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CHILDREN'S INTERPRETATION OF OBJECT TERMS EMBEDDED IN LINGUISTIC CONTEXTS

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CHILDREN'S INTERPRETATION OF OBJECT TERMS EMBEDDED IN LINGUISTIC CONTEXTS

by

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INTRODUCTION

In the study of semantic development children's acquisition of stable word meanings has been an issue of focal interest. How does the young child come to discover that words have "enduring, conventionally determined and culturally shared meanings that transcend the immediate linguistic context?" (Werner & Kaplan, 1963). Consistency across contextual variation is implicated as an important characteristic of word meanings.

However, language use also involves "semantic flexibility" (Barclay, Bransford, Franks, McCarrell, & Nitsch, 1974) in that different aspects or attributes of lexical items may become salient on different occasions of use. In order to fully appreciate the significance of a given utterance, speakers/hearers have to assign context-appropriate interpretations to individual lexical items (e.g,,Barclay et al., 1974; Bransford & McCarrell, 1974; Bransford, McCarrell, Franks, & Nitsch; 1977; Miller & Johnson-Laird, 1976; Olson, 1970). That task frequently involves inferential processes (Bransford et al., 1977; Brown, Smiley, Day, Townsend, & Lawton, 1977; Frederiksen, 1972, 1975; Kintsch, 1974, 1977).

The present study examines whether children's understanding of object terms presented in a linguistic context is congruent with a constructivist model of

comprehension. Four and 6-year-olds' ability to offer interpretations that contained inferential information derived from linguistic contexts was explored.

A discussion of the theoretical framework adopted here will be presented, followed by a review of pertinent empirical evidence concerning adults' and children's interpretive, inferential abilities. Finally, the present project will be introduced.

Theoretical Framework Adopted

The questions posed here concern developmental changes in children's appreciation of the significance of lexical items embedded in linguistic contexts. Emphasis on utterance meanings or on linguistic tokens (Katz & Langendoen, 1976) places the present project in the domain of language use. Consequently, concerns about the competence of ideal speakers/hearers (see Fillmore, 1972; Katz, 1972; Katz & Langendoen, 1976; Valian, 1979, for a review of these issues) are not addressed.

According to the position adopted here, the significance of lexical items is not immanent in linguistic input (Paris, 1975), but has to be actively constructed by language users (e.g., Barclay et al., 1974; Bransford & McCarrell, 1974; Bransford et al., 1977; Olson, 1970). Lexical items are held to be underdetermined with respect to their significance or intended or understood meanings

(Bransford et al., 1977) on particular occasions of use. In other words, the same lexical items may assume a variety of significances (e.g., Bransford et al., 1977; Bolinger, 1965; Miller & Johnson-Laird, 1976; Olson, 1970). For instance, the utterance "Smith is sitting in the chair" may be intended to identify Smith, to identify a particular chair, to indicate Smith's location or his actions on the chair as well as a variety of other matters (Miller & Johnson-Laird, 1976).

In view of the variability in the significance of lexical items reliance on fixed dictionary meanings is insufficient for comprehension. Rather, language users have to actively determine the intended meanings of lexical items which are held to be a "joint function of the meanings of the entities and particular contexts in which they occur" (Bransford & McCarrell, 1974). To arrive at the significance of lexical items speakers/hearers have to engage in elaborative, constructive activities (Barclay et al., 1974; Bransford & Franks, 1971; Bransford & McCarrell, 1974; Bransford et al., 1977). Comprehension is postulated to entail semantic integration of textual information, the result of which is the transformation of the original linguistic input. Semantic integration may take the form of an amalgamation of pieces of information that were presented separately (e.g., Barclay & Reid, 1974; Hayes-Roth & Thorndyke, 1979; Paris & Lindauer, 1977). Since the

intended meaning of lexical items is underdetermined with respect to particular occasions of use, semantic integration may also involve "going beyond the information given," i.e., may entail semantic inferences on the basis of subjects' knowledge states and pertinent contextual cues. It is interesting to note that proponents of various theoretical positions concur in emphasizing the import of world knowledge and consideration of pertinent contexts (e.g., Bransford et al., 1977; Frederiksen, 1972, 1975; Katz, 1977; Katz & Langendoen, 1976; Kintsch, 1974, 1977; Kintsch & van Dijk, 1978; Miller & Johnson-Laird, 1976; Olson, 1970; Shank, 1975; Smith, 1977) in language comprehension.

In summary, the model of comprehension adopted here postulates constructive, elaborative activities that are guided and constrained by consideration of pertinent contexts and frequently involve inferences. While extralinguistic context undoubtedly plays an important role in comprehension, only the impact of linguistic context will be considered here. The present study was aimed at examining whether young children's approach to contexted lexical items is congruent with a constructivist model of comprehension. In order to assess children's tendency to assign differential interpretations to object terms as a function of pertinent linguistic context children were

queried about the same object terms embedded in different story contexts.[1] The linguistic contexts highlighted, but did not explicitly identify different attributes[2] of the object terms. Hence comprehension of the intended meaning of object terms required interpretive, inferential activities. Before discussing the present project in greater detail pertinent studies of adults' and children's interpretive, inferential abilities will be reviewed.

Pertinent Adult Literature on Interpretive, Inferential Skills

Adults' tendency to approach text in a constructive, elaborative manner has been explored with respect to their memory for inferential relations in sentences and prose passages. While memory related issues are not of interest here, subjects' tendency to make inferences on the basis of linguistic context is. Therefore, memory studies are of some relevance to the present project.

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[1]Story contexts are discussed here as the bases for the selection of particular attributes of target object terms. This does not imply that the significance of story contexts is unambiguous. Rather, their intended meaning is viewed as relatively clearer than that of target object terms.

[2]The present approach does not entail a distinction between lexical and general conceptual domains of knowledge. For expositional convenience, information pertinent to the interpretation of target object terms will be discussed as attributes of the object terms. The terminology is not intended to deny children's knowledge of referent objects as an important source of information.

The paradigms most commonly employed are recognition and recall tasks. In a typical recognition paradigm, subjects are exposed to text, and after short delays, are requested to select from a list of items those that occurred in the original text. Lists of items generally contain a) actual excerpts from the text, b) inferences that are compatible with the information previously presented without having been explicitly stated, and c) filler items. Subjects' responses are viewed as reflecting their representation of the original text; false recognition of "new" compatible items as "old" is regarded as evidence for semantic inferencing. For instance, Bransford, Johnson and Solomon (1973) presented subjects with acquisition sentences such as "John was trying to fix the bird house. He was pounding the nail when his father came out to watch him and to help him do the work." Among the items provided during the recognition phase of the experiment were unrelated sentences, the above acquisition sentences, and a sentence containing inferential information, e.g., "John was using the hammer to fix the bird house when his father came out to watch him and to help him do the work." Subjects who recognized the latter sentence as "old" were credited with inferences about implied instruments.

Recall paradigms explore the effectiveness of cues that are inferentially related to linguistic acquisition materials in promoting recall of these materials. Cues

facilitating recall are held to reflect subjects' representation of the original linguistic input. For example, Till (1977) prompted recall of the sentence "the secretary circled the dates" with the cues "calendar" (inferred object) or "manuscript" (irrelevant object). Superior recall of the input sentence upon presentation of the former cue was regarded as evidence for subjects' tendency to make semantic inferences.

Adults are generally reported to make context appropriate semantic inferences. They erroneously recognize as "old" items explicating previously implied instruments, consequences of actions (Johnson et al., 1973) and locations (Bransford & Franks, 1971), and are able to recall previously provided information on the basis of cues about implied instruments (Masson, 1979), and implied objects (Till, 1977). Adults utilize linguistic context to "go beyond the information given". (Comparable research with children will be reviewed in the following section.)

With respect to the present interest in subjects' ability to assign differential interpretations to the same object terms as a function of changes in linguistic contexts, studies employing the same lexical items while providing differential contextual frameworks are of interest. Some of these studies involve polysemous materials, i.e., lexical items that have "categorically distinct senses" (Anderson, Pichert, Goetz, Schallert, Stevens, & Trollip,

1976). Research projects are aimed at demonstrating that subjects can be induced to focus on one of these senses as a function of the experimenter's manipulation of contextual cues.

Emphasis on changes in the sense of words differs from the present interest in variability in the salience of attributes of object terms that does not alter the underlying sense of the term. (E.g., viewing a chair as dirty versus regarding it as old[3] are both compatible with the same sense of "chair"). Research on polysemous materials is of interest here insofar as it explores subjects' ability to flexibly interpret linguistic input under consideration of contextual cues.

For instance, Schallert (1976) reports that subjects' memory of a polysemous paragraph as either pertaining to "problems of a baseball team manager" or "problems of the manager of a glassware factory" was determined by the experimenter's provision of a biasing title upon presentation of the paragraph. Likewise, the interpretation of ambiguous phrases with identical surface structures, but different deep structures was affected by surrounding linguistic context (e.g., Tzeng, Alva, & Lee, 1979). Numerous studies

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[3]Some sources, such as Anderson and Ortony (1975) and Anderson et al., (1976) regard such changes in the significance of lexical items as part of the domain of polysemy.

have demonstrated context determined variability in the encoding of the sense of homographs (e.g. Davis, Lockhart, & Thomson, 1972; Hunt, & Ellis, 1974; Light & Carter-Sobell, 1970; Paul, Bernbach, & Snuttjer, 1975; Pellegrinot & Salzburg, 1975).

Another set of studies focuses on context-based changes in the interpretation of general concrete nouns (Anderson, & Ortony, 1975; Anderson et al., 1976). Rather than postulating changes in the sense of these nouns, researchers explore subjects' tendency to encode particular category exemplars instead of the general terms presented in the original text. Anderson and Ortony (1975) report that general terms such as "container" were differentially interpreted as a function of their sentential contexts. For instance, the cue "bottle" facilitated recall of the sentence "the container held the cola." The same cue was ineffective for the sentence "the container held the apples," for which "basket" proved an effective cue. These findings were replicated and extended in a study by Anderson et al. (1976). "When interpreted in context, general terms were typically encoded on the basis of an instantiation," i.e., nouns were identified with "real or imagined things." This effect persisted when low associates or peripheral category members were implicated by context. For instance, for the sentence "the nurse pointed to the bird on the platter," the

cue "turkey" (peripheral member of the category bird) induced better recall of the original sentence than the cue "robin" (central category member). Anderson et al. (1976) conclude that subjects do not encode and store the meanings of general terms but transform information in accordance with contextual cues.

A study of contextual effects on the encoding of specific meaning constructs, i.e., words that have one distinct sense, is of particular interest to the present study. Barclay et al. (1974) demonstrated via a recall paradigm that subjects' interpretation of common nouns such as "piano" varied as a function of their particular sentential contexts. For instance, the sentence "the man lifted the piano" induced subjects to focus on the weight of pianos, while the sentence "the man tuned the piano" implicated pianos as musical instruments. Different attributes of the same common nouns were rendered salient by linguistic contextual cues. It may be concluded that adults assign variable, context-appropriate significances to contexted lexical items, and that these interpretations frequently involve semantic inferences.

As stated earlier, studies of subjects' memory for inferential information do not elucidate language users' immediate comprehension of text. It is unclear to what extent the findings reviewed above are attributable to memory effects as opposed to being characteristic of the

initial processing of linguistic input. The transformation of information may have occurred over time rather than during encoding. Hence the present questions concerning subjects' deployment of interpretive, inferential skills upon the presentation of text are not directly addressed in the above studies.

Pertinent Child Literature on Interpretive, Inferential Skills

In the field of semantic development, young children's understanding of object terms has received considerable attention. The identification and classification of attributes or features constituting the young child's early lexical concepts have been pursued. For instance, the primacy of perceptual, functional or contrastive features has been discussed (Anglin, 1977, 1978; Barrett, 1977; Clark, 1973; Gruendel, 1977; Nelson, 1974; Smith, 1978). Variability in children's focus on such attributes has been examined in terms of children's overextensions. Nelson, Benedict, Gruendel, and Rescorla (1977) view some referentially inappropriate applications of lexical items as indications of analogical word use. They propose that rather than labeling objects the young child may be attempting to point out the similarity of one object term with another. Such analogical statements have been observed with respect to various attributes of a given object. Bowerman (1977)

introduces the notion of "complexive word use," stating that "children do not consistently regard any single attribute as critical for word use but rather shift from one feature to another in successive uses." Variability of features underlying reference (Gruendel, 1977) may be viewed as an early version of differential interpretations of object terms. To date, there appears to have been no systematic examination of constraints on such variability in young children.

Some insight into older children's ability to construct variable, context-appropriate interpretations of linguistic input that involve semantic inferences can be gleaned from studies of children's memory for inferential information in text. These research projects are aimed at examining whether children's representations of linguistic input encompass inferential information, and whether such information has become integrated with explicitly provided input to the extent of being indistinguishable from the latter. Cued recall (Paris & Lindauer, 1976; Paris, Lindauer, & Cox, 1977) and recognition paradigms (Johnson & Scholnick, 1979; Liben & Posnansky, 1977; Paris & Carter, 1973; Paris & Mahoney, 1974; Somerville, Hadkinson, & Greenberg, 1979) similar to those described in the previous section have been commonly employed. As in the adult literature, the underlying assumptions are that facilitative

effects of inferential cues and false recognition of "new" items as "old" implicate semantic inferences as part of subjects' representation of the original text.

The questions raised in the study of memory for inferential information (integration of inferential and actually presented information) differ from those underlying the present research project (children's deployment of interpretive, inferential skills upon presentation of text). Nevertheless, the former set of studies is of interest here since they frequently contain claims about children's inferential abilities, and have thus colored the current understanding of the development of inferential skills. It should be noted that Paris and Upton (1976) have examined children's immediate comprehension of text. Subjects were presented with stories and were required to answer "yes-no" questions concerning information actually presented and inferential information. This research project will be discussed in conjunction with memory studies of inferential abilities, since it was motivated by the same theoretical framework.

Studies of semantic inferences have addressed the domains of inferences about implied instruments (Paris & Lindauer, 1976; Paris & Upton, 1976), and spatial relationships (Liben & Posnansky, 1977; Paris & Carter, 1973; Paris & Mahoney, 1974; Somerville et al., 1979), as well as inferences based on seriation (Johnson & Scholnick,

1979), inclusion (Johnson & Scholnick, 1979), semantic entailment (Paris & Upton, 1976) and consequences of actions/events (Paris & Upton, 1976; Paris et al., 1977). An age range from kindergarteners through seventh graders and college students has been covered.

Kindergarteners and first graders were found to recall significantly fewer sentences when presented with cues about implied instruments than when given explicit cues that had occurred as part of the original input (Paris & Lindauer, 1976). The experimenter's provision of cues about implied consequences of actions did not facilitate recall in subjects of this age group (Paris et al., 1977). Performance under these conditions was equivalent to that observed on a free recall paradigm. These findings have led to the conclusion that kindergarteners and first graders do not spontaneously include inferential information in their representation of text.

Liben and Posnansky (1977) examined the bases for young children's false recognition of inferential information as "old". They hypothesized that rather than making semantic inferences children might be relying on familiar lexical characteristics of sentences, e.g., the relational terms used and noun orders. Liben and Posnansky's study (1977) involved alterations of such lexical characteristics of acquisition sentences. For instance, the premises "the

surprise was in the box" and "the box was behind the door" were transformed into the true inference (with changed relational term and noun order) "the door was in front of the surprise." For this type of true inference false recognition was rare. Liben and Posnansky (1977) conclude that kindergarteners and first graders do not spontaneously make semantic inferences. As stated above, this view is shared by other sources (Paris & Lindauer, 1976; Paris et al., 1977).

The nature of young children's difficulties with semantic inferences was explored by Paris and Upton (1976), who examined differential developmental patterns associated with various types of inferences. Paris and Upton (1976) distinguish between lexical and contextual inferences. Lexical inferences are defined as being predominantly based on individual lexical items. Examples of lexical inferences are semantic entailment (e.g., reference to a "little sister" in an experimental story entails reference to a "girl" or "child") and implied instruments (e.g., reference to someone "chopping wood" indicates that an "axe" was most probably used). Inferences that require integration of intra- or intersentential information are labeled contextual. Presuppositions (e.g., events described in an experimental story make it highly probable that a previous state/action has occurred) and consequences (events described make it

highly probable that a subsequent event/action will occur) fall into this category. The notion of context-independence of certain lexical inferences, namely those involving implied instruments, seems questionable in light of Anderson and Ortony's finding (1975) that implied instruments vary as a function of intrasentential factors. "The accountant pounded the desk" implicates his fist as the instrument used. "The accountant pounded the stake" suggests that a hammer was employed. Nevertheless, treatment of semantic inferences as heterogeneous phenomena seems fruitful. Paris and Upton (1976) report that kindergarteners had much greater difficulty with contextual than with lexical inferences. This finding suggests that the integration of text is a skill not mastered by young children.

However, conclusions about young children's difficulties have to be qualified in light of the observation that children were able to utilize inferential cues after having been induced to make inferential information explicit. Paris and Lindauer (1976) report that children who were requested to play-act sentences about implied instruments tended to indicate, through their actions, that particular instruments were used. Following this, cues about those implied instruments proved as effective for recall as were cues that had been explicitly stated in the original sentences. Paris et al. (1977) required children to make

up stories about sentences that implied consequences of actions. Those children who constructed the implied relationships spontaneously as part of their stories showed improved recall when presented with cues explicating implied consequences. On the basis of these findings, Paris et al. (1976, 1977) define children's limitations as "strategy production deficiency" (Flavell, 1970). In other words, young children's difficulties are seen as resulting from their failure to spontaneously deploy inferential skills rather than from the absence of such abilities.

Even this formulation seems to represent an underestimation of children's semantic inferential abilities. Somerville et al. (1979) report that 5-year-olds recognized as "old," statements that contained information about spatial relations not explicitly stated in the acquisition materials. Somerville et al.'s study (1979) involved use of concrete manipulable representations in the form of toy figures as well as overlearning of the explicitly stated spatial relations. Under these experimental conditions, 5-year-olds spontaneously deployed inferential skills.

In summary, several sources concur in the conclusion that 5-year-olds and first graders do not spontaneously make semantic inferences (Liben & Posnansky, 1977; Paris & Lindauer, 1976; Paris & Upton, 1976; Paris et al., 1977). Since children can be induced to establish implicit semantic

connections, their difficulty is viewed as arising from a lack of appropriate strategies for enhancing memory and comprehension (e.g., Paris & Lindauer, 1976; Paris et al., 1977). However, Somerville et al.'s findings (1979) indicate that even 5-year-olds are capable of spontaneous inferencing under conditions of overlearning of relevant information and of use of toy figures.

Somerville et al.'s report (1979) suggests that children's deployment of inferential skills varies as a function of task requirements. Hence interpretive, inferential abilities should be examined under a variety of experimental conditions to assess children's full potential with respect to these skills. In the present experiment, young children's interpretation of contexted object terms was investigated on two experimental tasks, free production and forced choice.

An important feature of Somerville et al.'s study (1979) is the reduction of memory requirements through overlearning of relevant information. Other developmental studies of memory for inferential information (e.g., Liben & Posnansky, 1977; Paris & Lindauer, 1976; Paris et al., 1977) necessitate the deployment of both memory and inferential skills. This dual requirement may impede children's interpretive, inferential performance. In order to maximize young children's deployment of interpretive, inferential skills, memory load was minimized in the present experiment.

Children's self-generated interpretations of contexted object terms are another area explored in the present study. In the developmental research discussed above, inferential performance has generally been evaluated on the basis of children's ability to respond to experimenter-provided cues. Improved recall of previously presented information upon the experimenter's presentation of inferential cues (e.g., Paris & Lindauer, 1976; Paris et al., 1977) and subjects' recognition of statements composed by the experimenter as "old" (e.g., Johnson & Scholnick, 1979; Liben & Posnansky, 1977; Paris & Mahoney, 1974; Sommerville et al., 1979) have been explored. These procedures do not provide information about the types of interpretations children generate themselves.

In addition to examining children's comprehension of contexted lexical items, it is interesting to explore their understanding of the bases for such interpretations. What do young children regard as relevant for the determination of the intended meaning of contexted object terms? Will they refer to story contexts? Will they make explicit inferential connections they establish? To what extent do accounts of interpretations reflect the interpretive, inferential activities children have actually engaged in? These questions were addressed in the present experiment by requesting children to provide rationales for previous interpretations of contexted object terms.

Finally, it seemed desirable to broaden the age range covered in previous studies and to assess younger children's interpretive, inferential skills.

Present Project

The present project was aimed at an examination of constructive, elaborative activities underlying young children's comprehension of contexted object terms. Children's ability to differentially interpret such terms under consideration of linguistic context, and to include inferential information in their interpretations, was explored. This was achieved by investigating subjects' ability to appreciate changes in the intended meaning of object terms as a function of specific story contexts.

Experimental materials were designed with an emphasis on their familiarity and relevance to young children. Object terms referring to basic level objects (Rosch, 1978) were selected as target items since they have been reported to feature early in semantic development (Anglin, 1970, 1977; Brown, 1976). Experimental stories were designed to emphasize as salient attributes which young children regard as associable with target object terms. The stories focused on themes believed to reflect common childhood experiences.

Children's interpretations of target object terms were obtained immediately following the presentation of a

given experimental story. This procedure was adopted to explore children's interpretive, inferential skills under conditions of minimal memory demands.

In order to elucidate the impact of task requirements on children's deployment of interpretive, inferential abilities, performance under two experimental conditions was contrasted. One group of subjects was presented with a forced-choice task, i.e., was required to select, from a set of three experimenter-provided response cues, the item that best matched the significance of a given target object term. Another experimental group was tested on a production paradigm, i.e., was requested to generate interpretations of contexted object terms.

Use of the production paradigm was intended to provide insight into the nature of children's self-generated interpretations of contexted target object terms.

Information about children's understanding of the bases for interpretations of target object terms was obtained by inquiring about children's rationales for their previous responses.

The above design was developed to address the following questions:

- Do children differentially interpret contexted object terms as a function of linguistic context? Do such interpretations include inferential

information, i.e. information derived from but not actually mentioned in the original text? These issues were explored by presenting the same object terms in the context of different stories, highlighting but not identifying different attributes of object terms. Children's tendency to offer variable interpretations of the same object term on different occasions of use, and context appropriateness of interpretations were examined.

- What is the impact of task requirements on children's deployment of interpretive, inferential abilities? This question was addressed through a comparison of children's performance on the production and forced choice tasks.
- What is children's understanding of the bases for their interpretations of contexted object terms?
  - Will they mention aspects of experimental stories when asked to motivate their interpretations of contexted object terms, thereby demonstrating sensitivity to the import of linguistic context?
  - Will children make explicit the inferential connections they have established? These issues were examined via an analysis of

children's rationales for their self-generated interpretations of object terms.

- What is the relationship between the accuracy of children's interpretations of contexted object terms and their discussion of the bases for such interpretations? For instance, will context-appropriate interpretations be explicitly motivated in terms of linguistic contexts? A comparison of the self-generated interpretation- and rationale data was undertaken to elucidate this question.

- What is the developmental course of the above phenomena? This question was explored with respect to two age groups. The younger group was the youngest age group to whom the present paradigms appeared meaningful. Pilot testing established 4-year-olds as this group. Their performance was contrasted with that of 6-year-olds, since first graders have frequently participated in related research projects. Thus the present study was designed to broaden the age range covered in previous investigations while also comparing children's performance on the present tasks with that of their peers in related situations.

METHOD

In order to evaluate children's interpretations of object terms embedded in linguistic context, it seemed critical to first obtain baseline data concerning subjects' understanding of the significance of these lexical terms. Two control tasks were developed to addressed this issue.

A definitional task was designed to determine which attributes children commonly associated with target object terms. In constructing experimental stories such attributes were never highlighted by story contexts, so that a contextually relevant interpretation would not be confounded with an already salient interpretation.

In a second task, target object terms were paired with attributes later to be highlighted by story contexts. The task was aimed at investigating whether subjects regarded certain attributes as associable with target object terms. This was undertaken to avoid contextual emphasis on unfamiliar aspects of the significance of object terms.

Subjects' use of contextual information was examined in two experimental tasks:

In a production task, children were presented with story contexts and questioned about the attributes of target object terms. In a forced choice task, they were

read the same stories and then required to select, among three possible choices, the response best describing a target object term. Thus the impact of task requirements on children's interpretive skills could be examined.

Control Tasks: Definitional; Applicability of Attributes

Definitional Task

Subjects: Twelve 4-year-olds ($\bar{X}$ = 4;5; range: 4;3 to 4;6), six girls and six boys, and 12 6-year-olds ($\bar{X}$ = 6;6; range: 6;2 to 6;10), seven girls and five boys served as subjects. All children attended a private NYC kindergarten/ elementary school; all were native English speakers.

Materials: Eight object terms referring to basic level artifacts (Rosch, 1978) were selected as target stimuli since nouns at this intermediate level of generality were expected to be familiar to young children (Anglin, 1977; Brown, 1976). The target object terms were chosen in such a way as to form four sets of object term pairs, i.e., sets of two object terms belonging to the same superordinate category. (The choice of object term pairs, rather than individual object terms occurred in view of the experimental tasks. To enhance the generalizability of experimental findings, story frames were desired to fit two object terms equally well. This led to the use of object term pairs the members of which were substituted

for each other for a given story.)

The object terms selected were:

cookie - candy

cup - plate

table - chair

pants - dress

Procedure: Subjects were tested individually by a female experimenter, who was a native English speaker. They were introduced to the task of reporting salient attributes of target object terms in the following manner:

> Imagine that someone from outer space comes to visit. She has never been here and does not know what things are all about. For example, she does not know what beds are like. I want you to help her out. Please tell her what things are like. O.k.? What is a bed like?

If the subject had difficulty in offering a response, the experimenter reiterated and clarified the question. After the subject responded the experimenter inquired about the eight target object terms. Six subjects of each age group were exposed to these object terms in different random orders. The remaining six subjects were presented with parallel orders with the other member of each object term pair appearing in the place of the first object term.

To obtain complete responses the experimenter inquired intermittently: "Is ther anything else about X I need to know?" Subjects' responses were recorded verbatim.

Findings pertinent to the experimental tasks: Four- and 6-year-olds' explications of the eight object terms presented were examined for reference to attributes that had been selected as potential target items for the experimental tasks. This was undertaken to avoid later contextual emphasis on attributes that were highly associated with target object terms under definitional conditions.

Only one of the potential target attributes was mentioned. This indicates that the attributes selected were not commonly viewed as integral parts of the significance of target object terms. (For a discussion of findings not directly pertinent to the present experimental project see Appendix D.)

Applicability of Attributes Task

Subjects: The same children as in the definitional task served as subjects.

Materials: Each of the eight target object terms was paired with a number of attributes, half of which were associable and half of which were non-associable with the particular object term. Twenty-one associable attribute-object term pairs were obtained by generating semantically acceptable attribute-object term combinations (e.g., heavy table). Twenty-one non-associable combinations were obtained

by pairing object terms with attributes that involved the feature [+ animate] (see Chomsky, 1965); e.g., happy table. The experimenter's associability judgments were confirmed by three adult raters who reached perfect agreement when requested to indicate whether or not attribute-object term pairs were semantically acceptable.

The same 42 attribute-object term pairs were then used in the applicability of attributes task. (See Appendix A for a complete list of attribute-object term combinations.)

Procedure: Each subject was tested individually by a female experimenter who was a native English speaker. Upon completion of the definitional task subjects were informed that they would be asked questions which required a response of: "Yes, that's right" or "No, that's silly." Two practice items were then presented: "Can a ball be red?" "Can a ball be grouchy?" The experimenter affirmed correct responses. If a subject answered incorrectly, s/he was asked to reconsider the problem.

After the practice questions had been answered correctly, the attribute-object term pairs discussed above were presented to six subjects of each age group in different random orders with the following restrictions:

- maximally four associable or non-associable attribute-object term pairs were presented in direct succession,

- members of a given object term pair (i.e., object terms belonging to the same superordinate category) were restricted to a maximum of three consecutive presentations,
- the same object term was not introduced on more than two successive trials.

The remaining six subjects of each age group were presented with the same attributes as their peers. However, these attributes were paired with the other member of a given object term pair. For instance, the question: "Can a dress be dirty?" was transformed into: "Can pants be dirty?" etc. Subjects' responses were recorded verbatim.

Findings pertinent to the experimental tasks:

Children's responses to attribute-object term pairs were scored as correct (affirmation of associable combinations; rejection of non-associable ones) or incorrect (rejection of associable combinations; affirmation of non-associable ones).

For the selection of target attribute-object term combinations for the experimental tasks only associable combinations were relevant. Attribute-object term pairs were excluded from consideration for the experimental tasks when more than 1/3 of subjects of either age group responded incorrectly to them, i.e., denied their associability. This was undertaken to restrict later contextual emphasis to those attributes that were regarded as compatible with target

object terms by at least 2/3 of children of both age groups.

The attribute-object term combinations that were excluded on the basis of the above criteria were:

dirty cookie (rejected by 50% of both 4- and 6-year olds).

dirty cake (rejected by 50% of 4-year-olds, and by 66.6% of 6-year-olds).

small cake (rejected by 50% of 4-year-olds).

(For discussion of findings not directly pertinent to the present experimental project see Appendix E.)

Experimental Tasks: Production; Forced Choice

Production Task

Subjects: Twelve 4-year-olds ($\bar{X}$ = 4;2; range 4;0 to 4;6), five girls and seven boys, and 12 6-year-olds ($\bar{X}$ = 6;6; range: 6;1 to 6;9), six girls and six boys participated in the experiment. All children attended and were tested at one of two private N.Y.C. kindergartens/ elementary schools; all were native English speakers. The children had not participated in the two control tasks.

Materials: Of the four object term pairs presented in the definitional and applicability of attributes tasks, two object term pairs in conjunction with four associable attributes per object term pair (i.e., a total of eight attributes) were selected for incorporation in story frames. The choice of target stimuli was based on the following

criteria:

- only attributes that were not spontaneously associated with a given target object term on the definitional task were used.
- only attribute-object term pairs that were regarded as associable by at least 2/3 of 4- and 6-year-olds in the applicability of attributes task were included.

These selection criteria yielded the following object term-attribute combinations:

table/chair - clean, heavy, tall, old

dress/pants - dirty, warm, wet, long

1. Design of stories: Eight story frames were constructed to serve as contextual settings for the target object terms (table, chair, dress, pants) so that there were two stories for each target object term. Stories differed with respect to the attribute they emphasized as salient. For instance, for the object term pants there was a story about wet pants and another one about long pants. (See Appendix B for a complete list of experimental stories.)

Comparability of the stories was achieved in the following manner: each story centered on the same girl's experience with the referent of a given target object term. All stories contained background information about the girl's activities, as well as describing her involvement

with the referent of the object term under consideration. Each target object term was mentioned twice in the story. The information highlighting a particular attribute of the object term as salient was summarized in a statement appearing at the end of a given story. Stories varied in length from 30 to 34 words.

To enhance the generalizability of experimental findings the eight story frames were designed in such a way as to make possible the substitution of the target object term in each story by the other member of a given object term pair. Thus the two stories about the girl's pants could be converted into stories about her dress and vice versa. Likewise, the object terms table and chair could be substituted for each other in the respective story frames. The above procedure yielded two sets of stories. (Minor alterations of stories were necessary; e.g., changes in verb endings to preserve subject-verb agreement when transforming stories about the girl's dress into ones about her pants and vice versa.)

2. Validation of stories: Each set of stories was presented to two adult raters who indicated the attributes of the target object term highlighted by the story contexts. For all stories, the raters' interpretations of the target object terms corresponded to those postulated by the experimenter.

The comprehensibility and comparability of the experimental stories was examined by presenting each set of stories to three 4-year-olds and three 6-year-olds in a memory task. Each story was read to subjects who were required to indicate what was said about the target object term. All twelve children were able to do so for all experimental stories.

Procedure: Each subject was tested individually by a female experimenter who was a native English speaker. The experimental task was introduced by informing subjects that they would be read some stories about a little girl, Jenny, and then would be asked questions about each story. Then the following sample story was presented:

> Jenny was having dinner with her parents.
> She picked up her cup to have some milk.
> Jenny said to her mother: "Mommy, you
> forgot to put milk into my cup."

The child was asked: "What was the cup like?" If s/he failed to indicate that it was empty, the experimenter probed further until the subject offered a correct response. One 4-year-old was unable to do so and was excluded from the experiment.

Following the sample story, six children of each age group were presented with one set of stories while the remaining six subjects were given the complementary set.

Stories within each set were read to the child in random order with the following restriction:

- Two stories about the same target object term never occurred in direct succession.

After a given story had been presented, and the child had responded to the question about the target object term, s/he was requested to indicate the reason for her/his response, i.e. was asked: "Why do you think so?"

Forced Choice Task

Subjects: Twelve 4-year-olds ($\bar{X}$ = 4;3; range: 4;0 to 4;4), six girls and six boys, and 12 6-year-olds ($\bar{X}$ = 6;7; range: 6;5 to 6;10), seven girls and five boys participated in the experiment. All children attended and were tested at one of two N.Y.C. kindergartens/elementary schools; all were native English speakers. The children had not been involved in any of the tasks described above.

Materials: The same stories as in the production task were used. For each story, a set of three possible response items was compiled. One response item consisted of the attribute highlighted by the story. Another response item was a non-highlighted but associable perceptual attribute. This attribute was emphasized as salient in a second, different story about the target object term, but was irrelevant to the story under discussion. The irrelevant associable attribute was included to investigate subjects'

tendencies to focus on particular perceptual attributes of target object terms without consideration of context. Finally, a third response item described a salient function of the target object term, e.g., "a chair to sit in" (see Appendix C for complete set of forced choice items). The three types of response items were presented in random order, following each story. Randomization for each child was constrained by consideration of the total set of eight stories each subject would receive:

- each type of response occurred as first, second or third choice, an approximately equal number of times,
- maximally three response items of the same type (i.e., story related attribute; irrelevant perceptual attribute; salient function) were presented in the same position in direct succession (i.e., as first, second or third choice).

Procedure: Subjects were tested individually by a female experimenter who was a native English speaker. The experimental task was introduced by informing the subject that s/he would be read some stories and would be requested to select from a set of three choices, the answer best describing part of the story. Then the same sample story as in the production task was presented. The child was instructed: "Tell me the best answer. Was it a big cup,

an empty cup or a cup to drink from?"

If the child responded correctly, the experimenter affirmed the response. If s/he responded incorrectly, the experimenter probed further until the child arrived at the appropriate response. All 4- and 6-year-olds were able to do so.

Following the sample story, each set of stories was presented to six subjects of each age group in the same random orders as in the production task. After a given story had been read and the child had selected a response item s/he was requested to motivate her/his choice, i.e., was asked: "Why do you think so?"

RESULTS

Children's performance on the experimental tasks was subjected to the following analyses: 1) Four- and 6-year olds' tendency to assign different significances to target object terms on different occasions of use was explored. 2) Context specificity of children's interpretations of target object terms as assessed. 3) Various aspects of the rationales children provided for their interpretations were examined.

Assignment of Variable Significances to Target Object Terms

The first analysis performed was aimed at determining whether children assigned variable significances to target object terms on different occasions of use. Lack of variability would preclude context specific interpretations of target object terms, and would thus obviate the need for further analyses.

Since each target object term was presented in the context of two story frames, highlighting different attributes of the term as salient, assignment of variable significances could be assessed by comparing children's responses to a given target object term on both occasions of its presentation. Responses to stories 1 and 4 implicating pants or a dress as wet versus long were contrasted, as were responses to stories 2 and 8, establishing a table or chair as heavy versus clean.

Likewise, responses to Stories 3 and 7, implicating a dress or pants as dirty versus warm, and to Stories 4 and 6, establishing a chair or table as tall versus old were compared. Responses were regarded as variable when different significances were attributed to a given target object term for each of the two stories the term was embedded in. For example, the object term pants was properly described as "too long" in Story 5 and "wet" in Story 1. Rigid responses were defined as involving assignment of the same significance to a target object term on both occasions of its presentation. For instance, the response "like these" was incorrectly offered for the object term chair for both Story 4 and Story 6. A minimum of zero and a maximum of four variable responses could be made. Only performance on the production paradigm was considered, since the experimenter's provision of a restricted pool of items on the forced choice task appeared likely to increase the probability of selecting the same item twice. Children's protocols were scored by three adult raters who reached perfect agreement with respect to variability judgments.

Both 4- and 6-year-olds showed a pronounced tendency to assign variable significances to target object terms embedded in linguistic contexts. Four-year-olds offered variable responses 85% of the time, while 6-year-olds did so 100% of the time.

In order to determine the extent of developmental differences, a χ^2 analysis was performed concerning the number of subjects of each age group who offered variable responses for all four object terms. All 12 6-year-olds did so, while only seven 4-year-olds did (three 4-year-olds offered rigid responses for one object term; two 4-year-olds advanced rigid responses for two object terms). A significant χ^2 value of 3.84 $p < .05$ was obtained, indicating developmental increase between the ages of 4 and 6 in children's tendency to assign variable significances to object terms on different occasions of use.

Beyond demonstrating that children perceive the significance of object terms as variable, one must evaluate the nature of this variability. In order to yield the intended meaning of contexted lexical items, variability has to be constrained by consideration of linguistic contextual cues. This issue was addressed in three analyses, exploring context specificity of children's interpretations of target object terms.

Context Specificity of Interpretations

Production Paradigm

Children's self-generated interpretations of target object terms were evaluated with respect to their appropriateness to the story context a given object term

was embedded in. Responses were classified as context specific or non-context specific.

In order to be labeled context specific, interpretations had to meet one of the following criteria:

a) reference to the attribute adult raters had identified as being highlighted by story context, or reference to a synonym of this attribute. Examples of acceptable synonyms are presented in parantheses.

Story 1 - wet (soggy)

Story 2 - heavy

Story 3 - dirty

Story 4 - tall (high)

Story 5 - long

Story 6 - old

Story 7 - warm (hot, heavy - as in heavy clothes)

Story 8 - clean (shiny)[4]

b) reference to a category exemplar congruent with the story context; e.g., "snow pants" for Story 7.

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[4]Inspection of children's protocols revealed that some children implicated the table/chair as dirty or dusty. Since this interpretation seems likewise compatible with the story context (i.e., appropriately describes the state of the table/chair before it was wiped), such responses were also scored as context specific.

Non-context specific responses: All responses that were not related to story contexts in one of the above ways were classified as non-context specific. This category included:

a) a majority of clear cases of context unrelated responses; e.g. "a glass table" for Story 2; "blue" for Story 6.

b) some responses that involved reference to global (and hence non-context specific) attributes; e.g. "big" for Story 4; "nice" for Story 6.

c) some responses that did not qualify as interpretations of target object terms in that they consisted of mere repetition of information from the story without any further explication; e.g. "she tripped over them" for Story 5.

Children's responses were classified by three adult raters. The reliability requirement of agreement between at least two raters for each rating (see Brockway, Chmielewski, & Cofer, 1974) was met in all cases.

The incidence of context specific interpretations was evaluated in an analysis of variance, performed on Age (4- versus 6-year-olds), Set (contrasting the two sets of experimental stories), and Story (contrasting the eight experimental stories), with Story a repeated measure. Four-year-olds offered significantly fewer context specific

interpretations ($\bar{X}$ = 3.3/8) than did six-year-olds ($\bar{X}$ = 6.3/8), $F(1, 20) = 21.95$, $p < .001$. This finding indicates developmental improvement, between the ages of 4 and 6, in children's ability to incorporate contextual cues in their self generated interpretations of contexted object terms.

Insert Figure 1 about here

Figure 1 indicates that 4-year-olds did not perform better on any story than did 6-year-olds; on 7/8 stories they performed more poorly.

Experimental stories differed with respect to the incidence of context specific interpretations they elicited. $F(7, 140) = 4.55$, $p < .001$. Scheffé tests revealed that Story 4 (tall chair/table) received significantly fewer context specific interpretations ($\bar{X}$ = 1.7) than did Stories 1 (wet pants/dress, $\bar{X}$ = 6.0), 8 (clean table/chair, $\bar{X}$ = 6.0), and 7 (warm dress/pants, $\bar{X}$ = 5.7). There was a significant Age x Story interaction, $F(7, 140) = 3.08$, $p < .01$. Figure 1 demonstrates that six-year-olds' superiority with respect to context specific interpretations was not of the same magnitude for all experimental stories. No other significant main or interaction effects were obtained.

1. Error analysis: The nature of non-context specific responses was explored in a qualitative analysis. Such responses were evaluated in terms of the discrete pieces

of information or response elements they contained.[5] Response elements were categorized according to the classification scheme utilized in the evaluation of children's definitions of object terms in control task 1.[6] (See Appendix D, pp.84-85, for description of classification scheme.)

Insert Table 1 about here

Table 1 summarizes the incidence of different types of information 4- and 6-year-olds provided in discussing the significance of contexted target object terms. The low incidence of "other responses" indicates that the vast majority of children's responses pertained to various aspects of target object terms/referent objects. Thus non-context specific responses may be regarded as unsuccessful attempts at determining the significance of target object terms rather than as arising from random responding.

Forced Choice Paradigm

Children's selection of one of the three experimenter -

[5]The vast majority of responses consisted of one response element only. One 4-year-old and four 6-year-olds offered non-context specific respones that contained more than one response element.

[6]A category "Repetition of Information" was added to account for repetition of contextual information without further explication.

provided response items as capturing the significance of a given target object term was evaluated. Responses were classified as context specific or non-context specific. Children's choice of the attribute identified by adult raters as being highlighted by a particular story context was regarded as a context specific interpreation. These target attributes were the same ones as in the production task (see p. 41).

Selection of the response item describing a salient function of the target object term, or the response item indicating an irrelevant perceptual attribute were scored as non-context specific responses (see Appendix C for complete list of forced choice items). Three adult raters reached perfect agreement in scoring children's responses. Protocols contained from zero to eight context specific responses.

The incidence of context specific interpretations was evaluated in an Age (2) x Set (2) x Story (8) analysis of variance, with Story a repeated measure. Four-year-olds offered significantly fewer context specific interpretations ($\bar{X}$ = 5.7) than did 6-year-olds ($\bar{X}$ = 7.8), $F(1, 120) = 22.24$, $p < .001$. This finding suggests developmental improvement, between the ages of 4 and 6, in children's ability to select from a set of experimenter-provided response items the one best describing the significance of contexted object terms.

No other significant main or interaction effects were observed. Thus the finding on the production task of differential interpretability of experimental stories and of varying superiority of 6-year-olds as a function of story was not replicated on the forced choice task.

Comparison between Performance on Production and Forced Choice Tasks

In order to assess the impact of task requirements on children's interpretive, inferential skills, a direct comparison between performance on the production and the forced choice task was made.

The scores obtained from the coding of children's protocols for the production and forced choice tasks were used. Since, on the forced choice task, random selection of experimenter-provided response items would yield correct answers in 1/3 of cases, correction for guessing was necessary. This was achieved by summing the number of context specific interpretations a child offered, and by converting the resultant total[7] into a score according to the following formula: $K_a = X_a - \frac{W_a}{A - 1}$, with X_a = number of correct responses, W_a = number of errors, A = number of response items per trial (Lord & Novick, 1968). Scores for performance on the production task remained unaltered.

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[7]Consideration of performance across the eight experimental stories precluded an analysis of items effects.

The incidence of context specific interpretations was evaluated in an Age (2) x Condition (2) x Set (2) analysis of variance. Six-year-olds offered an average of 7.0 context specific interpretations, which significantly exceeded the average of 3.9 such interpretations provided by 4-year-olds, $F(1, 40) = 44.09$, $p < .001$. Thus, children's ability to successfully consider contextual cues in the interpretation of contexted target object terms improved between the ages of 4 and 6 for both experimental tasks employed here.

The forced choice condition yielded a significantly greater number of context specific interpretations ($\bar{X} = 6.1$) than did the production paradigm ($\bar{X} = 4.8$), $F(1, 40) = 8.25$, $p < .01$. Since the effects of possible guessing had been neutralized, this finding indicates that the experimenter's provision of sets of response items resulted in enhanced deployment of interpretive, inferential skills.

There was also a significant Condition x Set interaction, $F(1, 40) = 4.64$, $p < .05$, illustrated in Figure 2.

Insert Figure 2 about here

Figure 2 demonstrates that while the two sets of experimental stories differed in the extent to which they yielded context specific interpretations on the production task,

performance on both sets of stories was comparable under forced choice conditions. This finding indicates that the experimenter's provision of response cues reduced item differences that were observed when subjects generated interpretations of target object terms themselves.

Analysis of Rationales for Interpretations

Several aspects of the rationales children offered for previous interpretations of target object terms were explored: 1) the type of information children implicated as relevant; 2) the relation between different types of rationales and the context specificity of previous interpretations; 3) semantic inferences, i.e., children's reference to both salient contextual information and their selection of a focal attribute of the target noun. Only data obtained on the production task were considered. Forced choice data were excluded because offering rationales for experimenter-provided responses would not necessarily reflect the children's own understanding of the experimental tasks.

Type of Information Implicated as Relevant

Children's rationales for their self-generated interpretations of target object terms (i.e., their response to the question: "Why do you think so?") were analyzed according to the following classification scheme:

Rationales were labeled story related when they contained reference to the story context a given object term was embedded in. For instance, "because she was in the rain" for Story 1 or "she played in the park" for Story 3 were scored as story related rationales.

Rationales were classified as category related when they addressed implications of a given object term's category membership, i.e., contained statements about the category as a whole. For instance, "because every table is the same" for Story 2 or "because chairs are wood" for Story 4 were regarded as category related rationales.

Rationales that consisted of explications of or elaborations on subjects' original interpretations without reference to the story context were categorized as redundant. Such rationales typically involved a description of properties of referent objects that children seemed to regard as congruent with their focus on a particular attribute of the object term. For instance, for Story 3 the interpretation "it was dirty" was followed by the rationale: "because there was stuff all over it". For Story 7, the interpretation "warm" was accompanied by the rationale: "because it was made of wool". In these cases, children appeared to be explicating their general conceptions of dirty pants and warm dresses, rather than establishing a link between aspects of the preceding linguistic context that implicated pants as dirty and the dress as warm.

Rationales that could not be categorized according to the above classification scheme were assigned to a residual category, labeled other rationales. This category included a variety of idiosyncratic responses, such as "because I want it to" for Story 7, and "maybe they were her father's" for Story 5.

When subjects failed to offer a rationale for a previous interpretation, this was noted as a no rationale response.

Three adult raters evaluated children's rationales. The requirement that at least two raters be in agreement was always met, (see Brockway et al., 1974). Each type of rationale occurred minimally zero and maximally eight times in individual subjects' protocols.

Insert Table 2 about here

Table 2 displays the incidence of all five types of rationales provided by 4- and 6-year-olds for their self generated responses.

Story related rationales were of particular interest in that they implicate linguistic context as relevant to the significance of contexted object terms. The incidence of story related rationales was examined in an Age (2) x Set (2) x Story (8) analysis of variance, with Story a repeated measure. Four-year-olds offered significantly fewer story

related rationales ($\bar{X}$ = 3.6) than did 6-year-olds ($\bar{X}$ = 5.3), $F(1, 20) = 5.55$, $p < .05$. This finding indicates a developmental increase in children's tendency to implicate linguistic context as pertinent to interpretations of contexted object terms.

The experimental stories differed in the extent to which linguistic context was invoked in children's rationales for previous interpretations of object terms, $F(7, 140) = 2.62$, $p < .05$. Pairwise Scheffé tests did not indicate the locus of interstory differences. Nonpairwise comparisons revealed that Story 4 (tall chair/table) yielded significantly less reference to story context ($\bar{X}$ = 2.7) than did Stories 8 (clean table/chair, $\bar{X}$ = 6.0) and 5 (long pants/dress, $\bar{X}$ = 5.7). There were no other significant main or interaction effects.

An informal comparison of the incidence of the four other types of rationales indicates no difference in 4- and 6-year-olds' tendency to motivate interpretations of target object terms in terms of pertinent categories as wholes (see Table 2). Likewise, redundant rationales seem to occur with comparable frequency for both age groups. Table 2 shows that 4-year-olds tended to be more likely than 6-year-olds to resort to idiosyncratic rationales, or to offer no rationales at all.

Interrelation between Different Types of Interpretations and Rationales

The questions raised here concern the interrelation between context specificity of interpretations and the type of rationale offered in accounting for them. Are interpretations based on successful consideration of linguistic contextual cues discussed in terms of pertinent story contexts? What types of rationales are provided for non-context specific responses? Are there developmental differences with respect to the association of interpretive, inferential skills and subsequent rationales for interpretations?

Insert Table 3 about here

Table 3 displays the coocurrence of different types of interpretations and rationales offered by 4- and 6-year-olds on the production task.

For both age groups, the majority of context specific interpretations were followed by rationales, involving reference to story contexts. This association appeared more pronounced for 6- than for 4-year-olds.

With respect to non-context specific interpretations 4- and 6-year-olds' protocols showed different patterns. Six-year-olds tended to motivate such interpretations with reference to pertinent categories as wholes, while 4-year-

olds demonstrated no preference for a particular type of rationale, but appeared to respond in an unsystematic manner.

Explication of Semantic Inferences

Rationales that involved reference to linguistic context were subjected to a further analysis. Would children who had implicated story contexts as relevant to the interpretation of target object terms make explicit the connection between contextual information and their focus on a particular attribute of the object term? In other words, would they present semantic inferences?

Rationales were regarded as containing semantic inferences when they involved reference to both the information in the story used as the basis for the interpretation of target object terms and to the attributes of the object terms identified as focal. In other words, premises and conclusions[8] had to be invoked. For instance, "she went out in the rain [premise] and she got wet [conclusion]" for Story 1 was regarded as falling into this category. "Because if you do a good job [premise] it could be shiny [conclusion]" for Story 8 is another example of explication of semantic inferences.

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[8]Reference to premises and conclusions reflects the experimenter's analysis of semantic inferences. Conscious knowledge of the inferential nature of the experimental task is not attributed to subjects.

Children's story related rationales were scored by three adult raters, subject to the requirement that at least two agree. The incidence of explication of semantic inferences was evaluated in an Age (2) x Set (2) x Story (8) analysis of variance, with Story a repeated measure.

Children of both age groups rarely explicated semantic inferences. Six-year-olds did so significantly more frequently ($\bar{X}$ = 3.3) than did 4-year-olds ($\bar{X}$ = .7), $F(1, 20) = 14.52$, $p < .01$. Thus children's tendency to establish a direct connection between relevant contextual information and assignment of particular significances to target object terms increased between the ages of 4 and 6. There were no other significant main or interaction effects.

DISCUSSION

How well do young children negotiate the task of interpreting contexted object terms? All but one 4-year-old and all 6-year-olds succeeded in arriving at the intended meaning of some target lexical items. When presented with basic level object terms (Rosch, 1978) embedded in story contexts, children showed some ability to identify attributes highlighted by but not explicitly stated in linguistic contexts. While adults' ability to selectively focus on attributes of object terms implicated by sentential contexts has been demonstrated (Barclay et al., 1974), such "semantic flexibility" (Barclay et al., 1974) has not been previously reported for young children.

The present findings of interpretive, inferential skills in 4- and 6-year-olds are congruent with a constructivist view of comprehension (Bransford & Franks, 1971; Bransford & McCarrell, 1974; Bransford et al., 1977; Paris, 1975). Context appropriate interpretations of object terms indicate that young children actively sought to determine the significance of these terms, rather than relying on fixed "readings" of their meaning. Particular occasions of word use were considered in that interpretations of object terms varied as a function of pertinent linguistic contexts (Frederiksen, 1972, 1975; Kintsch & van Dijk, 1978; Werner & Kaplan, 1952). Even 4-year-olds showed some

tendency to "go beyond the information given" and to refer to attributes of object terms not explicitly mentioned in the original texts. It is important to note that such inferential skills were displayed with respect to attributes that were not central to, i.e., were not spontaneously mentioned as part of, children's definitions of object terms (see Control Task 1). This indicates that 4- and 6-year-olds possess rich semantic representations of common object terms that are accessed in a selective, flexible manner. While early semantic development has been described as involving children's ability to refer to different attributes of object terms on different occasions of use (see Bowerman on complexive word use, 1977; Gruendel, 1977; Nelson, 1976; Nelson et al., 1977) the present study demonstrates that 4-year-olds not only discuss various attributes of object terms but are frequently able to constrain their selection of particular attributes by consideration of linguistic contextual cues. Thus an important developmental step with respect to comprehension of contexted lexical items (Barclay et al., 1974) has been at least partially achieved by the age of 4.

While the vast majority of 4- and 6-year-olds displayed interpretive, inferential skills in some cases, especially 4-year-olds frequently failed to arrive at the intended meaning of contexted object terms. An examination

of potential areas of difficulty clarifies the nature and limitations of young children's interpretive, inferential abilities.

Children who did not arrive at the intended meaning of such terms may not have attempted to elucidate their significance at all but may have responded to the experimenter's questions about target object terms on a different basis. This did not appear to be the case. When queried about object terms, children referred to perceptual attributes of object terms, discussed functional aspects, made evaluative statements, and/or offered analogous information by referring to related objects. Only a small proportion of 4-year-olds' responses did not appear to be directly pertinent to target object terms. It may be concluded that children were attempting to specify the significances of object terms, i.e., were engaged in interpretive efforts.

Another basis for failure to offer context specific interpretations might be children's tendency to assign rigid interpretations to object terms, irrespective of contextual variation. This occurred very infrequently. When presented with the same object terms embedded in different story contexts, highlighting different attributes as salient, both 4- and 6-year-olds tended to offer differential interpretations of these object terms. It is important to note that each child advanced variable

interpretations for some object terms (i.e.,no subject offered rigid responses only). Perception of the significance of contexted object terms as variable seems to be a phenomenon of considerable generality.

In some instances, 4-year-olds attributed the same significance to object terms appearing under different contextual conditions. In these cases, children appeared to resort to response sets. For example, some subjects offered the same inappropriate response for a number of object terms, e.g., "it was big" or "it was like this one." These children did not appear to refer to fixed "readings" of the significance of individual object terms. Rather, offering global statements about a number of object terms may be regarded as a strategy for negotiating materials children did not fully comprehend.

Six-year-olds offered no rigid responses for the same object terms at all. This finding may be accounted for in at least two ways. It may reflect 6-year-olds' greater sensitivity to the need to construct differential interpretations of object terms on different occasions of use. A second possibility is that children of both age groups were equally sensitive to this requirement, but that 6-year-olds achieved better comprehension of the experimental stories presented. Use of texts of varying levels of complexity could clarify this issue. It may

be concluded that children of both age groups perceived the significance of object terms as variable, so that ignorance of the need for flexible interpretations does not seem to be the basis for non-context specific responses.

Was failure to arrive at the intended meaning of object terms based on lack of sensitivity to the import of linguistic context? The present data suggest that this was not the case. Both 4- and 6-year-olds tended to consider linguistic context on a global level at least. This conclusion is based on a comparison of the types of information associated with the significance of contexted object terms and children's explication of attributes of object terms presented in isolation on the definitional control task (see Table A in Appendix D). When discussing object terms presented in isolation, 4-year-olds provided "contextual information", i.e.,named object users, spatial and temporal occasions of object use, associated objects etc. in 16% of cases. Six-year-olds did so 28% of the time. In other words, children created contextual frameworks for the occurence of referent objects. In contrast, this type of contextual information was never provided when children of both ages discussed object terms embedded in linguistic contexts. Children appeared to perceive target object terms as already related to specific contexts, so that further contextual elaboration became unnecessary.

Thus, even at age 4, children display some sensitivity to linguistic context.

The above findings suggest that young children possess considerable interpretive abilities. They actively attempt to determine the intended meaning of contexted object terms. They perceive the significance of such terms as variable. They tend to consider linguistic context in a global manner at least. These skills are well established by the age of 4. This observation suggests that failure to arrive at the intended meaning of target object terms may reflect difficulty in isolating relevant contextual cues, and/or in establishing appropriate inferential connections. Developmental improvement between the ages of 4 and 6 in children's ability to assign context specific interpretations to contexted object terms seems to be attributable to greater proficiency with respect to either or both these skills. This conclusion is strengthened by the observation that developmental differences in interpretive, inferential performance of 4- and 6-year-olds did not seem to be based on differences in children's memory for the present linguistic materials. This is suggested by the finding that 4- and 6-year-olds were equally successful in recalling salient information for all experimental stories (see validation of stories, p. 33).

It is important to consider that interpretive, inferential difficulties were not insurmountable. Even

4-year-olds showed some ability to determine the intended meaning of contexted object terms, i.e., made some context appropriate semantic inferences. The absense of individual differences suggests that the vast majority of children tested may be credited with some interpretive, inferential abilities. This finding is in contrast with reports of kindergarteners' and first graders' failure to make semantic inferences (Liben & Posnansky, 1977) unless induced to make explicit implied information (Paris & Lindauer, 1976; Paris et al., 1977). This discrepancy between conclusions about young children's inferential skills seem to result from differences in the domains of interest and in the choice of experimental paradigms.

Developmental research that reports the absence of semantic inferences in children's interpretation of text (Liben & Posnansky, 1977; Paris & Lindauer, 1976; Paris et al., 1977) has involved an examination of children's comprehension of linguistic input with respect to their memory for text. The focus of interest is the wholistic representation of both information actually presented and subject-generated interpretations/inferences. These sources of information are held to become indistinguishable. Semantic integration in this sense can be shown most clearly when subjects are prevented from engaging in verbatim recall of the original texts. Therefore, memory paradigms with interpolated tasks are advantageous. Studies that explore

children's recognition of inferential information as previously presented (e.g., Liben & Posnansky, 1977; Paris & Carter, 1973; Paris & Mahoney, 1974) clearly exemplify this approach. Use of memory paradigms entails that demonstration of semantic inferences requires deployment of both memory and inferential skills.

The present study does not address the representation of semantic information in memory, but focuses on children's immediate comprehension of text. The term integration as it is used here refers to children's ability to utilize textual information and inferential skills in determining the intended meanings of contexted object terms. Whether or not subjects regard inferential information as derived from text or believe it to be part of the original stories is not of interest. Subjects' interpretations of object terms were obtained immediately upon completion of each experimental story. This design was intended to reduce memory requirements and to make possible enhanced demonstration of inferential skills. Thus improved performance under the present conditions may be attributable to reduced task requirements.

Materials effects may constitute another differential factor. Semantic inferences required in the present study consisted of presuppositions and consequences concerning common events. This type of reasoning may be mastered earlier in development than problems involving formal logic,

such as transitive inferences (e.g., Johnson & Scholnick, 1979; Liben & Posnansky, 1977; Paris & Carter, 1973; Paris & Mahoney, 1974).

Beyond the type of reasoning required, the scenarios described here, such as getting wet in the rain or tripping over long pants/dresses, may have been sufficiently familiar to young children to facilitate inferential thinking. Furthermore, experimental stories presented here were shorter and probably more easily comprehensible than linguistic materials tapping similar types of reasoning. For instance, Paris & Upton (1976) employed the following story:

> "Chris waited until he was alone in the house. The only sound he heard was his father chopping wood in the barn. Then he pushed the red chair over to the sink which was full of dishes. Standing on the edge of the sink, he could just barely reach the heavy jar. The jar was behind the sugar and he stretched until his fingers could lift the lid. Just as he reached inside the door swung open and there stood his little sister."

In summary, reduced memory requirements and the type of experimental materials used in the present study may have contributed to improved interpretive, inferential performance observed here.

The present study provides direct evidence for the impact of task requirements and of relevance and congruence of experimental materials on children's interpretation of contexted object terms. Both 4- and 6-year-olds offered

a greater number of context specific interpretations of contexted object terms on the forced choice than the production task. In other words, when presented with sets of experimenter-generated response cues children demonstrated greater interpretive, inferential skills than when required to generate interpretations of object terms themselves. The differential impact of task requirements on interpretive, inferential performance observed here is congruent with the notion of enhanced deployment of skills under certain conditions (e.g., Cole, Gay, Glick, & Sharp, 1971; Scribner, 1975).

The present design does not allow specification of the facilitative effects of the experimenter's provision of response cues. Presentation of a fixed set of items may have focused subjects' attention in that it implicated the problems as one requiring one definite answer. Alternatively, the cues presented may have supplemented incomplete original interpretations or redirected partially appropriate ones. Cues that at least partially matched children's initial self-generated interpretations would appear most likely to be selected as best describing target object terms.

The above hypotheses imply that the finding of differential performance on the forced choice and production tasks may reflect qualitative differences between subjects'

self-generated interpretation/inferences and cognitive activities subjects perform on the basis of experimenter-provided materials. Children's response to experimenter-produced cues need not mirror their initial comprehension of text. This suggests that studies utilizing experimenter-provided cues to assess inferential abilities, e.g., cued recall (Paris & Lindauer, 1976; Paris et al., 1977) or recognition paradigms (Liben & Posnansky, 1977; Paris & Carter, 1973; Paris & Mahoney, 1974; Sommerville et al., 1979) may not warrant conclusions about children's initial encoding of semantic information. With respect to the present study it is important to note that children's self-generated interpretations were prompted by the experimenter (via her inquiry about target object terms). Therefore, children's tendency to spontaneously engage in interpretive, inferential activities remains unclear.

In addition to demonstrating differential deployment of interpretive/inferential skills as a function of task requirements, the present findings indicate that the level of congruence of linguistic materials affects performance. Experimental stories were designed to be equivalent with respect to their comprehensibility and relevance to young children. However, both an evaluation of children's self-generated interpretations of target object terms and an examination of the rationales offered for interpretations

indicate that Story 4 (tall chair/table) presented particular difficulty for both age groups. This story yielded fewer context specific interpretations than other stories. With respect to children's rationales for their interpretations, it induced the lowest incidence of reference to story contexts.

There are at least two possible explanations for these findings, both of which concern the level of congruence of this story. The attribute-object term association presupposed in Story 4 may have been experienced as incongruous, i.e., chairs and tables may not be regarded as potentially being tall. The associability of attributes task that was designed to eliminate incongruous attribute-object term combinations did not implicate tall chair/table as odd. However, this task tapped comprehension rather than production, and therefore does not provide information about subjects' tendency to label chairs/tables as tall.

Beyond this, the total story context may have been perceived as incongruous. Story 4 contains the suggestion to stand on a chair/table. This unusual function of or use for chairs and tables may have violated young children's expectations or scripts concerning these object terms. In discussing tables on the definitional task, one 6-year-old spontaneously remarked: "You could stand on them, but that is not polite manners". Thus children may have experienced

Story 4 as bewildering which may have impeded their interpretive performance. In a similar vein, Jewson, Pea, Scribner, & Glick (1980) report that violation of children's world knowledge affected their ability to solve syllogisms.

It may be concluded that familiarity and congruence of linguistic materials play an important role in children's ability to deploy interpretive, inferential skills. This is supported by another items effect. Four-year-olds showed greatest facility in providing context specific interpretations for Stories 1 (wet pants/dress), 8 (clean table/chair), and 3 (dirty pants/dress). All of these stories highlighted attributes describing transient states of objects. Nelson (1976) reports that earlier in semantic development, namely between the ages of 24 and 30 months, children are particularly sensitive to transient object states. It appears that this sensitivity persists until the age of 4. At age 6, on the other hand, this was no longer the case. Again, the interpretability of stories appeared to be affected by the relevance of linguistic materials, which was found to undergo developmental change.

It is interesting to note that the items effects reported above were observed under certain experimental conditions only. While interstory differences were noted on the production task, both 4- and 6-year-olds' performance

was equivalent for all eight experimental stories under forced choice conditions. This finding further supports the view of the interpretation of contexted object terms as a complex phenomenon that is affected by various factors.

The present study examines a domain that has not been explored to date, namely, children's understanding of the bases for the interpretation of contexted object terms. This information can be gleaned from an examination of rationales children provide for previous interpretations. Several facets of such rationales are of interest. What types of information will children indicate as relevant to the intended meaning of contexted object terms? What is the relation between children's discussion of their interpretations of object terms and the interpretive, inferential activities underlying such interpretations? Will children make explicit semantic inferences?

In motivating previous interpretations of target object terms both 4- and 6-year-olds showed some tendency to refer to story contexts. Their discussion of pertinent linguistic context is of particular interest since it indicates recognition and consideration of particular occasions of word use. "Immediate linguistic context" (Werner & Kaplan, 1963) is implicated as a noteworthy determinant of the intended meaning of contexted lexical items. Children's tendency to refer to linguistic context

was found to increase between the ages of 4 and 6.

At times, children of both age groups failed to acknowledge the relevance of linguistic context to the significance of contexted object terms. Instead, they would motivate their interpretations of object terms with reference to pertinent categories as wholes, i.e., would explicate attributes of tables, chairs, pants, or dresses. In doing so, they appeared to focus on "stable, enduring aspects of word meanings" (Werner & Kaplan, 1963) that "transcend the immediate linguistic context." While reference to specific contextual elements occurs at both ages 4 and 6, it is not consistently made by either age group.

An examination of the relation between the rationales offered by children and the interpretive, inferential activities underlying their interpretations of object terms reveals that for both age groups, the majority of context specific interpretations were motivated with reference to linguistic contexts. In these cases interpretations and rationales may be described as congruent in that the bases for previous interpretations (story contexts) were discussed in accounting for these interpretations.

It is interesting to note that congruence between interpretations and rationales did not always obtain. Both 4- and 6-year-olds offered some rationales which implicated

story contexts as relevant in conjunction with interpretations that did not capture the intended meaning of target object terms, i.e., were non-context specific. In arriving at these interpretations, children may have considered contextual cues, but may have failed to make appropriate semantic inferences. Alternatively, children may have recognized the import of story contexts only upon hearing the experimenter's request for rationales for their interpretations, and may not have incorporated contextual cues in their original interpretations.

Finally, children's tendency to explicate semantic inferences will be considered. Explication of semantic inferences was operationalized here as children's reference to both story context and the attribute of the target object term regarded as salient. Use of this terminology is not intended to convey that children perceived the task at hand as inferential. They may not have regarded contextual information as premises and choice of salient attributes as conclusions. Rather, children are credited here with some recognition of a connection between particular aspects of linguistic context and the assignment of particular significances to contexted object terms.

Six-year-olds' rationales contained significantly more semantic inferences than did 4-year-olds'. However, children of both age groups' explications of semantic

inferences was far below their ability to make such inferences in their self-generated interpretations of object terms (as indicated by the incidence of context specific interpretations which were presumably based on successful semantic inferences). Thus, there was further evidence for a gap between children's deployment of interpretive, inferential skills and their accounts for such interpretations. The discrepancy may be accounted for in at least two ways. Children may have difficulty in reconstructing and reporting on interpretive, inferential activities of this level of complexity. Alternatively, 4- and 6-year-olds' conceptions of what constitutes adequate rationales for interpretations may generally not include explication of semantic inferences.

It may be concluded that children's rationales for their interpretations of contexted object terms reflect considerable awareness of the need to consider linguistic contextual cues as well as containing some explications of semantic inferences. Children's ability to discuss this understanding undergoes developmental improvement between the ages of 4 and 6. For both age groups, some discrepancy between interpretive, inferential activities children engaged in and their discussion of the bases for previous interpretations of object terms was observed.

Summary

The present study demonstrates that 4- and 6-year-olds approach the task of ascertaining the intended meaning of contexted object terms in a manner congruent with a constructivist view of comprehension (Bransford & Franks, 1971; Bransford & McCarrell, 1974; Bransford et al., 1977; Paris & Lindauer, 1977). Children were presented with basic level object terms embedded in story contexts that highlighted but did not explicitly identify certain attributes of these terms as salient. All children but one were able to offer context appropriate interpretations for some object terms. They demonstrated greater interpretive, inferential skills than have been reported elsewhere (e.g., Liben & Posnansky, 1977; Paris & Lindauer, 1976; Paris & Upton, 1976; Paris et al., 1977). Such skills improved between the ages of 4 and 6. The deployment of interpretive, inferential abilities was shown to be affected by task requirements; children performed better on the forced choice than the production task. Relevance and congruence of linguistic materials also affected both 4- and 6-year-olds' interpretive, inferential performance. An examination of children's command of prerequisite skills for the interpretation of contexted object terms indicates that children at both age levels tended to assign differential interpretations to target object terms on different occasions of use. All

children demonstrated some sensitivity to linguistic context on a global level at least. Children's rationales for previous interpretations mirrored their interpretive, inferential skills, i.e., revealed awareness of the import of linguistic context, as well as some ability to explicate semantic inferences. Nevertheless, discrepancies between interpretive, inferential activities performed and children's discussion of the bases for these interpretations were observed at both age levels.

Table 1

Analysis of Non-Context Specific Responses Offered by 4- and 6-Year-Olds: Incidence of Different Types of Information Associated with Contexted Object Terms

Type of Information	4-year-olds	6-year-olds
Perceptual Characteristics	29 (50.9%)	15 (57.7%)
Function/Action	6 (10.5%)	4 (15.3%)
Analogous Responses	9 (15.8%	3 (11.6%)
Evaluative Responses	4 (7.0%)	1 (3.8%)
Other Responses	5 (8.8%)	0 (0%)
Repetition of Information	4 (7.0%)	3 (11.6%)

Table 2

Incidence of Different Types of Rationales for Interpretations of Contexted Object Terms, Provided by 4- and 6-Year-Olds

Type of Rationale	4-year-olds	6-year-olds
Story Related	43 (44.8%)	64 (66.7%)
Category Related	11 (11.5%)	11 (11.5%)
Redundant	8 (8.3%)	5 (5.2%)
Other	20 (20.8%)	8 (8.3%)
None	14 (14.6%)	8 (8.3%)

Table 3

Association of Types of Interpretations and Rationales Offered by 4- and 6-Year-Olds

	4-year-olds		6-year-olds	
Type of Rationale	Context Specific	Non-Context Specific	Context Specific	Non-Context Specific
Story Related	27 (67.5%)	16 (28.6%)	59 (78.7%)	5 (23.8%)
Category Related	1 (2.5%)	10 (17.9%)	3 (4.0%)	8 (38.0%)
Redundant	5 (12.5%)	3 (5.4%)	4 (5.3%)	1 (4.8%)
Other	7 (17.5%)	13 (23.2%)	5 (6.7%)	3 (14.3%)
None	0 (0%)	14 (25.0%)	4 (5.3%)	4 (19.0%)

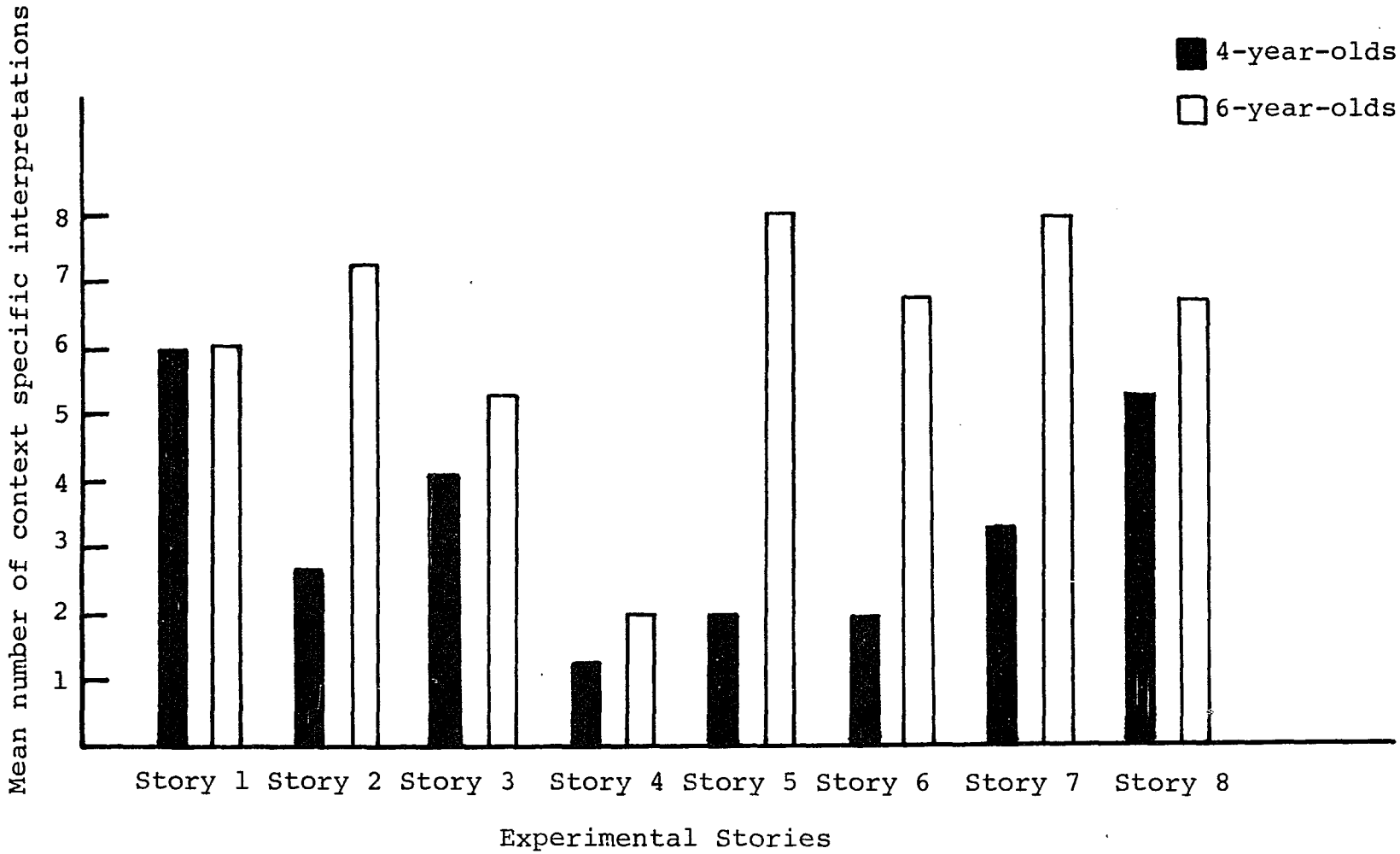

Figure 1: Incidence of Context Specific Interpretations: Interaction of Age with Story (Production Task)

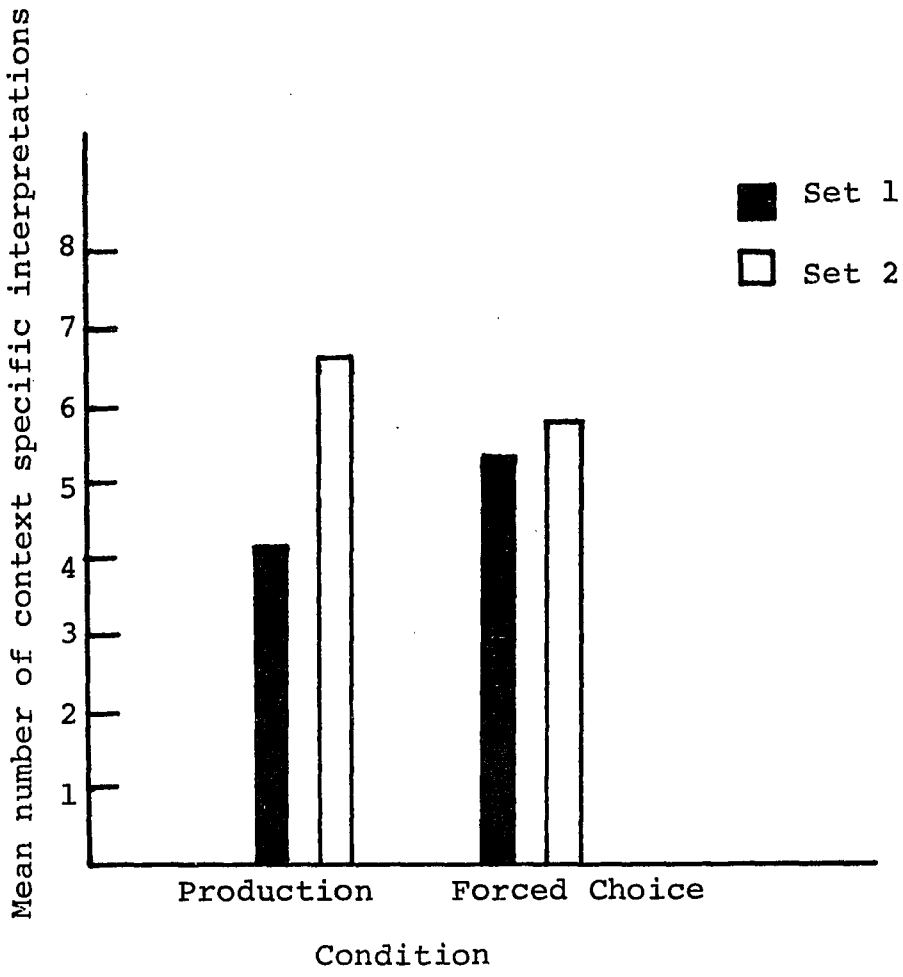

Figure 2: Incidence of Context Specific Interpretations: Interaction of Condition with Set (Comparison of Production and Forced Choice Tasks).

Appendix A

Applicability of Attributes Task

Attribute - Object Term Pair Combinations

Object Term Pair	Associable Attributes	Non-associable Attributes
pants/dress	long	sad
	wet	busy
	warm	tired
	clean	slow
	dirty	bored
cookie/cake	sweet	sick
	hot	mean
	big	dead
	soft	smart
	dirty	noisy
	burnt	awake
table/chair	heavy	happy
	wet	naughtie
	old	quiet
	short	angry
	clean	friendly
cup/plate	big	alive
	clean	hungry
	dirty	crazy
	broken	silly
	empty	asleep

Appendix B

Experimental Stories

Sample Story

Jenny was having dinner with her parents. She picked up her cup to have some milk. Jenny said to her mother: "Mommy, you forgot to put milk into my cup."

Story 1

Jenny went for a walk. Suddenly it started to rain. When Jenny got home her mother said: "Look at your pants (dress). Your pants (dress) look(s) like you got caught in the rain."

Story 2

Jenny's parents moved the furniture around in their living room. Jenny's father tried to life a table (chair), but it didn't move. Jenny's father said: "I need help to lift this table (chair)."

Story 3

One day, Jenny was playing in the park. When she got home her mother said to her: "Take a bath and give me your dress (pants). Your dress (pants) needs (need) washing, too."

Story 4

Jenny had to get a book from the top shelf of a bookcase. Her mother said: "Step on this chair (table). If you stand on this chair (table) you can reach the top of the bookcase."

Story 5

Jenny was trying on clothes. Her mother was helping her. She looked at Jenny and said: "You can't wear these pants (this dress). You will trip over these pants (this dress) when you walk."

Story 6

Jenny and her mother were visiting Jenny's grandmother. They were talking about Jenny's grandmother's furniture. Jenny pointed at a chair (table). Her mother said: "Grandma got this chair (table) many, many years ago."

Story 7

Jenny and a friend went to buy clothes. Jenny could not decide what to get. Her friend said: "Buy this dress (these pants) Jenny. This dress (these pants) will keep you from freezing in the winter."

Story 8

Jenny was helping her mother around the house. She wiped a table (chair). Her mother said: "You did a great job, Jenny, I can see you really wiped this table (chair)."

Appendix C

Forced - Choice Items

Story	Target Object Term	Target Attribute	Salient Function	Irrelevant Perceptive Attribute
1	pants/dress	wet	to wear to put on[1]	long
2	table/chair	heavy	to eat at to sit in	clean
3	dress/pants	dirty	to put on to wear	warm
4	chair/table	tall	to sit in to eat at	old
5	pants/dress	long	to wear to put on	wet
6	chair/table	old	to sit in to eat at	tall
7	dress/pants	warm	to put on to wear	dirty
8	table/chair	clean	to eat at to sit in	heavy

[1]The second item was presented in conjunction with the second target object term.

Appendix D

Definitional Task

Further Results and Discussion

The nature of children's interpretations of certain object terms under definitional conditions was examined with respect to the amount of information provided and the types of information offered. These issues were addressed by analyzing children's responses in terms of discrete pieces of information or response elements, and by exploring the nature of response elements by classifying them according to the following scheme:

Function/action responses: Indications of actions performed on or with objects referenced by object terms. Reference to functions objects serve. E.g., "you wear pants," "a plate is to eat on."

Perceptual characteristics responses: Reference to the shape of pertinent objects (e.g., "round" for plate), to object parts (e.g., "legs" for table; "buttons" for pants), to object properties (e.g., "hard" for table, "blue" for pants), and to materials objects are made of (e.g., "plastic" for cup).

Contextual information responses: Reference to circumstances under which pertinent objects are likely to be encountered/used. This includes informational about who uses the object (e.g., "girls" for dress, "people" for cup), when and where objects are found (e.g., "for birthdays" for cake) - see Nelson's spatio-temporal organizers (1978), and about other objects used in conjunction with target objects, (e.g., "you put plates and knives and forks on it).

Analogous responses: Comparisons of objects referenced by object terms with other items. These may belong to different categories (e.g., "like my hand" for plate), or to the same category as the target object (e.g., "like blue jeans" for pants).

Evaluative responses: Assessment of general appearance or specific attributes of pertinent objects (e.g., "pretty" for dress, "delicious" for cake).

Other responses: A small number of response elements could not be classified according to the above scheme and were assigned to the residual category "other responses."

Amount of Information Provided

The response elements mentioned by all children of a given age group were summed across the eight object terms

presented. Four-year-olds' protocols contained 193 response elements, while 6-year-olds offered 194 discrete pieces of information. Thus there were no developmental differences with respect to the amount of information 4- and 6-year-olds volunteered when discussing the present object terms.

For both age groups, considerable individual differences were noted. Four-year-olds offered from nine to 29 response elements, while the range for 6-year-olds extended from eight to 30 discrete pieces of information. Again, both age groups performed in a comparable manner.

Types of Attributes Associated with Object Terms

This analysis was aimed at exploring the nature of children's interpretations of object terms under definitional conditions. The incidence of particular types of attributes was computed for each age group, i.e., the percentage of function/action - , perceptual characteristics - , contextual information - , analogous - , evaluative - , and other responses was determined. The above attribute types were rank ordered for each age group.

Insert Table A about here

Table A reveals developmental differences with respect to the types of attributes children associated with object terms under definitional conditions.

Four-year-olds showed a preference for stipulating perceptual characteristics of pertinent objects, e.g., mentioned their shape, parts, perceptual properties and materials objects consist of. The functions commonly served by pertinent objects were referenced in second place, followed by contextual information about when, where, by whom and in the proximity of which other items objects might be encountered or employed.

Six-year-olds demonstrated a marked preference for explicating the functions objects serve. Contextual information was less frequently provided, and perceptual characteristics received less attention still.

Relation of Present Findings to Developmental Literature

The present findings are congruent with the observation that both functional and perceptual features or attributes associable with object terms are referenced early in semantic development (Anglin, 1977, 1978; Bowerman, 1977; Gruendel, 1977; Nelson, 1973, 1974, 1978).

Four-year-olds' preference for perceptual characteristics of objects appears to be in contradiction with Nelson's theoretical model of the primacy of functional information (Nelson, 1973; 1974; 1978). A recent study of children's definitions of lexical items and their general conceptual

knowledge of these terms is particularly relevant. Nelson (1978) reports that 3- to 5-year-old children offered predominantly function-action responses.

The discrepancy between Nelson's observation and the present findings may be explained in at least two ways. Four-year-olds tested here may have had a general preference for perceptual attributes associable with object terms. Alternatively, the discrepant results may be attributable to differences in the experimental paradigms employed.

The present task was introduced as a request to provide information about object terms for someone (from outer space) who had no prior knowledge of the objects in question. Four-year-olds may have conceptualized this demand as pertaining to the visual identification of objects, e.g., "How would you recognize an x if you saw one?" This may have led to particular focus on perceptual information. It should be noted that this speculation is congruent with the assumption that perceptual features or attributes are critical in the identification of category exemplars (Anglin, 1977, 1978; Nelson, 1974, 1978).

Since it is difficult to stipulate defining perceptual features for artifacts (Anglin, 1977; Smith, 1977 personal communication) reference to perceptual characteristics of objects is likely to be accurate with respect to a subset of category members only while being misleading for others. Six-year-olds may be more cognizant of the limitations of the

perceptually based identification of artifacts, and may prefer to refer to functional information which has greater generality.

Thus the developmental differences observed here may reflect 4-year-olds' tendency to identify objects on the basis of perceptual characteristics when induced to do so by task requirements as opposed to 6-year-olds' growing awareness of the greater reliability and generality of functional information irrespective of task factors. Further examination of the impact of instructional variation on children's definitions of object terms is needed to substantiate this hypothesis.

It is important to note that there were considerable individual differences with respect to the types of attributes children of both age groups associated with object terms. Six 4-year olds offered predominantly perceptual characteristics while the remaining six subjects of this age group couched the majority of their responses in functional terms. Nine 6-year-olds showed a preference for functional information; three of their peers explicated all eight object terms predominantly in perceptual terms, while one 6-year-old referenced mainly contextual information.

This observation is congruent with Nelson's report (1978) of considerable individual differences in children's definitions of words. In view of these findings, group data have to be interpreted with caution.

Table A

Rank Order of Attribute Types Associated with the Definition of Object Terms

Rank Order	4-year-olds	6-year-olds
1	perceptual characteristics 42%	function 49%
2	function 33%	contextual information 28%
3	contextual information 16%	perceptual characteristics 17%
4	analogous 5%	analogous 3%
5	evaluative 3%	other 3%
6	other 2%	evaluative 2%

Appendix E

Applicability of Attributes Task

Further Results and Discussion

In order to gain further insight into 4- and 6-year-olds' judgements concerning the associability of certain perceptual attributes with target object terms, the incidence of erroneous responses (rejection of associable = semantically acceptable attribute object term combinations; affirmation of non-associalbe = semantically odd ones) was computed for both age groups.

Ten percent of 4-year-olds' responses were erroneous, while 6-year-olds erred on 6% of the attribute object term combinations presented to them. The high level of accuracy indicates that even at age 4 children's judgements of semantic acceptability with respect to the association of perceptual attributes with object terms correspond essentially to adult intuition.

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