested by two considerations. First, judges have considerable difficulty discriminating "describing own activity" from "task self-guidance," as noted in Study 4. Second, at younger ages (5 and 6), our bright Ss showed a higher percentage usage of this category than average Ss (a usage difference principally at the expense of usage of "muttering" by the young bright Ss).

Category 1 repetition, and Category 2, commanding objects, were pooled in the analysis of Figure 4 because both were infrequent categories and both were at the bottom of the postulated hierarchy. As anticipated, both categories decline regularly, with age.

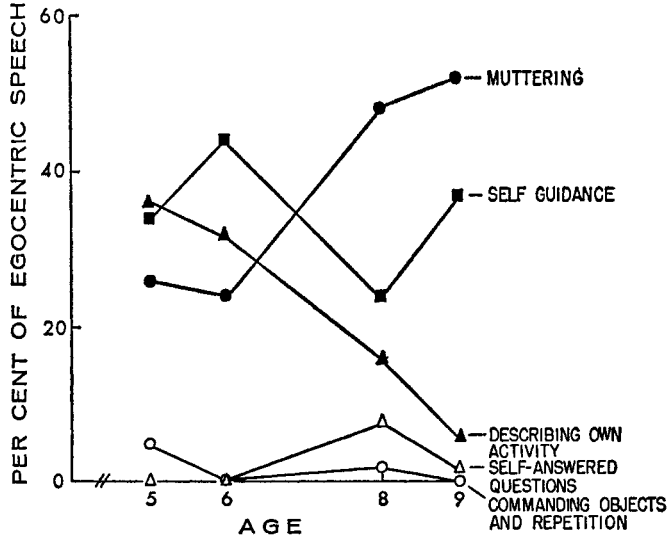

FIG. 4.—Distribution of egocentric speech among functional categories at four ages.

In summary, then, while the number of Ss in Study 3 is too small to define clear age trends, the tentative trends observed were consistent with the postulated developmental hierarchy. They are also consistent with the findings of Klein (1963) and others of the progressive increase of cognitive self-guidance and inaudible muttering in the age range studied. Further data related to the hierarchy are reported in the next study.

FOURTH STUDY

Our final study had the following aims:

1. Since the study was attached to a cross-national study, our first aim was to ascertain the influence of culture (and cultural sex roles) upon incidence of private speech.

2. The second and major aim was to replicate Vygotsky and Luria's (1930) sketchily reported findings that private speech increases with task difficulty. If egocentric speech serves a planning or self-guiding function, it should increase when obstacles arise in task completion. Vygotsky and Luria reported almost twice as much egocentric speech when difficulties were introduced in the child's task activities.

3. A third aim was to further validate the hierarchy of forms of private speech considered in the previous study. An increase in usage of the intermediate and higher categories of private speech (as opposed to the lowest categories) with increasing task difficulty would indicate the cognitive-functional nature of these higher forms. Additional evidence for the hierarchy would also be provided if the intercorrelations among the categories formed a Guttman (1954) simplex.

Subjects

Subjects consisted of 34 children, aged 4-6–5-0. There were 17 American children (10 boys and 7 girls) and 17 Norwegian children (9 boys and 8 girls). All children were attending nursery school at the time of the experiment. Children in each group were roughly equated by mental age ($\bar{x} = 115$) and by social class (middle class).

Procedure

The experimental procedure is defined in detail elsewhere (Hjertholm, 1968). Each child was presented individually with a series of four tasks. The tasks were administered in the following order: (1) bead stringing, which the children performed for a maximum of 6 minutes; (2) easy jigsaw puzzle with eleven pieces; time limit of 9 minutes; (3) building a tower of fifteen 1-inch cubes; children were allowed 6 minutes to work on the building; and (4) hard jigsaw puzzle (22 pieces, different

design); a maximum of 12 minutes was allowed for completion. The experiment was conducted in the child's home. The mother, as well as the *E*, was usually present for the first two tasks.

The order of difficulty of the tasks is clear for three of the tasks. Tasks 1, 2, and 4 clearly constitute an order of difficulty. The location of Task 3 (tower building) in an order of difficulty is uncertain. One line of evidence for ordering the tasks comes from the frequency of children's spontaneous comments as to difficulty of the task and from requests for help, presented in Table 5.

TABLE 5

ABSOLUTE NUMBER OF COMMENTS ABOUT TASK DIFFICULTY MADE BY *Ss* ON FOUR TASKS

Task	Task Is Difficult	Request for Help
1. Beads.....	5	2
2. Easy puzzle.....	6	16
3. Block tower.....	11	3
4. Hard puzzle.....	27	31

In terms of requests for help, Task 2 is more difficult than Task 3, but in terms of comments as to task difficulty, Task 3 is more difficult than task 2. If difficulty is conceived in a cognitive, rather than a sensorimotor, sense, it would appear that Task 2 is more difficult than Task 3. Assuming this order (1, 3, 2, 4) the effects of order and of mother's presence are partially counterbalanced between easy (1, 3) and difficult (2, 4) tasks.

Scoring Egocentricity

Egocentric speech was coded as in Study 3. While Piaget's formulations suggest use of a "coefficient of egocentrism" as an index of presocial orientation, Vygotsky's formulations suggest use of an absolute amount measure as an index of task-induced variation in self-guiding private speech. Accordingly, the latter measure was used, prorating to equate for the different time periods involved in each task situation.

Coding Reliability

The experimental sessions were tape-recorded and coded by a second coder. Overall coder agreement on egocentric speech was high ($r = .90$). Agreement on subcategories was not systematically calculated but appeared high except with regard to distinguishing activity description and task self-guidance. The *E*'s tendency in on-the-spot coding was to judge as "self-guidance" many statements judged by a second judge as "describing own activity."

Results

In order to examine the effects of nationality, sex, and task on amount of private speech, scores were subjected to a three-way analysis of variance. Task was a significant influence on egocentric speech ($F = 14.0$, $df = 3$, $p < .01$), but nationality and sex were not ($F < 1.0$ for both variables).[3] Not only did the analysis of variance indicate that national and sex roles do not affect amount of private speech; it also indicated that these roles did not influence the definition of the task situations. The analysis of variance indicated no interaction between the task effect and the social-role effects ($F < 1.0$ for Task $\times$ Role interactions). This suggests that the ability of the situations to elicit private speech is determined by transcultural dimensions of the cognitive task. The cultural variables of nationality and sex role, then, were not significant determinants of private speech in contrast to the significance of cognitive factors of task, age, and IQ found in this and the previous studies.

Figure 5, presenting mean egocentric comments for each task, strongly suggests that the significant task dimension is the amount of cognitive activity required for solving the task.

It is apparent that the more cognitive tasks (the two puzzles) induce more egocentric speech than the two sensorimotor tasks. There is also an increase of egocentric speech with difficulty, but only for the cognitive tasks (2 and 4). Newman-Keuls tests comparing means indicated no significant differences between the two sensorimotor tasks but did indicate significant differences between the two puzzles ($p < 05$).

These findings are consistent with those reported by Vygotsky and Luria (1930) and help to clarify their meaning. Vygotsky and Luria reported an increase in private speech when the task is made more difficult. There are two plausible types of explanation for this finding. The first, Vygotsky's, is that a task requiring increased thought or cognitive activity will increase private speech (an external form of such thought). The second is that private speech has an expressive function aroused by frustration (e.g., the frustrated adults's swearing and muttering). Our findings support Vygotsky's interpretation. If task difficulty only influences private speech when the task is cognitive, then the difficulty dimension is not a "frustration" dimension but rather is a dimension of pull for cognitive activity.

The conclusions just advanced are given further support by a consideration of the varieties of egocentric speech used in each task.

[3] There is a nonsignificant ($F = 2.4$) trend toward an interaction between nationality and sex. This trend can probably be discounted, since the group responsible for the trend, the American girls, was lower in IQ than the other groups as well as lower in use of private speech. (Study 2 indicated a positive relation between IQ and private speech at this age.)

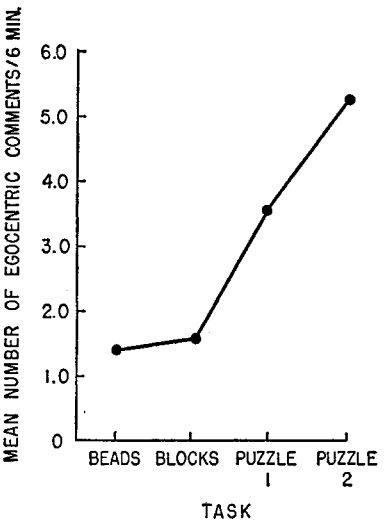

FIG. 5.—Mean number of egocentric comments made during four tasks of increasing difficulty. (Means prorated for time length of task.)

The distribution of egocentric speech among functional categories for the four tasks is presented in Figure 6.

The clear task self-guidance categories (self-guidance and questions answered by the self) increase with cognitive difficulty as expected. This relation might have been sharper if the *E* had made more use of the "describing own activity" category. (As mentioned in the method section, the *E* tended to classify as self-guidance those statements classed as "describing own activity" by other judges.)

As Figure 6 indicates, the only category used substantially beside the self-guiding ones is "inaudible muttering," and the relative increase of self-guidance is at the expense of a relative decrease in muttering. The decline is chiefly due to a drop from a high use of muttering in the first bead-stringing task to a low use in all other tasks. The relatively low usage of muttering on the other tasks (20–25 per cent) corresponds to that found for the roughly parallel (5-year-old) age group in Study 3. It seems likely that at the young age studied, some inaudible muttering represents the partial internalization of self-guiding speech but some is the partial expression of noncognitive forms of private or social speech. The fact that mutt ring was markedly high in the first but easier situation suggests that some muttering might reflect "shy" partial inhibition of social speech as well as partial inhibition of self-guiding speech. Study 3 suggested that the high relative usage of muttering at later age (8–9) did represent the most mature form of private speech displacing cognitive self-guiding speech. At

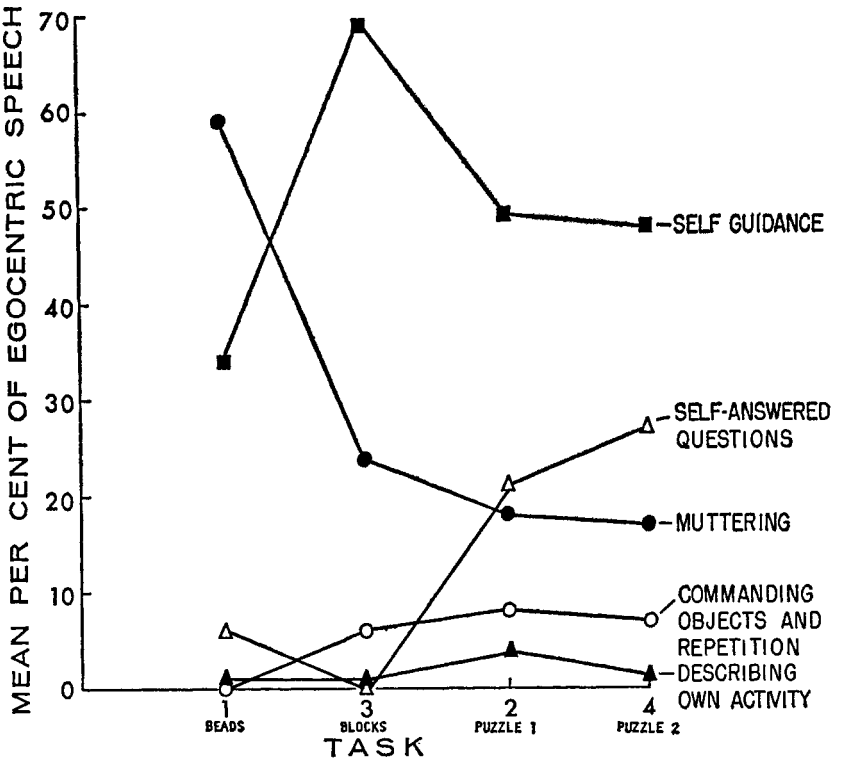

FIG. 6.—Distribution of egocentric speech among functional categories for four tasks of increasing difficulty.

the later age, then, one might expect to find an increase in muttering with cognitive difficulty, even though a decrease was suggested by the present study.

The fit of the speech category intercorrelations to a Guttman (1954) simplex pattern can be determined by inspection of Table 6. Table 6 indicates that the intercorrelations among our private-speech categories are low. Under one logic, a functional unity among a number of measures should be reflected by high positive correlations among them. According to this logic, Piaget's or Vygotsky's treatment of private speech as a functionally unitary type of behavior is unwarranted in light of the correlations reported in Table 6. According to the logic advanced in our theoretical introduction, however, one could claim that private speech has a functional unity without predicting high intercorrelations among subcategories of such speech. This claim would be based on the view that the subcategories represented different developmental levels of responses with similar cognitive functions.

Since higher levels of response displace lower levels of response, one would not expect consistent positive correlations among them.

Table 6 has been ordered in terms of its relevance to the simplex pattern. The "simplex" pattern derives from the expectation that the farther two types of response are separated from one another in a developmental sequence, the lower should be the correlations between them. Table 6 indicates rough agreement with the expectation that the correlations between two categories should decrease as these categories are increasingly separated in the developmental hierarchy. The correlations tend to diminish as we move away from the main diagonal entries, whether we go across the rows or down the columns. The major exception is that "describing own activity" does not fit within the order at all and is essentially uncorrelated with any of the other categories, probably because the scoring of this category by the *E* was not reliable. With this exception, the patterning is consistent with the hypothesized developmental-hierarchy patterning of category use. The fact that the patterns of category usage in children of a single age fits the same developmental hierarchy supported by the age trends of Study 3 provides substantial evidence for the notion that the age trends are the result of an internally logical sequence, rather than of learning contingencies associated with age.

SUMMARY AND DISCUSSION

Our summary and discussion is organized around the issues and hypotheses listed at the end of the introduction. The first issue is whether private speech represents a distinctive aspect of the young child's cognitive orientation and development. Our findings clearly support the "cognitive development" approach to private speech shared by Piaget and Vygotsky. Our age trends are consistent with their assumption that private speech is common among young (4–6) children, declines thereafter in regular fashion, and is practically absent in older children capable of internalized logical thought. While incidence of private speech among young children (4–6) in either peer or adult situations was only about half as high as that reported by Piaget (70–40 per cent) (1926), it was substantial. While the

TABLE 6

CORRELATIONS AMONG CATEGORIES OF PRIVATE SPEECH

Category	6	5	4	1	3
Inaudible muttering (6)	...	.36	.01	−.07	.05
Task self-guidance (5)	.36	...	.31	.05	.11
Self-answered questions (4)	.01	.31	...	.31	−.08
Repetition and commands (1 and 2)	−.07	.05	.31	...	−.11
Describing own activity (3)	.05	.11	−.08	−.11	...

rate of age decline of private speech found in our studies varied according to situation and to measure (percentage of egocentrism or raw amount), it clearly diminished substantially after ages 6–7 and had practically disappeared by age 10.

Given the assumed course of age development ,the next question raised for the cognitive-development approach is that of whether the course of age development is to be explained by the child's level of cognitive development or by other forms of learning or maturation association with age. Studies 1 and 2 indicate that intelligence was a significant determinant of incidence of private speech. Correlations between intelligence and egocentric speech were about as high ($r = .40$ at ages 4–5) as the test-retest reliabilities of our egocentric-speech measures. Furthermore, our studies indicated that the effects of both age and IQ were to be interpreted as primarily due to mental age or cognitive level rather than to other factors associated with IQ or chronological age. The effect of IQ was found to be contingent on the age of the group studied (i.e., on mental age) rather than to be a "brightness" effects. Chronological-age trends seemed to be timed by mental rather than chronological maturity. Both bright and average children seemed to have curvilinear courses of development inflecting at mental ages 6–7.

Two findings from Study 4 lend some further support to the view that the incidence of private speech is primarily determined by cognitive-development factors. Study 4 indicated that the incidence of private speech among 5-year-olds was not significantly affected by sex or nationality (Norway vs. the United States). In contrast, cognitive task difficulty was a major determinant of private speech. This parameter was defined by "intrinsic" features of the situation rather than by specific cultural definitions, as the parameter affected children similarly in the different nationality groups.

Our findings, then, suggests that incidence of private speech reflects the child's level of cognitive development and the functional demands of the situation for cognitive activity. This conclusion assumes that private speech is a relatively unitary category with a common functional meaning. Such an assumption can be most plausibly elaborated in terms of the notion that various forms of private speech represent different developmental levels of behavior with a common self-communicative functional significance. The following hierarchy was hypothesized following Vygotsky and Mead: Category 1, word play and repetition; Category 2, remarks to nonhuman objects; Category 3, describing own activity; Category 4, questions answered by the self; Category 5, self-guiding comments; Category 6, inaudible muttering; and Category 7, silent inner speech.

Preliminary observations of age trends in Study 3 were consistent with this assumed developmental order. Intercorrelations among these categories found in Study 4 were also consistent with a Guttman simplex order im-

plied by the developmental-hierarchy assumption. Study 4 also indicated that the more cognitively demanding tasks pulled relatively more of the developmentally higher than of the lower categories (an exception was inaudible muttering, which may serve less cognitive functions at early ages).

While both Piaget and Vygotsky assumed the cognitive-development determination of private speech suggested by these findings, they differed in their view of the cognitive-development significance of private speech. Piaget assumed that it reflects an egocentric precommunicative orientation to social situations which disappears with age. In contrast, Vygotsky assumed that it represents a transitional stage toward mature inner thought, into which it is transformed with development. All our findings were consistent with the Vygotsky as opposed to the Piaget interpretation.

One major finding in support of the Vygotsky interpretation has already been mentioned, the finding that private speech has a curvilinear rather than a monotonoically declining relation to mental age. A second major finding supporting the Vygotsky interpretation is the finding from Study 4 that private speech increases with task demands for cognitive activity.

These findings are consistent with Vygotsky's original observations and with recent Russian and American experimental studies. These studies are based on task situations constructed so as to require defined forms of private speech for task solution. Our findings of a parallel trend in spontaneous private speech in more social and less task-oriented situations extend the Vygotsky interpretation to a broader range of self-informing behavior. In particular, our findings suggest that the Vygotsky interpretation applies to those puzzling forms of speech in social situations which Piaget considered "egocentric" because it is ambiguous whether they are meant to be self-guiding or to be efforts at social communication.

The extension of the Vygotsky analysis to spontaneous social situations just suggested is clarified by our finding of a developmental hierarchy in forms of private speech. The postulated hierarchy is one of movement toward increasingly cognitive and inner-directed speech. The fact that these forms of speech appear to represent higher levels of a hierarchy having the more Piagetian forms of egocentric speech at lower levels suggests that the Vygotsky-Luria analysis is not simply appropriate to special cases of private speech and that private speech is not a wastebasket category but has some central developmental meaning. The most interesting problems concerning the meaning are those suggested by the contrasting significance of such speech for social development postulated by Piaget, Vygotsky, and Mead.

In Vygotsky's view the private speech of the child reflects not only his inability to engage in silent thought but his "parasocial" orientation, (i.e., his lack of differentiation between speaking to himself and speaking to others.) While Vygotsky's characterization has points in common with Piaget's characterization of the child's orientation as egocentric, Vygotsky

assumed a genuine communicative intent behind both private and social speech, while Piaget assumed it only for the latter. Our findings were more consistent with Vygotsky's view than with Piaget's. Study 1 indicated that among preschool children high social speech and high popularity are correlated with high use of private speech. High engagement in cooperative social activity was unrelated to proportion of private speech (coefficient of egocentrism) and positively correlated with absolute amount of such speech. Among young children, then, the disposition to engage in social communication and interaction with peers is consistent with that involved in the disposition to private speech; that is, the latter is "parasocial" in Vygotsky's sense.

The conclusion suggested is something more than the assertion that the talkative child will engage in both private and social speech, an assertion adequate to account for the observed correlations of .68 between private and social speech. Popularity and developmental level of social participation represent something more than talkativeness and correspond more to a notion of maturity of communicative intent. Our finding of more private speech in a situation with peers than with adults, while contaminated with other variables, is also consistent with Vygotsky's observations of more private speech in situations in which social communication and self-communication are similar (and contrast with Piaget's 1956 report of more private speech with an adult auditor).

While Vygotsky's characterization of private speech, as parasocial, is more consistent with the findings than Piaget's characterization of it as egocentric, it is still essentially a negative rather than a positive characterization of its functional significance in social development. A more positive characterization of its functions was derived in the introduction from Mead's perspective. In Mead's theory the similarity of self-communication and social communication found in the young child represents not so much a lack of differentiation of the perspectives of self and other as the nonexistence of a self's point of view prior to acts of social communication. The self (or the self's meaning) is established in social communication. While this point of view also assumes some early lack of self-other differentiation, it does not attribute great significance to the distinction between Piaget's phrasing that the child distorts forms of social speech in the interests of self-communication or Vygotsky's phrasing that the child gives self-communication a quasi-social appearance. More positively, Mead's theory suggests that the differentiations involved are somewhat different at different points in development, with lower forms being more "egocentric" and higher forms more "parasocial." The essence of Mead's view, however, is the postulation that the dialogue form (questions answered by the self) is a necessary step in the internalization of speech as linguistic thought. While our evidence located the dialogue form as an intermediate developmental step in the hierarchy, the dialogue form was not so common as to

conclusively establish its place in development. It may be hoped that future studies of private speech might employ the category system described and so supply clearer evidence concerning this question.

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