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ABSTRACT

The inferential use of linguistic and extralinguistic information in structuring conversations was studied in 90 three- and five-year-old children. Pictures portraying an actor-action-object relation, e.g., a child picking a flower, were used to guide conversational sequences. Both active pictures (which emphasized an action relating actor and object via postural cues) and static pictures (which did not) were used. Linguistic topics were implied by prefacing each picture with comments topicalizing actor, action, or object. Neutral control groups were run in which no topic was implied and, in an explicit control group, the actor's action on the object was directly topicalized for three-year-olds. Neither actor, action, nor object productions of three-year-olds varied significantly with topic; explicitly defining a topic increased the incidence of action and object responses and induced pronominalization or ellipsis of actor. Five-year-olds ellipsed or pronominalized actors for implied object and gave fewer action and object productions when actor was implied. Indefinite articles were used more than definite by both groups. Five-year-olds are clearly sensitive to implicit linguistic topics, whereas three-year-olds seem to require explicit topic definition for contingent replies. The increase in object utterances to active pictures is taken to support the notion that extralinguistic information may guide early linguistic productions and conversations. (Author)

Developmental Pragmatics: Linguistic and Extralinguistic Bases of early Conversations

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Running head: Commenting on Topics

The research reported herein was conducted while the first author was on faculty at Mount Saint Vincent University, Halifax, Nova Scotia. Special thanks are due to G. Dragone for preparing drawings and interviewing children. Gratitude and thanks are extended to the many perschoolers who participated in this study. For your convenience, requests for reprints may be directed to either author. First author's address is Psychology Discipline, Flinders University, Bedford Park, South Australia, Australia, 5042; second authors's address is Psychology Department, Acadia University, Wolfville, Nova Scotia, Canada, B0P 1X0.

Developmental Pragmatics: Linguistic and Extralinguistic

Bases of early Conversations

The study of language acquisition has dealt extensively with factors influencing the emergence of grammar or linguistic competence (de Villiers & de Villiers, 1978). This work has made it clear that linguistic performance and the pragmatics of appropriate language use are vital to and may underlie the language acquisition process (cf, Bates & MacWhinney, 1979; Dore, 1977; 1979). The present research is a pragmatic study of an emerging aspect of communicative competence: The inferential use of linguistic and extralinguistic information in structuring children's conversations.

Because coherent conversations necessitate careful monitoring of topic foci, it is particularly important that the child identify 'given' or known information (Chafe,1970; MacWhinney & Bates, 1978) in order to add relevant 'new' information pertinent to a particular topic. Given information can be picked up from both linguistic and extralinguistic sources that may be either implicit (tacit) or explicit (direct). While it is likely that young children use both linguistic and extralinguistic information to aid them in mapping meaning onto language (Bates, 1976; Greenfield & Smith, 1976), their separate and combined contributions to children's conversational responses have not been determined adequately (Dore, 1977).

Much of the available data gathered in naturalistic settings suggest that young children use both sources of information in mapping meaning onto language. However their unique contributions to conversational competence is equivocal because in naturo both are concurrently present and cues actually constraining conversations are unclear (cf., Bates, 1976; Dore, 1977; Bloom, Rocissano, & Hood,

1976). In the present study the influence of linguistic and extralinguistic information on young children's conversational comments was examined.

Experimental data (Bacharach & Luszcz, 1979) showed that children of three years were not as adept as children of five years in using implied linguistic information to structure their comments about actions in pictures. However Bacharach and Luszcz may have underestimated young children's communicative competence. Young children frequently omit verbs from their spontaneous utterances (Bloom, 1970) and more often comment on people and things aroung them (Bates, 1976; Nelson, 1973). Therefore, limiting conversational topics to actions and objects may have precluded their demonstrating topic detection. Young children may show more evidence of topic detection if action topics are made more explicit and/or if an attempt is made to increase comments on other less frequently uttered nominal topics.

Nominal relations are probably more easily represented explicitly in pictures than actions to the extent that nouns can be directly depicted whereas action relations must be inferred from artistic cues and spatial arrangements of items. The Bacharach and Luszcz study focussed on assessing conversational comments based on use of linguistically implied information alone, and the drawings minimized postural cues to action. This may have disadvantaged the younger children who seek topic definition extralinguistically. The explicitness of actors in drawings, particularly static ones, may effectively override young children's use of linguistic information in structuring conversations about other topics. It has been shown that young children can detect actions implied by postural cues used in

drawings (Friedman & Stevenson, 1975; Taylor & Bacharach, in press), thus young children may more readily exploit extralinguistic information to detect action topics if actions are more directly represented pictorially.

Young children may likewise demonstrate more topic detection if some other nominal topic as well as an action one were specified. Objects can be as directly portrayed in pictures as actors, therefore if topic detection is supported by direct extralinguistic information and if children tend to comment more on nominals anyway, detection of object topics may be more readily demonstrated than action ones for young children. To more fully assess young children's communicative competence, it would be necessary to devise conditions that might decrease production of actor utterances and increase production of other types. This was attempted in the present study by emphasizing action topics pictorially through postural cues and by introducing a second nominal topic, object, that is pictorially as explicit as agent.

Implicit linguistic topics were specified by prefacing each of a series of pictures with structured comments that topicalized either the actor, action, or object portrayed. Extralinguistic information was manipulated by having two renditions of each picture: One emphasizing, the other de-emphasizing, action states. In neutral control groups no topic was implied. Because young children may not spontaneously mention portrayed actions or objects of actions, additional three-year-olds received an explicit control condition in which actor was explicitly given and the relationship of the actor to the rest of the picture was explicitly interrogated.

It was hypothesized that younger children would be more likely than older children to predicate their conversational comments on

extralinguistic information, while older children would depend mainly on linguistically implied comments to guide their conversational replies. Linguistically explicit topic definition was expected to augment younger children's contingent conversational replies.

Method

Subjects

Ninety preschoolers in Halifax, Nova Scotia participated in the study. They were assigned to treatment conditions randomly. Across groups approximately equal numbers of boys (44) and girls(46) participated. Children were either between the ages of 2-6 to 3-6 (mean CA = 3-1) or 4-6 to 5-6 (mean CA = 4-11). All children had parental consent to participate and were also personally given the perogative to decide whether or not to join in the study.

Stimuli and Materals

Eight simple black on white line-drawings (20.3 x 25.4cm) portraying actor-action-object relationships (Brown, 1973) were used. The pictures were: a child and flower; a fireman and ladder; a horse and wagon, and a cat and ball of yarn. Two renditions of each were prepared: One emphasized the action relating an actor and object via postural cues and one was more artistically neutral with respect to an action (See Fig. 1).

Design

The experimental design consisted of an orthogonal combination of three between groups factors: Age (3, 5); Picture (active, static); and Topic (neutral control, implied actor, implied action, implied object). Linguistic topics were implied by prefacing picture presentation with comments topicalizing actor, action, or object. Neutral control groups were run in which no topic was implied and, for

three-year-olds, an explicit control group topicalizing the actor's action on the object was included. The latter control was run to demonstrate that the younger children could identify actions and objects in each picture and could respond to explicitly defined topics. Comments for the child/flower picture are given in Table 1.

Procedure

Children were seen individually in a relatively quiet area in their preschool centre. A female research assistant engaged each child in a free-flowing conversation. Once rapport had been established and the child was freely chatting, conversation was directed toward the experimental task and pictures. Each child was shown either the four active or static renditions of each picture in a random order. Appropriate comments always preceded picture exposure. The entire session was audio-recorded and later transcribed.

Two judges independently scored the first intact statement made by the child following picture presentation for actor, action, or object elements. Scoring discrepancies between raters were rare. Less than 1% of responses were unintelligible and these were classified as 'other' and eliminated from analyses. Protocols were scored not for a particular actor, action, or object, but for any reasonable instantiation; e.g., a child might have called the child a boy or girl, he or she; the flower grass or plants or them; picking touching or getting, and be scored as having given an appropriate response.

Results

The proportions of each child's utterances containing actor, action, and object responses, pronouns, and definite or indefinite articles were examined. Treatment of results will focus on each in turn.

Productions of actors, actions, and objects

Separate Age by Picture by Implied Topic analyses of variance were done on the proportions of utterances containing actor, action, and object elements. Table 2 provides a summary classification of the types of utterances children produced. Figure 2 graphically summarizes these productions as a function of age and topic. Actors were the most frequent component contained in the utterances of the three- (.87) and five-year-olds (.91). The analysis showed significant effects of Topic [$F(3,64) = 4.66$, $p < .005$] and the interaction of Age, Picture and Topic [$F(3,64) = 3.38$, $p < .02$]. Separate Picture by Topic analyses at each age showed actor responses given by younger children did not vary significantly with Picture or topic. However, the Picture by Topic interaction [$F(3,32) = 2.65$, $p < .06$] approached significance, the trend being for object topics accompanying active pictures to result in significantly fewer actor responses (.65) than any other condition (range .75 to .99). A significant Topic effect [$F(3,32) = 6.33$, $p < .02$], was obtained for five-year-olds. Tukey(b) multiple comparisons showed that implied object Topics (.67) resulted in significantly fewer actor responses than control (.97), implied action (.99), or implied actor (.99), for older children ($q = .27$ to $.29$, $p < .01$).

The proportion of both action and object responses increased with age (see Table 2) and for the older children was systematically related to implied topic. The analysis for action responses produced significant effects of Age [$F(1,64) = 66.25$, $p < .001$], Topic [$F(3,64) = 6.38$, $p < .001$] and their interaction, [$F(3,64) = 6.84$, $p < .001$]. Older children gave significantly more action responses than younger in all conditions. Separate one-way analyses on Topic at each age showed action responses for three-year-olds were unrelated to topic [$F(1,32) =$

3.13, $p < .08$]. For the older children, Topic was highly significant [$F(3,36) = 11.74$, $p < .001$]. Tukey (b) multiple comparisons showed significantly fewer action responses in the actor biasing (.15) relative to each of the other groups ($q = .41$ to $.46$, $p < .01$).

Object responses reflected a pattern somewhat similar to that seen in action responses. Significant effects of Age, Age by Picture [$F's(1,64) = 55.46$ and 6.64, $p < .01$], Topic and Age by Topic [$F's(3,64) = 11.61$ and 3.45, $p < .02$] were observed. Analyses on Topic at each age showed object responses were low and statistically unrelated to topic condition for three-year-olds [$F(3,36) = 1.46$, $p < .23$]. Topic was significant for older children [$F(3,36) = 12.24$, $p < .01$]. Tukey(b) multiple comparisons showed older children produced more object responses following implied object ($q = .41$, $p < .01$) or action ($q = .40$, $p < .01$) or when no topic ($q = .28$, $p < .05$) was implied and fewer when actor was implied. Object responses appear to be the only ones affected by picture type for young children. Three-year-olds produce significantly more object comments given active than static pictures [$F(1, 38) = 8.13$, $p < .01$].

As has been mentioned previously, for the younger children an explicit control group was run to assess replies when the conversational topic was explicitly given rather than implied. This group's data were compared to that for the neutral control and the corresponding implied topic groups in separate 2 (Picture) by 3 (Topic: neutral, explicit, implied) factorial analyses of variance, (i.e., if action responses were being analyzed, then implied action was the corresponding implicit group; means are shown as stars on Figure 2.) Actor responses indicated a significant main effect of Topic [$F(2,24) = 7.82$, $p < .003$] and Topic by Picture [$F(2,24) = 3.43$, $p < .05$].

One-way Topic ANOVA's for active pictures yielded a significant main effect [$F(2, 12) = 9.37$, $p < .01$]. Tukey(b) multiple comparisons showed a significant ($q = .54$, $p < .05$) decrement in actor comments to active pictures by the explicit group (.30) relative to implied actor (.84) or control (.99). Topic was nonsignificant for static pictures for [$F(2,12) = .53$]. For action responses Topic produced a significant effect [$F(2,24) = 28.50$, $p < .001$]. Tukey(b)'s showed significantly more ($p < .01$, $q = .41$) action responses (.90) in the explicit control than in the neutral (.075) or implied action (.125) groups. Analysis of object responses showed a main effect of Topic [$F(2, 24) = 14.34$, $p < .01$] and a Topic by Picture interaction [$F(2,24) = 4.40$, $p < .02$]. Analysis for active pictures showed no differences as a function of Topic [$F(2,12) = 1.30$]. For static pictures, object responses differed significantly as a function of Topic [$F(2,12) = 32.62$, $p < .01$]. Tukey(b) showed significantly more object responses for the explicit control group (.94) than for implied object (.10) or neutral control (.25) ($q = .37$ to .40, $p < .01$).

Pronominalization and Article Use

According to McWhinney and Bates (1978; Bates & MacWhinney, 1979) ellipsis, pronominalization, and definite article use increase with increased givenness. Analysis of pronominalization and article use were done to see how these sentential devices are related to implied topics. Analyses of ellipses were not done as this information is functionally the inverse of the analyses done on proportion of actors, actions, or objects in children's productions. Age by Picture by Implied Topic by Grammatical Class (subject,object) analyses of variance were done on proportions of subjects and objects represented in pronoun form; a further factor, Article Type (definite,

indefinite), was included in analyses of the proportion of subjects and objects uttered that were modified by a definite or indefinite article (all p's < .01).

Analyses of pronouns showed significant effects of Age [$F(1,64)$ = 15.05], Age by Topic [$F(3,64)$ = 4.10], Grammatical Class [$F(1,64)$ = 12.15], Age by Grammatical Class [$F(1, 64)$=7.14], Topic by Class [$F(3,64)$ = 4.95], and Age by Topic by Class [$F(3,64)$ = 6.07]. Picture had no bearing on pronoun use.

Topic by Class analyses at each Age showed no significant effects for younger children. Topic [$F(3,36)$ = 3.25], Class [$F(1,36)$=10.33] and their interaction [$F(3,36)$ = 5.93] were significant for older children. One-way analyses on subjects versus object for each Topic condition showed no significant effects for control or actor, but subjects were significantly more often pronominalized than objects for action (mean = .47; $F(1,18)$ = 7.71) and object topics (mean = .49; $F(1,18)$ = 10.62].

A further Picture by Topic by Class analysis of variance was done on the three-year-olds' data including the explicit control group. This analysis produced significant effects of Topic [$F(4,40)$ = 11.21], Class [$F(1,40)$ = 12.51], and their interaction [$F(4,40)$ = 7.86]. Previous analyses had shown no difference for the first four topic conditions, so a one-way ANOVA was done on proportions of subjects vs objects pronominalized by the explicit group. This produced a significant effect [$F(1,9)$ = 1.88, p < .01]. When explicitly asked what the actor is doing, children pronominalized actors 60% of the time, compared to 8% object pronominalization. Pronominalization occurred at a rate of 3% across the other groups.

Article-use analyses produced numerous significant main effects:

Age and Article Type (3.90 and 83.86, respectively) [all F's (1,64); F's in parentheses], and higher order interactions: Age [F's(1,64), p's $\leq$ .05] with Picture (5.04); with Grammatical Class (4.61); with Article and Grammatical Class (5.10); with Picture, Article, and Grammatical Class (10.57); and Age [F's(3,64), p's < .04] with Topic and Class (2.89); with Topic, Article, and Class (3.13); the Topic by Article by Class interaction was also significant (3.57). The two four-way interactions were further analyzed separately for each age.

Across pictures, Topic by Article by Class analyses of variance showed, for younger children, effects [all F's(1,36); p < .01] of Article (29.8), Class (7.25) and their interaction (6.33). Simple effects on the latter interaction showed no significant difference in definite articles modifying subjects (.068) and objects (.062), but significantly [$F(1,39) = 7.04$] more indefinite articles for subjects (.52) than object (.32). Older children showed a main effect of Article [$F(1,36) = 70.6$], and Topic [F's(3,36); p's < .02] interacted with Article Type (3.64), Grammatical Class (5.40) and with Article Type and Grammatical Class (5.84). Further Article by Class simple effects for each Topic condition showed only main effects of Article [F's(1,9); p's < .01] for control (30.93) and Action groups (7.28), main effects of Article (52.53) and Class (5.36) for actor; Article by Class interactions were seen for actor (7.30) and object (7.13). Subject versus object one-way analyses for implied actor and object showed no significant differences in definite article use. Significantly more indefinite articles were used with subjects (.87) than objects (.43) for implied actor [$F(1,18) = 6.73$, p < .02] and significantly fewer for subjects (.15) than objects (.57) for implied object [$F(1,18) = 10.64$, p < .01].

children, effects of Picture (4.62), Article (31.20), Class (8.19), Article by Class (7.72) and Picture by Article by Class (7.32) were observed. Separate Article by Class analyses of variance for Active pictures showed a main effect of Article [$F(1,19) = 9.63$], (definite = .12; indefinite = .48). For static pictures, Article (37.56), Class (10.19), and their interaction (12.61) were significant [F's(1,19); p's $< .01$]. One-way subject versus object analyses showed significantly more indefinite articles [$F(1,19) = 11.94$] modifying subjects (.58) than objects (.19) but no difference for definite articles (subject = .01; objects = .03).

Younger children's data were analyzed including the explicit control group. The pattern resembled that above, but produced an additional Implied Topic by Grammatical Class interaction [$F(4,40) = 5.58$, $p < .001$]. Previous analyses had shown implied and neutral control did not affect article use; a one-way subjects versus object analysis for the explicit topic group showed significantly [$F(1, 19) = 18.43$, $p < .01$], more articles used with objects (.29) than subjects

(.01). This is congruent with the high incidence of subject pronominalization in this group.

Discussion

These data reflect a clear developmental difference occurring between three and five years of age in the ability to detect and use conversational topics. The five-year-olds consistently infer the communicative intent of implicit linguistic topics, while the three-year-olds show little evidence of this skill. Yet three-year-olds are hardly communicatively incompetent. The pattern of responding seen when a topic is explicitly 'given' to young children shows that they can indeed be made to converse about actions and objects as opposed to actors in pictures. It appears that between three and five years of age children acquire a sensitivity to linguistic inference that is reflected in their conversational rejoinders; a necessary precursor to this is a sensitivity to explicit topic definition, a skill mastered by three.

These conclusions are based on several aspects of the data. First, nearly 74% of the utterances given by the younger children contain only the actor. The proclivity of young children to comment on actors despite implicit linguistic and extralinguistic biasing toward other conversational topics can be overridden when 'given' information is made explicit through a direct question. When this was done actors were ellipsed or pronominalized and action-object relationships were verbalized. This indicates that linguistically given information had been identified. Pronominalization is a particularly robust demonstration of topic detection; it occurred in 68% of the utterances of the explicit control group and in less than 3% of all other groups. Linguistic guidance of young children's topic selection seems to depend

on explicit communicative intentions.

The older children are much advanced in their demonstrated communicative competence. They show a flexibility in topic production that is complemented by syntactically appropriate sentential devices, i.e., frequent pronominalization of 'given' or old actors (49% of actors uttered were pronominalized). Evidence of appropriate linguistic inference is most clearly seen in older children's data when the pattern of decrements in the proportions of actor, action, and object productions is examined. Actor productions decline following implied object; action and object productions decline markedly following implied actor. Failure of action productions to drop following implied object is attributable to the propensity of older children to produce full sentences (see Table 2). Since verbs are not amenable to pronominalization they are maintained. A very dramatic indication of topic detection in the older children's data is the ellipsis of both action and object by them in the implied actor group.

There is some evidence that the picture manipulation behaved in the anticipated manner. It was expected that active pictures would facilitate topic inference of the younger children since it has been observed that children acquiring language depend on extralinguistic cues to map meaning onto language (Bates, 1976; deVilliers & deVilliers, 1978; Nelson, 1973). Data offering support for this notion are found in the increase in object productions of three-year-olds shown active pictures. As suggested by Bates (1976), children may begin the process of mapping linguistically implied information by using information implied extralinguistically, e.g., perceptually available information, here present in drawings. This possibility becomes more compelling when one considers that extremely

high probability (actor) and low probability (action) utterances would effectively mask any picture effects that might be operating. The one instance where there is a decline in actor productions (implied object /active pictures) concurs with the pattern seen in object productions. That is, pictures where actions are implied artistically do seem to facilitate detection of a linguistic topic. Active pictures also elicited 50% more articles than static and this too may illustrate the regulation of early linguistic productions by extralinguistic information. The failure to find stronger effects of the extralinguistic manipulation may be related to the method used to depict the static-active distinction. Until this possibility has been further examined the above conclusions must be tentative.

The main implication of the article use data is that although older children correctly inferred implied topics, neither they nor the younger children viewed the items represented in the pictures themselves as 'old'. MacWhinney and Bates (1978) suggest that definite articles will be used when the speaker presupposes the listener can make a match between a noun and a particular referent in working memory. The match could derive from remembering the referent had been mentioned in conversation or from perceiving the referent directly in the environment. The prefacing comments that formed the basis of conversational reference implied classes of referents, not a specific one. If article choice is based on conversational context, the items contained in a picture would be 'new' and indefinite article selection would be appropriate. Alternatively, all items were visually shared by speaker and listener, thus one might have expected higher incidence of definite article use on two grounds: Karmiloff-Smith's (1977) contention that early definite articles are exophorically deictic and

Piaget's (1955) notion that young egocentric children tend to use specific referencing devices on the assumption that the listener shares their knowledge. The present data offer little support for either of these positions.

The propensity of indefinite articles suggests at least that children between three and five when first viewing a pictured object assume it is new and will modify it with an indefinite article. This would be expected on the basis of MacWhinney and Bates' (1978) report that indefinite article use decreased in descriptions of a series of pictures in which recurring items increased in givenness. It is possible that the use of indefinite articles stemmed from retention and correct use of information provided in the prefacing comments. This conclusion is not fully warranted by the present data and further studies will have to disentangle the relative contributions of linguistic and extralinguistic information in determining article use (cf., Maratsos, 1974).

The failure of the young children to use implicit linguistic information to structure their conversational responses is also difficult to interpret unequivocally because it is essentially a negative result. This finding may have been due to several factors including the children's failure to appreciate that the experimenter's comments were intended as a preface to picture presentation, the possibility that children picked up the implicit information but chose not to use it, or that they picked up the information and did not know how to use it. Whatever the locus of the communication failure, and there may be several loci, extensive research will be needed to isolate the effects. The results, however, clearly show that the older children have developed the necessary communicative competence to

handle the task. The younger children's failure to do so is probably not an attention problem as they responded appropriately when implicitly given a topic of conversation and also were as likely as the older children to spontaneously interject corresponding comments during the experimenter's prefacing conversation (about 80% of the three-year-olds and 83% of the five-year-olds did so). This illustrates that they did perceive the situation as a conversation requiring turn-taking, an early-attained communicative competency (Keenan & Klein, 1975).

In summary, although children as young as three can detect and comment on actors, actions, and objects portrayed in pictures, they tend usually to comment on actors alone. This tendency can be overridden linguistically by explicitly stating the conversational topic and extralinguistically by providing explicit perceptual cues. By five years of age children readily detect an implied topic. This communicative competence is reflected pragmatically in their topic choice and syntactically by employing appropriate sentential devices.

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Implied Topic	Comments
Actor	Do you know that there are a lot of different kinds of people?
	A man is a person.
	A lady is a person.
	A baby is a person.
	Here's a picture, tell me about it.
Action	Do you know children can do a lot of things?
	Children can draw pictures.
	Children can fly kites.
	Children can throw balls.
	Here's a picture, tell me about it.
Object	Do you know children can pick a lot of things?
	Children can pick up toys.
	Children can pick up balls.
	Children can pick up books
	Here's a picture, tell me about it.
Control Groups	
Neutral	Here's a picture, tell me about it.
Explicit	What's the child doing in this picture?

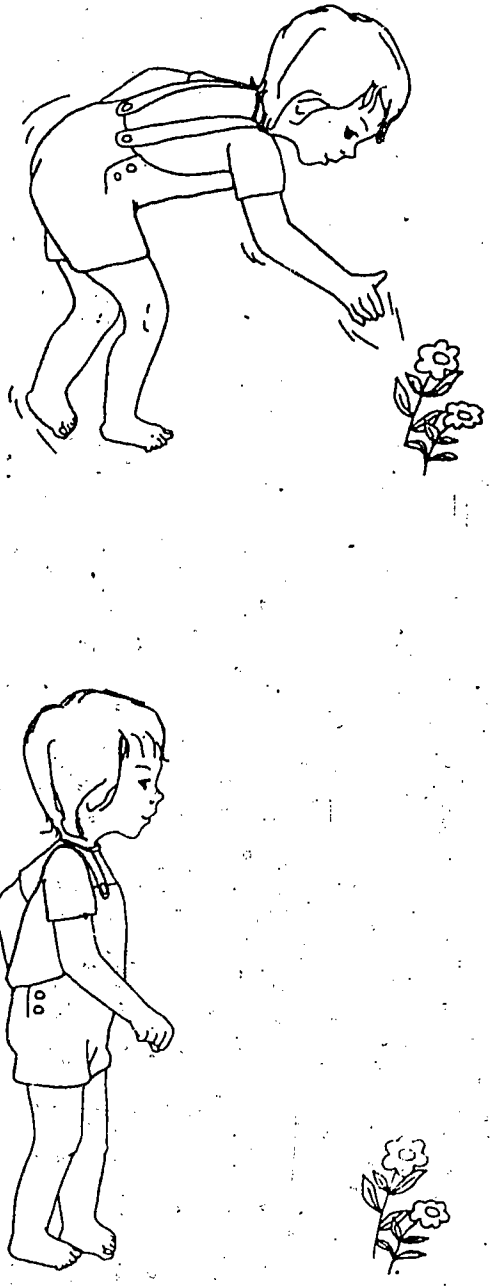
Table 2

Proportions of Each Type of Utterance for Three and Five-year-old Children as a Function of Linguistic Topic

	Age	Utterance Type						
		Ar	An	Ob	Ar+An	Ar+Ob	An+Ob	Ar
	3	.80		.03	.08	.05		
	5	.73				.13		
n	3	.68		.13		.05		
	5	.08			.08	.08		
t	3	.73		.23				
	5	.05	.03	.05	.03	.05	.25	
al	3	.73		.05	.05	.18		
	5	.33			.05	.08	.03	
cit	3		.15	.08	.05		.28	

'Ar', 'An', 'Ob' refer to 'Actor', 'Action', 'Object', respectively.

Figure 1. Example of Active (top) and Static (bottom) Pictures.



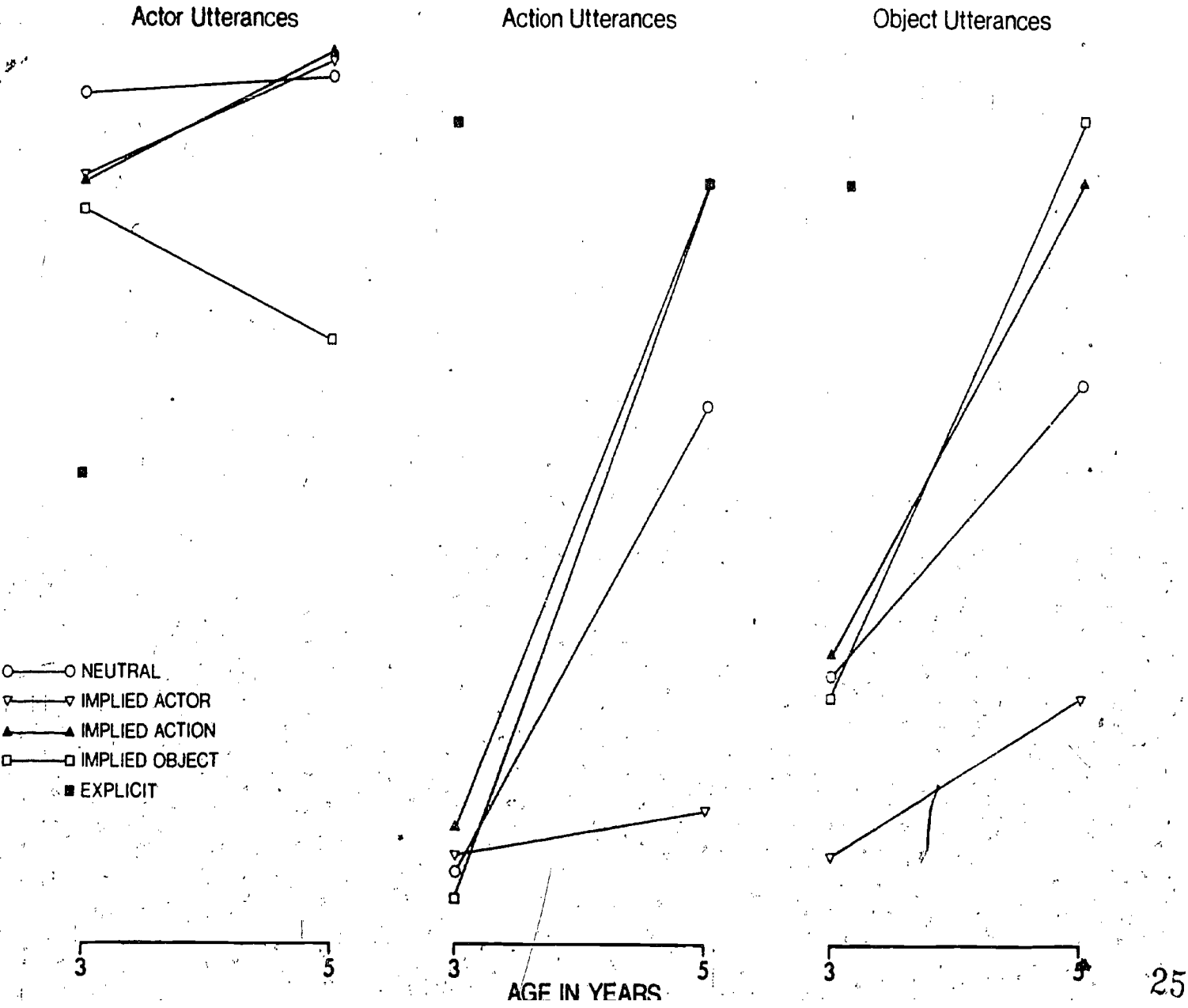

Actor Utterances
Action Utterances
Object Utterances
NEUTRAL
IMPLIED ACTOR
IMPLIED ACTION
IMPLIED OBJECT
EXPLICIT
3
5
3
5
3
5
AGE IN YEARS

Figure Captions

Fig. 1 Action and a Static Portrayal of a Boy Picking a Flower.

Fig. 2 Type of Response Given by Children as a Function of the Type of Comment used to Preface Picture Presentation and the Children's Age.