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Young children's use of the definite and indefinite
articles in referring expressions

Hazel Carr Emslie

1986

A thesis submitted for the degree of Doctor of Philosophy in
the University of Durham

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Department of Psychology
University of Durham



15. FEB. 1987

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I declare that the work in this thesis is all my own and has not been submitted for any other degree.

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Young children's use of the definite and indefinite articles
in referring expressions

Abstract

It is argued that the theoretical framework used in earlier studies of children's use of the articles is inadequate, failing in some important ways to capture even normal adult usage. A new theory of article usage is proposed which is based on the concept of mental models. Previous psychological investigations are evaluated in the light of this theory and the major issues raised are investigated experimentally.

Nine experiments involving approximately 310 three to seven-year old children and 65 parents are reported. The experiments were designed to investigate the effects of two main factors on children's use of the articles, namely, the knowledge of the listener and the composition of the referential array. Different kinds of tasks were employed which required responses varying from article plus noun to single sentences and extended narratives.

The results of the experiments showed that although young children can, and do, take into account the status of an object within a referential array, the over-riding factor in their choice of referring expression is their perception of the knowledge of the listener. When they judge that the listener's model does not contain the same number and kind of objects as their own (the listener is ignorant), children will use an indefinite description to introduce a referent regardless of the status of that referent in the array. However, when the listener is knowledgeable indefinite descriptions are reserved for one of several identical or similar objects and definite descriptions are used for objects which are known to be unique in the listener's model. Other factors which influence children's use of the articles include the difficulty of the task, the child's perception of the purpose of the task, and the range of descriptions in the child's linguistic repertoire.

INTRODUCTION

The research to be reported in this thesis concerns children's use of the definite and indefinite articles in referring expressions. Referring, from a psychological point of view, is analagous to pointing in that the speaker chooses a linguistic expression to point to an entity, or group of entities, that he wishes to talk about. Reference, then, involves a minimum of two people : a speaker and a listener or reader, and the referential component of language concerns the means by which the speaker ensures that both he¹ and his audience are jointly attending to the same object or ideas.

From a developmental point of view the earliest foundations on which linguistic reference will be built is the establishment of a means of regulating joint attention. We know from the work of researchers like Bruner and Schaffer (e.g. Bruner, 1975; Scaife and Bruner, 1975; Collis and Schaffer, 1975) that this begins at a very early age with eye to eye contact. By the time the child is four months old he can follow the mother's line of regard and soon after does so even more readily when the mother uses some verbal means of encouraging this, for example, by marked intonation in phrases like 'Oh! Look, Jonathan'.

The next thing a child must learn is that objects have names, and mothers soon begin to label the objects which are under joint focus of attention, especially in the context of joint activity. Labels are often used as a means of establishing joint attention (Bruner, 1975), and once attention is jointly directed mothers systematically act upon or comment upon what has caught their joint attention.

Once the child has learned the names of objects (typically beginning around 12-14 months) he has two means at his disposal for

1. Throughout this thesis the generic 'he' will be used rather than the more cumbersome he/she.



referring : non-linguistic means like eye-gaze and pointing and linguistic means, i.e. providing a label. We know from the work of Deutsch and Pechmann (e.g. Deutsch and Pechmann, 1982; Pechmann and Deutsch, 1982) that the child continues to use both means for several years when referents are physically present. When the child begins to use the articles in his utterances (somewhere around the age of two to two and a half years) he seems already to have distinguished between two classes of nouns; proper nouns and common nouns, for the child nearly always employs the articles correctly, that is, he uses them with common nouns and not with proper nouns. Katz, Baker and Macnamara (1974) showed that children between the ages of 17 and 24 months could distinguish between proper names, for example, the nonsense word 'That's Jop' and common names, e.g. 'That's a jop' as long as the reference was to an animate object (in this case a doll). This distinction was not made in the case of inanimate referents (boxes). Children as young as 17 months then seem to pick up this distinction in the case of animates solely on the presence or absence of the article. Katz et al suggest that amongst some classes of objects (e.g. people) individuality is salient; among other classes it is not (e.g. one spoon is very like another). This is the distinction between the two semantically different types of names and from this semantic distinction the child learns the syntactic distinction between common and proper nouns, e.g. the presence or absence of the article a or the. Thus around the age of two years children seem to make the semantic distinction between specificity (or individuality) and non-specificity (any member of a class) of animate objects. By the age of two and a half to three years children have mastered the specific/non-specific distinction with inanimate objects (Brown, 1973).

It is important that children learn that objects may have more than one label, e.g. their mother can be 'Mummy' and also a woman or a lady because when it comes to referring to an object within a set of similar objects the class name alone is not enough. The next thing that children need to learn in order to be able to refer successfully is to choose a referring expression which will distinguish between the intended referent and other alternatives. As Olsen (1970) demonstrated the white one would be enough to pick out a white

circle in a display of black squares and circles, it would not be enough to pick out the referent from a display of white circles and squares. If the display is physically in front of the speaker and listener the task is difficult enough. If the referent is not co-present the task may be even more difficult for the child has to introduce the referent in some way and in doing so he must take into account not only the set of alternatives from which he is selecting but the set of alternatives from which the listener may be selecting : the child must consider not only his own but his listener's knowledge of a referent.

If a speaker judges that something is 'new' to his listener one of the most common devices in English for introducing this referent is to use the indefinite article, e.g. 'I've just been bitten by a dog'. Once the referent has been introduced in this way the speaker can then go on to refer to this dog by means of a definite form such as the definite article the dog, or a pronoun it. If, however, the speaker judges that the referent is already known to the listener, for example if the child has been bitten by the family pet and he is telling his father about it, then the speaker can use a definite referring expression e.g. 'I've just been bitten by the dog'. Appropriate usage of the definite and indefinite articles therefore involves consideration of both the verbal and non-verbal context and of the speaker and listener's knowledge of the referent. It is with this latter component of referential language that young children appear to have the most difficulty. Brown (1973) reports that by the age of two and a half to three years children have mastered the specific and non-specific distinction as coded by the articles and that usage is stable, children using the articles in at least 90% of the situations in which adults would. However, according to Brown, correct usage does not extend to the situations in which the referent is known to them but not to the listener : children wrongly assume that what is known to them is also known to the listener and therefore over-use the definite article.

Although the definite and indefinite articles have been the subject of much study by both grammarians and philosophers for many years (e.g. Sweet, 1898; Christophersen, 1939; Russell, 1905; Searle, 1969) it is only in the last decade or so that psychologists have

become interested in their use. Given the complexity of the articles as outlined above it is perhaps surprising that developmental psycholinguists have only recently undertaken systematic studies of developments in children's use and understanding of the articles. Those investigations that have been published fall into two main groups. The first group may roughly be defined as viewing the articles as a contrastive pair whilst the second group has been concerned with looking at the articles as two of a much larger class of determiners.

That the articles do contrast is incontrovertible. The definite article has been seen as embodying the concepts of uniqueness (Russell, 1905) or inclusiveness (Hawkins, 1978), and familiarity (Christophersen, 1939) or location (Hawkins, 1978), that is, the definite article presupposes or implies (Lyons, 1977, p. 183) that the referent is known to the listener or that he can locate it in the physical context or in his memory store and that the reference is to all the objects being referred to whether there is one, in which case it is unique, or several. The indefinite article on the other hand does not presuppose familiarity and location, nor does it imply that the referent is unique. When a is used it implies that there are several members of the class which are being 'excluded' (Hawkins) from the reference. Researchers who have studied the articles as a contrastive pair (e.g. Maratsos, 1976; Warden, 1976; Emslie, 1978; Emslie and Stevenson, 1981) have therefore devised experiments of production in which the articles would be used to convey the contrasts and/or they have devised comprehension experiments in which the articles were the only means of conveying the intended contrasts. The emphasis in the research has largely been upon the 'familiarity assumed' versus 'familiarity not assumed' contrast. Children do seem aware that the conveys the expectation that the listener is familiar with the entity being referred to. In an investigation into the effect of the form of the question on the eyewitness testimony of preschool children Dale, Loftus and Rathbun (1978) found that children replied 'Yes' to questions about entities not actually present in the film when they were asked 'Did you see the X' more often than they did when they were asked 'Did you see a(n) X?' However, the age at which children will accurately judge whether or not an entity is known to a

listener is a matter of some debate. Some researchers (e.g. Maratsos, 1976; Emslie, 1978; Menig-Petersen, 1975, 1983) put the age as low as three or four whereas other researchers (e.g. Warden, 1976; Karmiloff-Smith, 1979) put it as high as nine or ten. Researchers like Maratsos and Warden have been concerned to find the age at which children approximate adult usage and the 'mistakes' that children made when they used the instead of a for a referent which was specific for them but not for the listener was explained largely in terms of the child's egocentrism. Piaget, writing of his children's frequent use of pronouns and the definite article said:

"the child hardly ever asks himself whether he has been understood. For him, that goes without saying, for he does not think about others when he talks (1959, p. 40)".

Thus it has been argued that this inability to take the listener's point of view is responsible for the over-use of the definite article.

There has been much experimental evidence to show that the young child is egocentric, for example the referential communication tasks of Glucksberg and his associates (e.g. Glucksberg, Krauss and Weisberg, 1966), but there has also been much evidence that young children can take the listener's point of view if they have the linguistic means for doing so (e.g. Cohen and Klein, 1968) and if the task is suited to the child's cognitive level of development (e.g. Borke, 1971; Geber, 1977; Emslie and Stevenson, 1981). The whole concept of egocentricity has recently been challenged (e.g. Donaldson, 1978) but as far as research into children's use of the articles is concerned the important point to note is that it is assumed that the child knows the rules about when to use a and when to use the but that he is somehow unable to apply these rules.

Researchers who have adopted what they term a functional approach to child language (e.g. Karmiloff-Smith, 1979; Garton, 1982) have viewed the articles not only as a contrastive system but also as part of a much wider system of determination. They see the definite article as being much more closely related to the demonstratives than to the indefinite article and point out that historically the articles came from different sources : the indefinite article is derived from

the same root as the numerical one, whereas the definite article is derived from a se - form which split to form the definite article the and the demonstrative that. Karmiloff-Smith argues that the developments in children's use of the articles after the age of about three should not be seen as a gradual approximation to adult usage where the major factor is a move from an egocentric to non-egocentric perspective, but as reflecting the child's developing awareness of the different functions that the articles serve. Children progress from using the articles in what she terms their descriptor functions, to the determinor functions. The initial descriptor function is a deictic one - 'the thing being jointly attended to' and this is shortly followed by an exophoric one 'the only thing of its kind here'. The extra-linguistic descriptor functions come before the intralinguistic determinor, e.g. anaphoric, functions.

Karmiloff-Smith argues that though the children may use the determiners for various functions the child views these determiners as a set of homonyms, each with a different function. However only gradually does he realise that the same morpheme may have many functions and thus treats determiners like a and the as plurifunctional morphemes. Whereas the main manipulation of the first group of researchers was the knowledge/ignorance of the listener, the main experimental manipulation of the functionalists was the composition of the referential array, the listener's knowledge was varied only in as far as the experimenter pretended not to know which one of the objects on a table had been hidden (Karmiloff-Smith) or the experimenter blindfolded herself and asked the child which object on the table a toy (manipulated by the experimenter) was 'talking to', all the objects having previously been in full view of both child and experimenter (Garton, 1982).

The two main groups of experimenters whose work will be discussed more fully in Chapter Two have thus adopted very different approaches to the study of developments in young children's use of the articles. However, both groups have taken as their starting point, as far as the design of the experiments is concerned, the way in which adults use the articles. It seems reasonable to suggest that without an adequate theory of the meaning and uses of the articles in adult language any study of young children's use of the articles is likely to use inappropriate methodology and produce interpretations which at best

are misleading and at worst erroneous. It is one of the contentions of this thesis that recent advances in the fields of philosophy, linguistics and psychology in explaining the circumstances in which definite and indefinite descriptions can be used show that the framework in which most previous experimental investigations took place is inadequate. Chapter One of this thesis contains a proposed model of the uses of definite and indefinite descriptions which incorporates insights from all three previously mentioned disciplines. This model is then discussed in relation to earlier theories. Chapter Two is a review of previous psychological research with children and the methodology and findings of these studies is discussed in the light of the proposed model. The chapter ends with a brief explanation of the reasons behind the design of the experiments in this thesis and the ways in which these experiments may clarify many of the issues raised in the discussion of the previous investigations. Chapter Three is a brief introduction to the background to the current research : 'appropriate usage' is discussed, the scoring procedure adopted in this thesis is explained and the design and procedure are outlined. Nine experiments are reported in Chapters Four and Five in which children's production of the articles was examined. The contexts in which the utterances were elicited was varied with respect to the composition of the array, the knowledge of the listener, the age of the listener, and the presence or absence of the referents. Different kinds of tasks were employed which required different kinds of responses varying from a/the + noun to single sentences and extended narratives. Children's use of generics was not investigated. Chapter Six is a general discussion of the results of the experiments.

CHAPTER ONE

THEORETICAL BACKGROUND TO THE CURRENT RESEARCH

"An adequate theory of acquisition must start with an adequate account of what has to be learned". (Chomsky, 1964).

When the current studies were embarked upon the categorisation used by most psychologists (e.g. Maratsos, 1976; Warden, 1974, 1976, 1981; Emslie, 1978; Emslie and Stevenson, 1981) was that of Brown (1973). Brown first separated out the naming (predicative) function of the indefinite article, e.g. That's a wolf. John is a bully, and argued that appropriate usage of both articles could be defined in terms of specificity/non-specificity of the referent as conceived by speaker/listener. This can be represented in a 2 x 2 matrix:

Table 1.1. The relation between definite and nondefinite forms and specific and nonspecific reference in speaker and listener (adapted from Brown, 1973, p. 342).

Listener (as conceived by speaker)		Speaker	
		Specific	Nonspecific
Specific	Definite: the Examples: Can I have the car? Let's move the desk.	Nondefinite: a Examples: There is a spy hiding in your cellar. You once wrote an article on superstition.	
Nonspecific	Nondefinite: a Examples: I saw a funny- looking dog today. John tried to lift a piano yesterday.	Nondefinite: a Examples: I don't have a car. I need a new belt. I want to catch a fish. I talked with a logician. I am looking for a book.	

Brown then went on to define the different circumstances in which the definite article could be used. This analysis was based mainly on the work of Christophersen (1939), and is summarised by Brown (1973, p.345) in the following table:

Table 1.2. Circumstances in which a speaker having a specific referent in mind may assume that a definite reference on his part will retrieve the same specific referent in the listener.

Reference	Example
1. Unique for all	the moon, the earth, the sky
2. Unique in a given setting	the desk, the ceiling, the floor
3. Uniquely salient for a given social group	the car, the dog, the boss, the Pledge, the Constitution
4. Made salient by pointing, nodding, spotlighting	the chair, the singer
5. Made salient by stimulus characteristics that capture attention	the dog, the explosion, the motor
6. Specified by entailment	the engine, the head, the captain
7. Specified by definition	the last sentence, the first of the month
8. Specified by a prior utterance	the funny-looking dog

However, Emslie and Stevenson (1981) found that this framework did not embrace all those circumstances in which adults (and some children) will use the definite article. They found that adults would sometimes begin a cartoon description task with the definite article rather than the indefinite article : a common stylistic device in story telling. They also found that parents made use of what they termed idiomatic expressions, for example 'A boy and a girl are playing football outside the house'; a definite article use which could not be accounted for by any of Brown's eight categories. Emslie and Stevenson found that the parent controls they used never performed better than the four-year old children and that it was rare indeed to find subjects other than university students who introduced all new entities with the indefinite article. Thus it would seem that Brown's analysis does not embrace all the circumstances in which adult native speakers will use the definite article on first mention.

More recent studies (e.g. Karmiloff-Smith, 1979; Garton, 1982) have concentrated on the functions of the articles. Like Brown,

Karmiloff-Smith and Garton identify the naming or nominative function of the indefinite article, but apart from this the functions they specify hardly overlap with Brown's circumstances of usage. Neither Karmiloff-Smith nor Garton discuss the identifying function of the indefinite article which is in Brown's speaker specific/listener non-specific quadrant. Karmiloff-Smith discusses only non-specific reference although she does say 'the use of the indefinite article does not necessarily imply non-specific reference since the indefinite article is chosen by the speaker because of the characteristics of the extralinguistic setting' (p. 48). In her synthesis of the child's acquisition of the functions of the indefinite article (p. 215) in French she lists only nominative, numeral (one in English) non-specific reference and generic function. The functions of the definite article she defines as deictic (the referent under current focus of attention of both speaker and listener regardless of other aspects of the context), which would appear to be equivalent to Brown's categories 4 and 5, (in Table 1.1) exophoric (the only member of its subclass in the current extralinguistic setting) which seems to be equivalent to Brown's category 2, and anaphoric function (following a previous linguistic mention) which is the equivalent of Brown's category 8, plus gender indicating, which is applicable to French but not English. The focus in Karmiloff-Smith's work is therefore on a limited range of functions when both speaker and listener know what referents are physically present in the context of utterance. Garton, too, restricts her investigations to a limited number of functions. The two functions of the indefinite article are naming and indefinite (generic) by which she means reference to any member of a class of objects, and the three functions of the definite article are deictic, exophoric (extralinguistic) and anaphoric (intralinguistic).

By not taking into account the effect of asymmetry between the speaker and listener's knowledge of a referent all uses of the indefinite article are reduced to naming or non-specific functions. As Brown's 2 x 2 matrix shows quite clearly a referent may be non-specific for the speaker, or the listener, or both. Neither Karmiloff-Smith nor Garton considered the role of the listener in their analysis of the uses of the indefinite article and treat all uses as non-specific, presumably for both speaker and listener. Both

Karmiloff-Smith and Garton focus their attention on the status of a referent in the extralinguistic setting, e.g. the speaker should choose 'an indefinite referring expression when the referent is one of several identical ones (Karmiloff-Smith, 1979, p. 48)', and possibly it is this emphasis on the external array which is responsible for their lack of attention to the importance of the knowledge of the listener.

Neither Brown's (1973) analysis nor the functional framework of Karmiloff-Smith and Garton, which is based on Lyons (1977), seem to capture in any adequate fashion all the complexities of the uses of the definite and indefinite articles. A more comprehensive framework is needed which incorporates insights from both grammatical and psychological studies. A recent grammatical analysis of definiteness and indefiniteness by Hawkins (1978) has more clearly defined the circumstances in which speakers can use the definite and indefinite articles and demonstratives. Hawkins' analysis will be incorporated into the psychological framework suggested by Johnson-Laird and his associates (e.g. Johnson-Laird and Garnham, 1980; Johnson-Laird, 1983) to provide a means of (a) characterising what goes on in the minds of speaker and listener during discourse (b) explaining the use of definite and indefinite descriptions and (c) making predictions about when the articles will be used. The psychological theory is known as mental models and this will be the starting point for developing the theoretical framework adopted for this thesis.

1.1 Mental Models

The idea of mental models, or internal models of the world is not new : as Johnson-Laird (1980, p. 73) points out Kenneth Craik, in 1943, discussed the advantages to an organism of having a "small-scale model" of external reality and of its possible actions within its head. A mental model, as conceived in this thesis, is a level of representation which goes beyond the level of propositional representation, and whilst it may be based on propositional representation it can also draw on general knowledge and other representations to go beyond what is explicitly asserted (e.g.

Bransford, Barclay and Franks, 1972; Bransford and McCarrell, 1977). A mental model, then, may be constructed on the basis of linguistic information and it may be supplemented by, or even created from perception, memory, imagination and other mental processes. Mental models can represent objects and relations between objects, actions and sequences of events. The information contained in a mental model may be used to answer questions, evaluate the truth conditions of the propositions asserted, make inferences and predictions.

Recently it has been argued that mental models account for the structure of discourse better than story grammars (Garnham, Oakhill and Johnson-Laird, 1982) and are better than a propositional level of representation for the understanding of spatial descriptions (Ehrlich and Johnson-Laird, 1982) quantified assertions (Johnson-Laird and Steedman, 1978; Freeman and Stedmon, 1984), pronoun comprehension (Stevenson, 1984) and understanding and recall of discourse (Garnham, 1981). Most recently it has been argued that the development of children's syllogistic reasoning depends on the acquisition not of formal rules of logic but of procedures for manipulating models (Johnson-Laird, Oakhill and Bull, 1986). The important thing about mental models as far as this thesis is concerned is that they make strong predictions about the use of the definite and indefinite articles in discourse and they may enable one to get a clearer picture of young children's understanding and use of the articles.

The model to be developed below owes much to the work of Johnson-Laird and especially to the paper by Johnson-Laird and Garnham (1980).

Mental models make use of tokens to stand for individuals in a one-to-one manner, they use links to stand for identities, and they represent sets of entities by introducing an arbitrary number of tokens denoting exemplary members of the set. One of the advantages of a theory of mental models is that each of the tokens in a model designates a separate, potentially distinguishable individual, an individual who may be unique within the model, though he may not be unique in the world. And this last point illustrates a crucial difference between the way a model theory accounts for definite and indefinite descriptions and previous theoretical accounts : the starting point for understanding definite and indefinite descriptions

is the content of the speaker and listener's models of the discourse not the status of a referent in the world (c.f. Russell, 1905). During discourse both speaker and listener construct a mental model of the discourse. These models, which will rarely, if ever, be the same for both participants, will contain a representation of individuals, events and relations plus what is known about the knowledge of other participants. These models are constructed partly on the basis of what has occurred in the discourse and partly from memory, perception, imagination, reasoning, etc. The speaker's task is to describe his model and his description, that is his linguistic output, his ostensive gestures etc., will be influenced not only by the content of his model, that is his knowledge, but by his intentions and by his judgement of the structure and content of his listener's model. The listener's task is to construct a representation of the discourse which is similar enough to that of the speaker for him to interpret the speaker's utterances.

This idea is similar to the one advanced by Sanford and Garrod (1981) that the recipient must construct "a unique model of the things being talked about and the relationships which exist between them (p. 159)" and to Stenning's (1977, 78, 80) idea that discourse involves the description and construction of models of the domain in which statements, phrases etc. are to be interpreted.

1.2 Discourse Models and Indefinite Descriptions

An indefinite description is an instruction to the listener to do one of two things, either to add one token to his model or to select one of several identical tokens already in his model. Thus a sentence such as

(1) Yesterday I saw a hyena

instructs the listener to put one token representing a member of the class of hyenas into his mental model and to link this token to the verb 'saw'.

Similarly in

(2) Pass me a banana

the indefinite description instructs the listener to put one token

representing a member of the class of bananas into his model.

An indefinite description such as

(3) John is a bully

instructs the listener to put one token representing a member of the class of bullies into his model and link it to 'John' with a relation of identity, e.g. John = bully.¹

An indefinite description such as a rat in (4) instructs the listener to select one of the tokens representing a member of the class of rats which have already been introduced into the model by the first sentence.

(4) There are many rabbits, cats and rats in the zoology department. While I was working there a rat bit my thumb.

There are several points to note about the indefinite descriptions in the above examples. In (1) the indefinite description identifies (Vendler, 1967) a new specific entity to which reference can be made (Karttunen, 1976). In the identifying use of the indefinite article the speaker assumes that someone, usually, but not necessarily, the speaker or listener can provide at least one unique description of that entity (Johnson-Laird and Garnham, 1980, p. 390). Sentence (2) is an example of a non-identifying use of the indefinite article for here the speaker does not assume that anyone can provide a unique description of that banana. He does not intend the description to refer to a particular banana but to any banana. This corresponds

1. Johnson-Laird and Garnham (1980, p. 380) point out that in the case of indefinite predicate nominals such as Hugh is a teacher at Akenfield which of the tokens, Hugh or teacher at Akenfield is the new information which has to be added to the model depends on what has gone before, i.e. on what has already been established in the model. If the previous conversation has been about Hugh then there will already be a token representing this entity in the model and the new token will be the one representing a teacher at Akenfield. The assertion may lead the listener to assume for the first time that there are teachers at Akenfield thus Vendler's (1967) claim that predicative indefinite descriptions do not establish existence is slightly misleading for such descriptions may establish the existence of entities that match their descriptive content (teachers at Akenfield) if the listener had no previous knowledge of such entities but this is quite independent of the entity (Hugh) to which the predicate applies.

to the non-specific use of the indefinite article. Similarly, in (3) the indefinite description a bully does not identify a new candidate for reference, it simply adds new information about an entity (John) which has already been established in the model. Thus in a nominative function of the indefinite article (Warden, 1976), e.g. That's a mouse, the referent has already been identified and is referred to by that. Whereas the indefinite description in (1) establishes the existence of a specific new entity in the discourse model the indefinite description in (4) singles out one of the rats whose existence in the model has already been established linguistically by the first sentence.

The existence of entities matching the descriptive content of indefinite noun phrases is not always established by direct linguistic mention, it may also be established on the basis of shared general knowledge. For example in (5) the existence of pages is established by our knowledge of the relationship between pages and books.

(5) I paid £35 for a book this morning and was horrified to discover a page was missing.

The speaker knows, and knows the listener knows, that books contain many pages and the indefinite description simply singles out one of them. As will be seen later, general or background knowledge can have a crucial role in the construction and interpretation of discourse.

Finally, examples (4) - (5) illustrate a further point about all indefinite descriptions : they do not preclude the existence in the mental model of other entities fitting their description. One could continue example (1) with - in fact I saw two, (2) with - Pass John one, too, (3) with - and so is Peter, (4) with - and another bit my arm, and (5) with - and another page was torn.

The above analysis of the indefinite article supports the major claims about the use and meaning of the indefinite article in previous grammatical and psychological studies. It supports the statement of Christophersen that an indefinite noun phrase "means just one single unspecified member of the class, nothing more (1939, p. 73)", and is compatible with Perlmutter's (1970) argument that a is an unstressed version of the numeral one. The analysis also supports the more recent claim of Hawkins that the indefinite article is inherently 'exclusive', that "there must definitely exist, in the minds of the

speaker and hearer at least, other referents which are not being included in the reference (1978, p. 199)", for, as has already been explained, the indefinite description either simply calls for one token representing a member of a class to be introduced into the model (as in example 1) and other tokens may subsequently be introduced, or calls for the selection of one of several identical tokens already in the models of both speaker and listener (as in examples 4 and 5). The differences which have been pointed out between 1 - 4 above also support Christophersen's claim that "a is neutral with regard to familiarity; it does not mark it, but neither does it preclude it (1939, p. 74)", if by 'familiarity' one understands 'known to be in speaker and listener's discourse models'. This point about familiarity is similar to one made by Hawkins who states that the indefinite article can be used to refer to objects in a shared set as long as the description refers to a subset of those objects.²

Finally, the analysis of indefinite descriptions is in accord with Johnson-Laird and Garnham's statement that

"In general, an indefinite description calls for one token of a class corresponding to its descriptive content to be linked to the other arguments, if any, of the verb, and for other such tokens, not so linked to be specified as optional (1980, p. 380)".

-
2. Hawkins states that 'the indefinite article can be used to refer to objects in some shared set only if the indefinite description can be understood as referring to not all objects of the required kind in this set, i.e. to a proper subset as opposed to the totality (1978, p. 184). This is why (a) is acceptable after 1. because it is reasonable to suppose that there are other windows in the house to which reference is not being made whereas (b) if it can be interpreted at all must be interpreted outside the set in question, that is, as referring to some roof other than that of the house previously mentioned in 1.

1. I've just decided to inspect a house

- (a) I decided not to buy it because a window was loose.
(b) I decided not to buy it because a roof was leaking.

1.3 Discourse Models and Definite Descriptions

A singular definite description is an instruction to the listener to link one unique token matching its descriptive content to the verb. The crucial difference between this analysis and previous grammatical (e.g. Christophersen, 1939) philosophical (e.g. Russell, 1905) and psychological (e.g. Brown, 1973, Karmiloff-Smith, 1979) analyses is that this uniqueness should be true of the token in the discourse model, not of an object in the world. Thus when a singular definite description is used there should not be other tokens of the same type in the discourse model; as Johnson-Laird and Garnham express it a singular definite description "specifically debar[s] the presence of other tokens of the same type from the discourse model (1980, p. 381)".

The representation of a sentence including a definite description such as (6) requires two unique tokens, one designating Margaret and one representing a member of the class of professors.

(6) Margaret met the professor yesterday.

If (6) follows (7) there is no problem in deciding which professor Margaret met : one member of the class of professors has been individuated by the identifying expression in (7).

(7) The university appointed a new professor last week.

If, however, (6) follows (8) then there are difficulties in deciding which professor Margaret talked to because more than one token corresponding to a professor has to be introduced to represent the second sentence of (8).

(8) The university appointed a new professor last week. In fact they appointed several.

A plural definite description, e.g. the professors instruct the listener to link every token of a set or to link the set as a whole to other arguments of the verb, e.g.

professor - or professor)³
professor - professor)
professor - professor)

Whenever a definite description is used reference is being made to all the tokens in the discourse model fitting that description whether there is one (e.g. the professor) or more than one (e.g. the professors) and it is to this extent that definite descriptions can be said to refer 'inclusively' (Hawkins, 1978).

Since the experiments to be reported in this thesis are primarily concerned with singular definite descriptions further discussion will largely be confined to such descriptions.

A singular definite description is used by a speaker when, in his judgement, the listener either already has one, and only one, such token already in his model or when he judges that the listener can add to his discourse model a unique token either on the basis of specific linguistic information or on the basis of shared knowledge for which there is either a linguistic or situational 'trigger' (Hawkins, 1978). The definite description informs the listener that the entity to which reference is being made is, or is going to be, the only such referent relevant to the current discourse.

Several points in the above paragraph require justification. I shall begin by briefly outlining the points on which the current theory is in agreement with previous theories (e.g. Christophersen, 1939; Brown, 1973; Hawkins, 1978) before discussing more fully those in which the discourse model theory goes beyond previous accounts.

3. Not all plural definite descriptions have only one plausible interpretation.

The women cleaned the house
might mean all the women cleaned the house together or that each woman cleaned the house separately. In the former interpretation the set as a whole would be connected to the argument of the verb, e.g.

woman)
woman)→
woman)

in the latter interpretation each token would be connected to the arguments of the verb, e.g.

woman →
woman →
woman →

(See Johnson-Laird and Garnham, 1980, p. 381).

One universally accepted point is illustrated by examples (6) and (7) above : that a definite description can be used when the entity to which reference is being made has previously been identified linguistically, thus there is already a unique token in the listener's model. This is the anaphoric (or second mention) use of the definite article. In anaphoric reference the definite description may include the original noun (e.g. professor), a synonym as in (9), or the speaker may make use of class inclusion relationships as in (10) (e.g. Christophersen, 1939; Jespersen, 1949; Hawkins, 1978).

(9) James was wearing denim trousers. The jeans were incredibly tight.

(10) Sheila was eating a carrot. The vegetable would supply her daily dose of carotene.

There are two important things to be noted about these kinds of definite descriptions. When the speaker chooses his description he must be sure that the listener is familiar with the semantic relationship between this term and the first description so that an identity link can be made between the two unique tokens (e.g. denim trousers = jeans), and the speaker must judge whether or not the token for that entity is "in the addressee's consciousness at the time the sentence is spoken" (Chafe, 1976, p. 54; c.f. Woisetschlaeger, 1983, p. 141). Thus a previous mention is not enough on its own to ensure the successful use of a definite description, the listener needs to be able to identify this token. If the speaker thinks the listener cannot do this then he will use an indefinite description⁴, e.g.

(11) I bought a car this morning. It's the one I told you about last week.

There are several kinds of circumstances in which a speaker can use a definite description on first mention. Firstly, in what Hawkins (1978) calls the Immediate Situation use, the speaker can use a definite description of an entity which is unique in the situation of utterance, e.g. at dinner one diner can say to another

(12) Pass the cauliflower please.

4. This further illustrates the point made by Christophersen that "a is neutral with regard to familiarity; it does not mark it, but neither does it preclude it (1939, p. 74)".

The speaker may also use a definite description of an entity which is 'salient' in some way, for example in a household full of cats if there was one sleeping halfway down the stairs it would be perfectly appropriate for the speaker to shout to someone coming down the stairs (13) 'Mind the cat!'

Here the definite description refers to the only cat relevant to the current situation.

In what Hawkins terms the Larger Situation use a definite description can be used without a prior introduction of the relevant entity if the speaker judges that identifiability is assumed because of shared "general knowledge of the existence of certain types of objects in certain types of situations [and] of the predictability of the object in question in this situation (Hawkins, 1978, p. 119)". This general knowledge may be common knowledge by virtue of the speaker/hearer's cultural, national, regional and/or local background. Thus one can talk about the sun, the moon, one can arrange to meet friends in the pub, one can say, in a town like Sunderland, that the councillors have agreed to give money to the Miners' Welfare Fund. However, in appealing to general knowledge one must also take into account the immediate situation of utterance : an Englishman talking to a fellow Englishman in London might refer to the Queen and be understood as referring to Elizabeth II. If he were talking to the same person in Spain the listener could be forgiven for interpreting this description as referring to Queen Fabiola. The speaker must therefore consider which aspect of the context, whether the physical context or previous discourse, is likely to trigger, or have triggered, the introduction of a token representing a member of the class of Queens.⁵

A listener may also put into his model a unique token representing the entity to which the speaker is referring when the information needed to specify that entity is actually provided by the speaker later in the sentence.

5. This is very similar to Christophersen's argument that "the speaker must in each case decide whether he thinks the expression that he uses will invoke the right associations in his hearer, i.e. whether there is a 'basis of understanding' (1939, p. 73)".

- (14) There was an interview with Arthur Scargill on the front page of The Times this morning.
- (15) I dislike the name Gladys.
- (16) Bill is amazed by the fact that there is so much life on earth.
- (17) What's the matter with Alice?

The man she went out with last night tried to rape her.⁶

In example (17) the possible referents for man are limited to one by the relationship between 'she' and 'Alice' and by speaker and listener's shared knowledge that, in our culture, a woman will typically date only one man in a night. The hearer would search his discourse model in vain for the man if the second sentence merely said 'The man tried to rape her'. However, the listener need not rely on general knowledge to restrict the possible number of referents to one. The definite description may be used to designate the only entity who is, or is going to be, relevant to the current discourse. As Grannis (1972) suggested, the definite article signals that the speaker is uniquely defining a mutual world of discourse and the relative clause helps to delimit the world. To this extent the speaker is "inviting - or compelling - his listener to share in a conspiracy of uniqueness (1972, p. 286)".

Definite descriptions which include relative clauses also illustrate a point made by Johnson-Laird and Garnham to demonstrate the difference between discourse models and previous philosophical approaches to definite descriptions. They argue that if a speaker remarks

- (18) The man who lives next door to me has bought a bird bath this usage neither entails (Russell, 1905) or presupposes (Strawson, 1950) that there is one and only one man living next door to the speaker, for no such claim is being made. "The definite description ... designates the only neighbour of the speaker who is (or who is going to be) relevant in the current context (1980, p. 377)". Uniqueness must be defined in terms of the status of the token for

6. These four examples illustrate what Hawkins (1978) terms 'unfamiliar uses' of the definite article which he says include associative clauses, NP complements, nominal modifiers, and Referent Establishing Relative Clauses.

that entity in the discourse model, not in terms of the status of that referent in the world.

Finally there is what Hawkins has termed the associative anaphoric use of the definite article which, it has been argued, (e.g. Cruse, 1980) is the most common use of all. In associative anaphora a linguistic expression (e.g. NP or VP) triggers off a set of associations and a first mention definite description is used of one of these associates.

In the following example (Johnson-Laird, 1983)

(19) Ann was in a shop. She was talking to the assistant.

the second sentence requires the introduction of a token representing a member of the class of shop assistants. Such a token may already be available in the listener's model if the word 'shop' triggered the imagination of the listener so that he had created a representation of a prototypical shop with a door, windows, display cabinets, shelves, a counter, a till, a shop assistant etc. If 'shop' did not trigger off the associations between a shop and a shop assistant thereby introducing a token, then the definite description itself can trigger its introduction by way of an inference based on our knowledge of prototypical shops.

There are many kinds of linguistic triggers. Christophersen (1939) gives a very rich set of examples such as a wedding, the bride, the bridesmaids, the cake. How one defines the parameters of such associates, how one limits the domain of reference, is not so easy to explain. Both Christophersen and Hawkins see the over-riding consideration as being that the speaker and listener share knowledge of the association. The weaker the association the more likely it is that a backwards bridging inference (Clark, 1977) will have to be made and the longer it will take the listener to introduce a unique token. Sanford and Garrod (1981, pp. 105-106) found that the time taken to read two sentences of the form

Mary dressed the baby.

The clothes were made of pink wool
was not reliably longer than

Mary put the baby's clothes on.

The clothes were made of pink wool.

However, there was a significant increase in the time taken to read

the second sentence in the pair

Mary put the baby's clothes on.

The material was made of pink wool.

It would seem that 'dressing' elicits a prior representation of clothes, but 'clothes' does not elicit a prior representation of their material. According to Johnson-Laird "these effects seem to depend on whether or not the discourse evokes a model containing a representation of the relevant token (1983, p. 384)". This would agree with Du Bois' (1980) argument that what he terms 'partial identification' is only possible of entities which are part of a well-defined script or scenario, and Anderson, Garrod and Sanford's (1983) finding that the less 'predictable' or 'scenario-bound' the entity the longer it took the addressee to identify the unique referent.

A further important point about the way in which a discourse model handles associative anaphora is illustrated by the a shop to the shop assistant example. There may be more than one token available in explicit focus or more than one slot in the script or scenario : the word 'shop' may have triggered a prototypical shop in which there is more than one assistant. Nevertheless a definite description can be used because the action as a whole singles out one particular assistant - the one who is talking to Mary (c.f. Sanford and Garrod, 1981, p. 167; Johnson-Laird, 1983, p. 385). Thus it can be seen that the discourse model theory which is proposed here can encompass a much broader range of possibilities for first mention definite descriptions than the grammatical and psychological theories which have been the basis for most previous psychological investigations into children's use of the articles (e.g. Maratsos, 1976; Warden, 1974, 1976, 1981; Emslie, 1978; Emslie and Stevenson, 1981). Christophersen, for example, argues that a definite description can only be used if there is only one associate (e.g. wedding - the bride) or if reference is to all the entities matching the description (e.g. wedding - the bridesmaids). Brown's classification includes only 'specified by entailment' like a car - the engine, which again, is a unique associate. These accounts, unlike the theory being presented here, do not allow for the kind of definite descriptions on first mention which are common in everyday usage like

(20) I had a terrific argument with John the other day. He came in like a whirlwind and stormed straight over to the window. The VP came in in no way entails or presupposes a room with only one window yet the listener or reader can build a bridge from the (only) window which is relevant to the context through 'room' which isn't mentioned, to came in. This underlies the necessity to include a greater use of inference in accounting for first mention uses of the definite article than even a pragmatic theory like that of Hawkins has allowed.

1.4 Summary

In the previous sections it has been argued that the starting point for understanding the uses of definite and indefinite descriptions is the structure and content of the speaker and listener's model of the discourse and that notions such as uniqueness and familiarity should be defined for discourse referents and not linguistic form, that is, the question that should be asked is not whether a referent has or has not been previously mentioned but whether a referent is, or is not, in the mental model.

It has been suggested that, in general, an indefinite description is used by a speaker to instruct the listener to add to his discourse model one token representing a member of the stated class. The main exception to this is when a number of tokens representing such class members is already in the model (see example 4) and the speaker uses an indefinite description to instruct the listener to select one of these tokens to update his model. In both cases the speaker is identifying the referent. In the former case the essential partitive nature of the indefinite article is presupposed; in the latter case the partition may equally well be asserted as in one of the. Predicate indefinites do not identify new objects : a unique description of the entity of which the predication is made is already available to both speaker and listener. In addition there is the non-specific indefinite which introduces into the model a token for one member of a class but is non-identifying.

When a speaker uses a definite description he assumes that the

listener can identify a unique set of entities matching the description though the basis of identification may be different : the token may already be in the listener's model or he may put one unique token there, because of previous explicit or implicit linguistic information, because the referent is physically co-present, because of shared general knowledge, or because the definite description itself uniquely specifies the referent(s) in question.⁷

Thus, following Stenning (1978, 1980), it is suggested that participants in a discourse should construct or describe their models on the principles of identifiability and anaphoric conservation : an indefinite description is not used for an entity, (or set of entities) already in the listener's model, it signals a new entity.⁸ If, for example, the speaker identifies a poor man he must go on to refer to him with a definite description (i.e. anaphoric conservation). If, later on, the speaker wishes to introduce another poor man he must do so with enough information for the listener to know he must add another token, e.g. another poor man, a second poor man, and in subsequent descriptions the speaker must include enough information for the listener to discriminate between the two individuals, for example the first poor man, the other poor man. The speaker must ensure that the listener's model contains the right number and kind of tokens and that it contains within it the uniqueness for definite

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7. Clearly as long as the token is uniquely identifiable the definite description need not contain the definite article, a pro-form like he or him could be used or, when the entity is physically present a gesture or that X may be enough.
 8. Two exceptions to this have already been noted, that is, (a) when there are a number of unidentified tokens already in the model as in example 4 or (b) when the speaker judges that the entity is not in the listener's consciousness or explicit focus. A further exception is when the speaker deliberately wishes to mislead the listener or reader, as, for example, in a detective story. In a story which introduces first a poor man, then a beggar man, then a thief, one assumes the three indefinite descriptions identify three distinct individuals although there is no logical inconsistency in assuming that one man could satisfy all three descriptions. It depends on what is revealed later in the story whether the listener is forced to form identity links between tokens (e.g. Stenning, 1980; Johnson-Laird, 1983, p. 383).

reference. Furthermore, as Cruse (1980, p. 314) and Klein (1980) and others have pointed out, the speaker must use a definite description if he can do so appropriately. These principles are, of course, similar to the Gricean maxims (Grice, 1975) and in discourse it is assumed that both participants are working according to the co-operative principle.

Having explained the theory of discourse models which is being adopted for the current investigation into young children's use of the articles in referring expressions it is now possible to look at previous psychological studies in this area and evaluate their methodology and findings in the light of this proposed model. This is done in the following chapter.

CHAPTER TWO

PSYCHOLOGICAL BACKGROUND TO THE CURRENT RESEARCH

As was stated in the Introduction, previous psychological investigations into young children's use of the articles fall into two main groups. The earlier studies (e.g. Brown, 1973; Maratsos, 1973, 1976; Warden, 1974, 1976, 1981) following the tradition of grammarians like Christophersen (1939) and Jespersen (1949) viewed the articles as a contrastive pair and looked at how and when the child approximated adult usage of the definite and indefinite articles. Deviations from theorised adult usage were seen as mistakes or errors and these were accounted for largely in terms of the child's egocentrism. Later researchers (e.g. Karmiloff-Smith, 1977, 1979; Garton, 1982, 1983) following the tradition of Lyons (1977) adopted what they called a functional approach where the articles were seen as only two members of a much larger class of determiners and these later studies sought to determine the functions the articles and other determiners such as the demonstratives this and that served for the children at various stages in their development. Deviations from (assumed) adult usage were seen not as errors but as reflecting the child's restructuring of his concept of the functions of the determiners, for example, at any given time one particular function may predominate, one function may conflict with another, and it is only gradually that the articles, and other determiners, acquire the plurifunctional status they hold in adult use.

This chapter is divided into two main sections; first there is a consideration of 'traditional' studies beginning with Roger Brown, and second there is a consideration of the studies which come under the 'Functional' approach. These sections are followed by a brief outline of the experiments which are reported in chapters 4 and 5.

2.1 The 'Traditional' Studies

A. Brown

Brown provides us with the most detailed naturalistic study of the articles (1973, pp. 340-356). In his analysis of the acquisition of the first fourteen morphemes in the speech of Adam, Eve and Sarah he showed that the articles were ranked eighth in acquisition although they were semantically the most complex of the fourteen morphemes and were the most common morpheme in parental speech. Brown concluded that "children somewhere between the ages of 32 and 41 months, roughly three years, do control the specific/non-specific distinction as coded by the articles (1973, p. 355)". However, he qualifies this statement by saying that this early productive control of the article contrast does not yet extend to circumstances when the child must take into account the fact that his listener's knowledge of the referent is not the same as his : children were able to use a definite description correctly when the referent was mutually known to be specific as in (a) and (b)

(a) the sky, the floor, the mailman, the middle

(b) That a jeep. I put some in the jeep.

They used indefinite descriptions when the referents were non-specific for both speaker and listener.

Put a band-aid on it.

A wheel looks like a Q.

But they often used definite descriptions inappropriately when the referents were specific for them but not for their listener.

I want to open the door. mother : What door?

The cat's dead. mother : What cat?

Brown explains such errors in terms of the child's egocentrism : their inability to decentre, to take the listener's point of view when it was different from their own.

Overall, Brown's naturalistic data leave many questions unanswered. In particular it is difficult to evaluate his analysis of correct and incorrect usage in the absence of more specific knowledge about the context. From Brown's analysis, and from the examples he gives (1973, p. 352) it is not clear whether or not he is claiming that children can sometimes create a discourse referent and maintain reference to it in the absence of the referent, that is strictly

within the linguistic context. Hickmann (1980) points out that the only two instances of 'appropriateness' involving what Brown calls 'prior mention' were indefinite descriptions predicated of a referent which was probably denoted deictically, followed by a definite form which could also have been used deictically, for example in (b) above, 'that a jeep ... the jeep'. As was stated in Chapter 1 indefinite predicate nominals do not identify new candidates for reference.

B. Maratsos

The first major experimental investigation into article acquisition was that of Maratsos (1976). Maratsos concentrated on a narrow age span, 32-60 months, and devised some ingenious comprehension, imitation and production tasks. The comprehension experiments will not be reported here partly because this thesis is concerned with production and partly because, as Brown (1973) observed, tasks in which listeners must base their responses purely on the a/the contrast 'puts an unusual communicative burden (p. 356)' on the articles. The main production task was a story completion task. The experimenter told the child stories and at the end of each story there was a question to which the children had to provide an answer 'a + noun' or 'the + noun'. For example, definite descriptions were elicited by the experimenter telling a story in which (a) (below) was embedded, and indefinite descriptions were elicited by presenting a different version of this context as in (b). In both cases children were asked (c).

Context : Story about a lonely man who went into the jungle to find someone to play with.

(a) ... he saw two animals. He saw a monkey and a pig.

(b) ... he saw some animals. He saw some monkeys and some pigs.

(c) Who came to the man? (e.g. (a) the monkey
(b) a monkey).

On the basis of the results of this experiment plus the results from an imitation task Maratsos divided his subjects into three developmental groups : three-year olds (3-all), low performing

four-year olds (4-low) and high performing four-year olds (4-high). Both four-year old groups used the definite article correctly to refer to previously identified items as in (a) above (an X - the X) but only the 4-high children consistently used the indefinite article to identify particular new referents as in (b) above (Xs - an X). By contrast, the three-year olds used the indefinite article correctly as in (b) (Xs - an X) but frequently failed to use the definite article when it would have been appropriate to do so as in (a) (an X - the X), that is, they over-used the indefinite article.

Maratsos' explanation for the infrequent use of the definite article by the three-year olds is essentially one to do with memory failure "the three-year olds may well have lacked a clear representation of the referents unique participation in the story context, leaving them only with a representation of class membership when answering (pp. 67-68)". Indeed the very fact that Maratsos' request was for a class name may well have biased subjects towards the indefinite article. Like Brown, Maratsos attributes the failure of the 4-low group to use an indefinite article in the second story type (Xs - an) to their egocentrism : they failed to realise a "unique member of the nominated class had not been established in the conversation for both themselves and their listeners (p. 73)". Maratsos concludes, therefore, that by three to four years children have acquired the distinction between specific and non-specific reference and by the age of five they can take the knowledge of the listener into account when it differs from their own.

Maratsos' studies have been heavily criticised on methodological grounds : experimental sessions in a strange environment with an experimenter the children had only met once before lasted up to an hour in length, a very long time for a young child, some of the procedures, for example, sitting on hands or putting them on one's head in order to prevent the obvious communicative tactic of pointing, may have made the children quite uncomfortable, and Maratsos himself admits that the story completion tasks were particularly disliked "which was not surprising as they involved responding to questions with no real answers" (Haviland, 1976). The above factors, as Haviland (1976) and Warden (1981b) have argued, can sabotage any attempt to assess non-egocentric behaviour, for if a child is tired

and uncomfortable he is not going to worry about taking his listener's point of view into account.

As far as the present thesis is concerned two other major criticisms must be made. Firstly, there was no systematic use of adult controls, yet in the one case in which adults were used Maratsos found their performance did not differ greatly from that of the four-year olds : 7 of the 13 parents 'over-used' the definite article in the Xs - an X paradigm like the 4-low group and 6 used the indefinite article like the 4-high group. Clearly not all adults will use the articles according to the theory adopted by Maratsos. Secondly the only listener in these experiments was the experimenter himself and it was he who established the linguistic context. It is quite possible that children in the 4-low group may well have assumed that the experimenter already knew the answers to the questions, that he was familiar with the referents, and this is why they used the definite article. Thus the two groups into which Maratsos divides his four-year olds may be distinguished by the way in which they approach the task rather than by egocentrism. Unless children are allowed to create their own discourse referents, and address their dialogue to a genuinely naive listener, it is not possible to decide if they can appreciate the need to identify a referent for a listener nor whether they can use the definite article anaphorically, that is, to refer back to a particular referent they themselves have previously introduced into the discourse.

C. Warden

The most extensive experimental study of English speaking children's use of the articles in referring expressions is that by Warden (1974, 1976, 1981) and it was Warden's studies that were the springboard from which the present author's investigations were launched. Warden's studies spanned the age range from three to nine years. Most of the 1974 studies concentrated on the four-year old age groups but one of them used three, five, seven and nine-year olds.

In Experiment I (1976) Warden found that four-year olds used the indefinite article in a naming task when a blindfolded experimenter asked 'What's that?' but very few of them (22%) used indefinite

articles in a describing task when the blindfolded experimenter asked them to tell him what was happening. However, the student controls also used some inappropriate definite descriptions (35%) and Warden concluded that both adults and children may have assumed that the blindfolded experimenter somehow shared their view of the events.

In Experiment II four-year olds and students were asked to describe four different drawings each of which depicted an animal being chased by another animal. There were two conditions : in the 'social' condition subjects looked at the pictures with the experimenter and in the 'isolated' condition subjects looked at the drawings on their own. Although the students responded to variation in the social context more than the children in that they used significantly fewer definite descriptions in the isolated condition neither they nor the children varied their use of indefinite descriptions in the two conditions. The students' performance was marked by a surprisingly high proportion of undetermined referring expressions in the isolated condition where they had been expected to use indefinite descriptions. Once again Warden concluded that the subjects had made certain presuppositions regarding their audience's knowledge of the referents.

In Experiment III the experimenter took no part in the communication process. Subjects had to tell a three picture cartoon to a same age subject who could not see the pictures because of a screen. Each story involved four referents, at least two of which appeared twice, thus allowing for a first and second mention. The results showed that from three years upward almost all subjects used a definite description when mentioning a referent for the second time. However, the most striking result concerned the way in which subjects mentioned a referent for the first time : only adults and nine-year olds used reliably more indefinite than definite articles. Contrary to Maratsos, Warden concluded that children under five fail to take into account their audience's knowledge of a referent (their initial descriptions are predominantly definite), that there is inconsistent usage between the ages of five and nine, and full mastery of the articles in referential language only from nine onwards.

It is worth considering the nature of the indefinite descriptions that were used by the younger subjects on first mention. The majority

(70%) of three-year olds indefinite descriptions were in naming statements as were 45% of those produced by the five-year olds. These, of course, do not constitute identifying descriptions. However, Warden does not explain why young children should resort to nominative sentences.

Warden does stress the fact that five to nine-year olds do sometimes identify referents for their listener. It is their inconsistency that is puzzling. Whilst invoking the concept of egocentricity to account for the over-use of the definite article Warden also suggests a major difficulty for young children is the fact that the indefinite article has two functions, namely, "to indicate either an indefinite referent or a specific, but previously unidentified, referent (1976, p. 111)". He suggests that children may be forced to rely on the definite article until they have mastered the identifying function of the indefinite article which, of course, depends on their awareness of the audience's point of view.

In an attempt to find the reasons for the differences between his 1976 results and those of Maratsos (1976), and also for the inconsistent use of the articles by his five - nine-year olds Warden (1981) conducted a further experiment to try to find contexts which would encourage children's use of the indefinite article to identify referents for a listener. Four age groups of children, five, six, seven and eight, and one adult (student) group were used. Warden pointed out that in his 1976 study the referents were always in front of the speaker who was always in face to face contact with his audience. He suggested that the physical presence of referents and listener might have encouraged the use of definite references, as might the static pictorial stimuli. In his 1981 study Warden eliminated the possible influence of static stimuli by using video-taped films. He then designed four experimental conditions which varied the presence/absence of listener and referents. In two conditions the listener was in the same room as the speaker (although he could not see the stimuli) and in the other two conditions the listener was in a separate room and the speaker communicated via a microphone. Warden termed these the Listener Present and Listener Absent conditions. In addition, two of the conditions required the speaker to describe the film while it was running (referents present)

and in two conditions the speaker described the film after it had finished (referents absent). Thus the four experimental conditions were

1. Speaker present, referents present
2. Speaker present, referents absent
3. Speaker absent, referents present
4. Speaker absent, referents absent.

Warden found no effect on the choice of referring expression for first mention of either the referents present/absent manipulation or the listener present/absent manipulation. In fact, combining the results of all four conditions Warden found a great similarity between the percentage of indefinite descriptions used in his 1981 and 1976 studies. This can be seen in Table 2.1.

	Age Group					
	5	6	7	8	9	Adult
1976	62	-	61	-	82	100
1981	57	61	62	60	-	89

Table 2.1. The use of indefinites in two studies (percentage scores) taken from Warden (1981).

Again Warden found that five - nine-year olds sometimes used identifying expressions on first mention and sometimes used definite descriptions. He concluded that the presence of identifying expressions was evidence of children's intention to identify referents. He advanced three possible reasons for these children's failure to do so consistently. First, that "the contextual manipulations ... failed to simplify the context sufficiently to enable children to surmount their egocentricity (p. 98)", second, that the children may have been inadequately motivated so that the results "do not adequately represent the children's communicative competence (p. 99)", and third, it is possible "that strict observance of the rule for using identifying expressions is exceptional in normal conversation (p. 99)". Warden, therefore, concludes by saying that should strict observance of the rule prove to be the exception, rather than the rule, "it may either reflect adult egocentricity, or be an indication that the linguistic specifications for article use needs to

be redefined". However, perhaps the best way to test Warden's suggestion that children intend to identify referents when they use indefinite descriptions is to determine whether children will use them in situations when they are needed, that is, when there is asymmetry between speaker's and listener's knowledge, and not use them when they are not needed, that is, when the listener is knowledgeable. There was no listener knowledgeable condition in the Warden study : even when the listener was present he could not see the videotapes. The crucial manipulation, therefore, is to have the listener knowledgeable or ignorant, not physically present or absent. Such a manipulation is used in the experiments described in Chapter 4.

The experimental investigations of Warden and Maratsos have very different conclusions about young children's ability to use the articles. However, the two studies are difficult to compare because the age range covered and the tasks used were very different. Much nearer to the age range covered by Maratsos and the task used by Warden was the investigation of Emslie and Stevenson (1981).

D. Emslie and Stevenson

The three experiments reported by Emslie and Stevenson (1981) were similar to those of Warden (1976) Experiment III in that subjects were required to tell a three picture cartoon story to a same age listener who could not see the pictures. A total of five subject groups were used in the three experiments : two, three and four-year olds plus students and parents. Similar results were obtained from all three experiments. The two-year olds did not appear to have mastered the distinction between the definite and indefinite articles but all other groups had grasped the distinction, that is, all other groups used indefinite descriptions on first mention and definite descriptions on second mention. The two-year olds used predominantly naming statements for first mention and showed no preference for either article with second mention. Thus Emslie and Stevenson found no evidence of an 'egocentric' stage in article usage unlike Maratsos with his 4-low group or Warden with his five to nine-year olds. Emslie and Stevenson suggest that the differences between the findings of their study and that of Maratsos may well be due to differences in

the task. The differences between their results and Warden's are more difficult to explain since the same kind of story-telling task was used. There are two possible reasons why Emslie and Stevenson's results were different. First, there were slight differences in the way the task was presented. To elicit identifying expressions the experiments must use a task in which the speaker is addressing a listener who has no previous knowledge of the referents. Children were supposed to be telling the story to another child but the experimenter was also in the room. It is possible that Warden had not made it clear enough that the speaker should be addressing the other child and not him. If the children had been addressing their remarks to the experimenter then definite descriptions would have been appropriate.

Secondly, and perhaps more crucial than differences in procedure, different materials were used in the two studies. From Warden's description of his pictures there seemed a strong possibility that differences in materials were responsible for differences in results. First, one has to imagine a great deal of action having taken place between pictures to be able to infer that the referents in different pictures are the same. One might expect, though, that this would have led to a greater use of a rather than the. This did not happen in Warden's experiment 3 although one suspects that at least some of his subjects may not have recognised the referents from the occurrence of a on second mention (8% 3 year olds, 10% 5 year olds). However, Warden's high proportion of egocentric responses, and perhaps his high proportion of nominative sentences when the indefinite article was used (70% 3 year olds, 45% 5 year olds) can be understood only if one also takes into account the fact that the spatial position of the referent was not easy to code verbally. Warden describes Picture 2 of story A thus : 'A cow stops the dog, and the hen is hiding behind the cow'. Not only is this state of events not obvious from the drawings (as illustrated in Clark and Clark, 1977, p. 369) it is very difficult for a three or even five-year old to express verbally. It seems likely, therefore, that if the children were struggling to interpret the pictures for themselves they would not be able to take the listener's needs into account at the same time.

One additional finding in the Emslie and Stevenson study proved

quite surprising : although the students who were included only in Experiment 3 performed with 100% consistency, as had the students in Warden's study, the parents in all three experiments were quite variable in their use of the articles. Considering only the use of a on first mention and the on second mention the parents' performance was never better than the four-year olds.

E. Hickmann

Hickmann (1980) asked seven and nine-year old children and adults to narrate six animated cartoons to a listener who had not seen the films. Each film consisted of a short interaction between hand puppets of common animals (the participants) who talked about two referents (the non-participants). In half the films the non-participants were inanimate objects who were introduced in the propositional role of direct object (e.g. I found a penny) and in the other half of the films the non-participants were animate and were introduced in the propositional role of agent of a transitive verb or subject of an intransitive verb (e.g. a tiger attacked me; a squirrel came by). Hickmann found that the majority of subjects in all age groups appropriately introduced the referents either with an indefinite article, a possessive pronoun or a definite description with a relative clause. However, 39% of seven-year olds responses, 13% of ten-year olds responses and 2% of adults responses were inappropriate, mainly because the definite article had been used alone to mention a referent for the first time. Hickmann says that inanimate referents were easiest for the children but that the more 'agent-like' animate referents were the less likely the seven-year olds were to introduce them with an indefinite article. Hickmann concludes that children do not consistently 'create' referents for later intralinguistic cohesive relations in discourse until around ten years of age where language has to be used as its own unfolding context.

From Hickmann's work it is clear that there are many factors to be taken into account, e.g. whether the objects are animate, animated or inanimate, even in an apparently straight-forward task like narration.

It is worth stressing that Hickmann's films were not silent movies as in the Warden experiments or the experiments to be reported in this thesis. There were 'non-participant' referents which were not seen but were talked about by the two 'animate participants'. The task, therefore, seems more complex than either the Warden (1976, 1981) or Emslie and Stevenson (1981) tasks since it involves reporting dialogue, that is, rephrasing linguistic material. Thus it is, perhaps, not surprising that the task is not fully mastered until ten-years of age.

F. Zehler and Brewer

Zehler and Brewer (1982) looked at the acquisition of the indefinite, definite and null articles in two and three-year old children and used students as controls. The children were tested in play sessions and were asked to complete sentences - indicated by rising intonation - during "shared narratives", whilst the adults were given the sentence completion items in booklet form and asked to respond as if they were speaking in a narrative.

Of particular relevance to the current research is the fact that as well as testing introductory/anaphoric reference Zehler and Brewer looked at objects which were context-uniques, e.g. car - steering wheel or what they termed context intermediates where a few like items are available in a particular context, e.g. car - door. As far as the introductory use of the indefinite article was concerned Zehler and Brewer found that even two and three-year old subjects produced a high percentage of introductory (identifying) uses of a (84% - 100%), which would support the findings of Maratsos and Emslie and Stevenson, and that although there was some over-use of the definite article this was confined to one particular context, namely, that in which a large number of items was present and the children had to refer to one of them, e.g. the girl opened a bag of blocks and took out the block (expected response a block). This is a strange result given that the mental model theory would also predict that subjects would use the indefinite article a or one of the when a large number of identical objects was present. Possibly the way in which the task was presented influenced the children's choice of determiner, but it is not clear

from Zehler and Brewer's account exactly what the procedure was. It is notable that in all studies (e.g. Karmiloff-Smith 1979; Garton, 1982) the most consistent over-use of the definite article is in this situation where the child has to refer to one of several identical objects which are visible to both speaker and listener. The possibility exists, therefore, that young children do not have the linguistic means at their disposal for making this kind of reference.

In the context-unique category all subjects used the definite article but interestingly, in the context-intermediate category (car - door) where only a few items were available and they had expected equal numbers of a and the they found that 92% of adults used the definite article as did many of the children. Zehler and Brewer term these 'quasi-knowns' and argue that in such cases shared world knowledge and Gricean conversational postulates take precedence over a simple specific/non-specific distinction. Despite Zehler and Brewer's own expectations the results are completely predictable in the mental model theory proposed in Chapter Two. Although previous theories (e.g. Christophersen, 1939) adopted by psychologists (e.g. Brown, 1973) allowed only for the on first mention when reference was to a unique entity or associate or to all associates matching the description, the mental model theory allows for the to be used for one of several possible referents when only one of the referents is, or is going to be, relevant. Thus when a driver of a car shuts the door the driver's door is the only relevant one, when a passenger shuts the door the passenger door is the only relevant one. The range of possible referents is restricted to one by the action of the verb (see examples 18-20 in Chapter Two for detailed discussion).

G. Bennett-Kastor

Further support for the argument that young children can and do identify referents for a listener comes from a study by Bennett-Kastor (1983) who asked two to five-year olds to tell her any story they wanted. She found no over-use of the definite article and almost every case of the use of the on first mention could be explained as generic or archetypal use, e.g. the big bad wolf, the sheriff, and the good guys.

Although a fairly wide range of tasks have been used in these 'traditional' studies these may be divided into two broad categories, namely, narratives (which include both picture stimuli and video-tapes) and manipulations of the referential array which have largely been concerned with array size. It is mainly with manipulations of the composition of the array that the 'functional' studies reviewed in 2.2. have been concerned.

2.2 The Functional Studies

A. Karmiloff-Smith

The most extensive investigation into French speaking children's use of the articles and other determiners was by Karmiloff-Smith (1979). Karmiloff-Smith studied children of about three to eleven years of age with about eight or nine subjects per age group, though the numbers varied within and between experiments from three to fourteen. She investigated children's use and understanding of the functions of the singular and plural definite and indefinite articles, the possessive and demonstrative adjectives, colour modifiers and two post determiners (same/different). She suggests that the determiners she studied have two general functions in adult language : the descriptor function and the determinor function. The descriptor function is centred on the attributes of a referent which is already implicitly or explicitly the focus of attention for speaker and listener, and is not concerned with the relationship of this referent to other potential referents. The determinor function on the other hand is used by the speaker to enable the listener to pick out a referent amongst other potential candidates and is therefore defining a relationship between the referent and its extra- or intralinguistic context. Karmiloff-Smith argues that children progress from descriptor to determinor functions and this progression is paralleled by a move from reliance on extralinguistic factors for clarifying their reference to a reliance on intralinguistic factors.

Ignoring the experiments which are concerned with the gender marking functions of determiners which clearly have no counterpart in English, Karmiloff-Smith reports six production and five comprehension experiments which she divides into two broad groups : those

investigating deictic, exophoric and quantifier functions, and those investigating the anaphoric functions. With the exception of a story completion experiment (designed to be similar to Maratsos' experiment) the experiments mainly involved the experimenter manipulating toys and then asking questions. At the end of each experiment "the child was questioned about his awareness of the rules that he had been using implicitly in his spontaneous responses (p. 62)". In the main anaphoric function production experiment, for example, the experimenter used a toy girl or boy to perform an action on one of three sets of objects (three different objects, three similar but different-coloured objects, three identical objects). After one action, for example the boy pushes a dog, the experimenter asked 'What happened?' After the child had responded a second action was performed, e.g. the girl pushes the same/a different object, and the experimenter again asked 'What happened?' In the identical objects trials the expected response to the first action was 'The boy knocked over one of the Xs/an X'. When the second action was on the same object the expected response was 'The girl knocked it/the X/the same X over', and when the second action was on a different object the expected response was 'The girl knocked an X/another X'. In the similar objects trials the expected response to the first action was 'The boy knocked over an X/the red X'. When the second action was on the same object the expected response was 'The girl knocked it/the X/the same X/also the red X', and when the second action was on a different object the expected response was 'The girl knocked over the green X'.

Since the experiment was designed to test the anaphoric functions of determiners the analysis concentrates on the child's response to the second action, though the way Karmiloff-Smith classifies the uses of the definite article in the second responses depended on the child's first response. If the child had used one of the expected responses (that is, an indefinite referring expression, a definite article plus localiser or, in the case of similar objects, a relevant modifier) in response to the first action and then the definite article for the second action this use was classified as anaphoric. But if the child had used the definite article for the first action, as many subjects did especially in the identical object trials, (4

year olds 83% and 39%, 5 year olds 60% and 55%, 6 year olds 61% and 37%, 7 year olds 27% and 7%, 8 year olds 40% and 10%, 9 year olds 43% and 26%, 10 year olds 17% and 4% for identical and similar trials respectively), and then used the definite article for the second action this use of the definite article was classed as deictic 'since the definite article for first mention is clear from context but has no previous linguistic mention (p. 126)'. Karmiloff-Smith found for a second action on the same identical or similar object there was a slight tendency (e.g. for identicals 5% for 4 year olds, 12% for 7 year olds rising to 37% for 10 year olds) to use spatial reference (e.g. the girl pushed the X in the middle) and that not only was the anaphoric definite article entirely absent from all groups for the similar objects and from all but 8 year olds (2%) and 10 year olds (16%) for identical objects but that the use of anaphoric pronouns was also very low (approximately 20% for all groups). Percentages of responses using the word 'same' ranged between 12% for 6 year olds and 43% for 9 year olds with no such responses in the 4 year old group. For a second action on a different identical or similar object the use of the indefinite article was low (around 10-20% in all groups), and not until subjects were ten years old did the use of another reach 40%. Overall, there was a tendency to use the definite article which Karmiloff-Smith sees as functioning deictically, i.e. pointing to the referent under focus of attention, and this was especially marked in the under seven-year old age groups.

Karmiloff-Smith concludes "that rarely, if ever, do children let the definite article alone carry the burden of anaphoric reference, where possible indeterminacy of reference could exist due to contextual factors. Thus, even when a correct initial indefinite reference was made, this was not followed by the definite article alone, as would be perfectly adequate, but children added additional markers (p. 139)". This she takes as supporting her idea that "linking intralinguistically is a difficult problem for the small child, which he is only able to attempt by multiple marking (p. 140)". The fact that under seven-year olds use the definite article to refer to the experimenter's action on another class member in the identical situation and use it for one of several identical objects in the first action is taken as clear evidence of this article functioning

deictically "not ... to link referents intralinguistically (p. 141)".

One other Karmiloff-Smith experiment is worth discussing here. In her second production experiment Karmiloff-Smith played a game she calls Hide and Seek which was designed to analyse the use of the singular definite and indefinite articles and the redundant versus obligatory use of adjectives. She had a number of opaque bags containing four objects. In some of the bags there were four different objects (singletons) in some two singletons and two identical objects, and in others two singletons and two similar objects of different colours (similar). The basic experimental procedure she describes as follows : "The child was shown the contents of one of the opaque bags containing four objects (three objects for very small children to avoid memory problems) and was asked to look at the objects very carefully. The experimenter then asked the child to close his eyes or turn his back whilst she removed an object from the bag. Then the child was asked 'What did I do?' or 'What did I hide?' depending on the item". In half of the trials the subject did the hiding and in the other half the experimenter did the hiding. In the latter case the experimenter pretended to forget what she had hidden.

In the singleton trials Karmiloff-Smith found 'What did I hide?' resulted in a tendency simply to name an object, e.g. a + n, whereas in response to 'What did I do?' those subjects who responded with verbs + article + noun tended to use definite descriptions. She also found that when the experimenter did the hiding at all ages responses were predominantly definite (e.g. 74% 4 year olds, 93% 10 year olds) whereas when the child did the hiding definite descriptions dropped (e.g. 47% 4 year olds, 62% 10 year olds).

Overall, Karmiloff-Smith finds the same kind of trend in both comprehension and production experiments, though acquisition seems to be earlier in comprehension. As far as the use of the articles is concerned she finds the earliest function for the indefinite article is its naming function whilst the definite article has a deictic (descriptor) function, that is, the is used for the object under joint attention regardless of the context. Somewhere between the ages of five and seven two more functions are added, namely the numeral function for the indefinite article and the exophoric function for the definite article, that is, indicating a single entity in the exophoric

context. The initial descriptor function develops into the determinor function via two channels; firstly by overmarking, that is, by adding information which is not required (e.g. the boy he re-pushed once more the same dog) and by exophoric reference in which the child takes into account the extralinguistic setting and the relation of the referent to other objects in that context. As new functions are added the child either uses separate morphemes, e.g. he uses tous for all and les, which is also a universal quantifier, is kept simply for making pluralization (c.f. Bresson, 1974), or the child creates agrammatical forms. Thus Karmiloff-Smith concludes that children go through a stage where a plurifunctional morpheme is seen by the child as a series of unifunctional homonyms and it is not until after about eight-years of age that children can cope with the simultaneous functions of a morpheme and redundant marking and agrammatical forms disappear.

Although the articles in French have many more functions than their equivalents in English (we have evolved a separate word one for the numeral function of un/une, we have no plural definite article and our articles do not have gender markings) many of the functions specified by Karmiloff-Smith are to be found in a and the and Karmiloff-Smith's theory, if it is correct, ought to extend to English speaking children. However there are a number of reasons for questioning whether or not Karmiloff-Smith was justified in drawing such detailed conclusions from the data collected. She herself admits that the Genevan method she adopts of testing the child and then questioning him about the rules he had used runs the risk of yielding 'rich, but incompatible intersubject data' (p. 58). She says of Experiment 5 (published in 1977) that "hypotheses were tested on the spot by, say, placing intonational stress on the post-articles, by reducing or increasing the number and types of objects present at one time, by adding such expressions as the same X as the boy just pushed, by using somewhat unusual forms such as a same X, by encouraging children to talk about similar objects they possessed and so forth (p. 382)". Particularly worrying is the fact that she says 'some of the experiments used subjects that had previously been interviewed in my other experiments' (p. 62) and yet we are not told how many of the children took part in more than one experiment or how many experiments

in fact they did nor are we told which experiments they were involved in and in which order. Given that the children did not merely 'play a game' but were asked questions about the language they used or what the basis was for their responses in the comprehension experiments this must surely have influenced their attitude to and responses in subsequent experiments, especially since the experiments were not very different from one another. Donaldson (1978) emphasised the importance of experimenters taking into account the child's perception of what the task is about. A child who has taken part in one experiment involving groups of toys in opaque bags may well have different assumptions about what another task involving similar bags of toys is about from one who has never taken part in an experiment before, as indeed might a child of ten as opposed to a child of three or four. Francis (1980), in her review of Karmiloff-Smith's book, says that whilst the conclusions may be true 'it has not been convincingly shown, for it is based partly on interpretation of responses that are open to question, and also on data gathered in situations in which the child's assumptions about the task are insufficiently explored'.

Even more crucial to the question of whether or not children had acquired particular functions is whether or not it was reasonable to expect these functions to be elicited by the contexts that were created. Karmiloff-Smith obtained her data in situations where linguistic demands were minimal because the referents were always visible to both speaker and hearer. She claims that the production of indefinite descriptions to create referents in discourse may not appear until nine years. But children were never allowed to create discourse referents without the presence of the entity and without it being already the subject of shared knowledge. In Experiment 5 for example, which was described earlier on pages 41-42, Karmiloff-Smith says that when the girl doll pushes one of a group of identical referents "the definite article is of course inadequate reference because of the identity of the objects. Upon hearing the child say 'The girl pushed the X' the experimenter could ask 'Which X?' (p. 129)". Why on earth would the experimenter have to ask 'which X?'. The experimenter herself had pushed the animal and both the experimenter and the child knew this : it was the only salient X in the immediate context. Here Karmiloff-Smith is defining article usage

in terms of the status of the referent in the world, not of the status of the token for that referent in the discourse models of the participants. It is, perhaps, not surprising that children used the definite article with or without a redundant modifier or spatial localizer as they tried to interpret the reason for the question. Karmiloff-Smith also points out that the use of the anaphoric definite article was strikingly low and she classes as inadequate the deictic definite article. One is bound to get deictic reference when the objects are physically present. In the context which Karmiloff-Smith created it is impossible to clearly differentiate deictic from strictly intralinguistic use (c.f. Hickmann, 1980). One can only test children's ability to use indefinite expressions to create discourse referents in contexts where there is no shared knowledge and where no extralinguistic context related to the content of the discourse can confound deictic and intralinguistic uses of speech. Karmiloff-Smith fails to do this. Such contexts are created in Experiments 1 - 5 and 9 in the current thesis.

Another problem which makes it difficult to interpret Karmiloff-Smith's findings is that it is not clear exactly what she did during some of the experiments, and these procedural details are quite crucial in interpreting the results. In the 'Hide and Seek' experiment, for example, did the experimenter make it clear whether or not she also knew what was in each opaque bag? Half of the trials were 'naming trials', that is, the child named the objects before the hiding took place, but since some children spontaneously named items she groups both sets of trials together when presenting the results so it is not clear whether or not the speaker and listener knew what was in the bags. Secondly, how was the child supposed to know what the experimenter had hidden? In her introduction Karmiloff-Smith states that the objects to which the child must refer was not visible, but at what stage, if any, were the remaining objects made visible? In discussing her results Karmiloff-Smith says at one point that the objects were still in the bag when the child made his response (p. 78) but later she says that in the case of identical objects "the child pointed to the other one present (p. 80)". Finally, when the child hid an object who, if anyone, closed their eyes? It is difficult to determine whether or not the speaker was supposed to be taking into

account an array which was known to both participants and which remained visible, or an array the composition of which was unknown to the listener and which remained not visible to the listener. The reported tendency of children to use the definite article when the experimenter did the hiding might well have been due to the child's (correct) assessment that the experimenter knew what she had hidden even though she pretended to forget, i.e. the children were aware of the status of the token for that referent in the listener's model, especially if the rest of the array remained visible. When the child did the hiding the percentage use of the definite article dropped in all age groups though it was still around the 50% mark for all except the 8 year olds (28%) and 9 year olds (81%). It may be that some subjects used the indefinite article when they hid an object because they judged that the experimenter may not have known what was hidden but the overall preference for the definite article may well have been due to the children judging that the experimenter could easily work out what was missing from the remaining visible items, especially if the experimenter did not close her eyes when the child did the hiding. If subjects were making these kinds of judgements this might explain why they simply tended to name an object when they gave article + noun responses. What other purpose would there be to the question if the experimenter 'knew' what was hidden? Unless it is clear exactly what knowledge speaker and listener have at each stage of an experiment it is impossible to interpret the results. Experiments 6, 7 and 8 of the current thesis attempts to spell out exactly what knowledge the participants have at each stage of the experiment.

B. Garton

Garton's D.Phil. thesis (1982) and subsequent paper (1983) describe work based on the theoretical approach of Lyons (1977) and the experimental approach of Karmiloff-Smith (1979). Garton investigated three-year old children's comprehension and production of the articles a and the and the demonstratives this and that. Of the comprehension experiments she herself admits that few, if any, conclusions could be drawn about children's comprehension of determiners since children's non-linguistic performances were

frequently guided by aspects of the task other than the language of the experimenter. I will concentrate, therefore, on the main production experiments. These were concerned with three functions of the definite article and two functions of the indefinite article, which she defines as follows:

<u>THE</u>	1. Deictic	To point to a salient object or make an object in context salient.
	2. Exophoric (extralinguistic)	To tie together the linguistic and the non-linguistic context, typically by the use of a descriptive sentence.
	3. Anaphoric (intralinguistic)	To mention an object or event that has been previously linguistically identified.
<u>A</u>	1. Naming	To specify the name of an object where a specific object is intended.
	2. Indefinite (generic)	To refer to <u>any</u> member of a class of objects.

Garton's (1982) experiments 5 and 6 were variations of Karmiloff-Smith's 'Hide and Seek' but the non-hidden objects remained in view on the table. Garton found no statistically significant effect of the composition of the referential array (like Karmiloff-Smith she used singletons, identicals and similars). She did find a strong tendency to omit the articles both when naming all the objects before the hiding took place and in responses to the question Hide? This is something which had not previously been commented on in the literature. However, there were differences in responses depending on the form of the question when subjects had not named all the objects before one object was hidden. The indefinite article was used in 25% of the responses to Hide? and 60% to Do? and the was used in 20% of the responses to Hide? and 0% to Do? Garton then classifies the functions that the articles were serving in these two experiments and does so in a somewhat idiosyncratic way. The

definite article she says might appear anaphoric but she classifies it as deictic, and says it was probably being used to mark the object, albeit hidden, under joint focus of attention. Given the design of the experiment it is impossible to tell whether the was being used anaphorically or deictically (c.f. earlier criticisms of Karmiloff-Smith's anaphoric use experiment), but in any case naming an object does not identify it for subsequent anaphoric reference which Garton thinks is the case. Also puzzling is Garton's classification of indefinite article responses. When subjects had not previously named objects Garton classifies indefinite responses to Hide? as naming and indefinite responses to Do? as generic. She says that the majority of 'generic' responses were of the kind 'I hid an X' by which the children meant 'any one'. Given that 12 of the 15 responses in this category were with similar and identical arrays one could just as well take these indefinite descriptions as children's awareness of the 'exclusive' nature of the indefinite article.

In Experiment 7 (1982) Garton used a toy farmer to knock down each of the toy animals in an array which was composed of singletons, identicals or similars. She again classifies indefinite descriptions in reply to 'What did the farmer knock over?' as naming but as generic in response to 'What did the farmer do?'. Her reason for classifying responses like 'He knocked over a cow' as generic is that "the child has no previous linguistic contact with the object and chooses to use the indefinite article to indicate that the action he is specifying is being done on a non-specific exemplar of a class of objects (1982, p. 128)". Non-specific for whom? Both child and experimenter could see what was happening, so in what sense was the object non-specific? Garton again seems to be assuming that previous naming (before the trials were run) identifies a specific object for reference. As was stated in Chapter One naming does not identify a new object, the token for that object is already available in the listener's model - in Garton's case because the object was physically present when she asked the child to name it. In any case, in the identical and similar trials there was more than one class member present and as was stressed in Chapter One the crucial factor about definite descriptions is not whether or not an object has been named or mentioned but whether there is one or more than one token available in the mental

model. Simply naming two or three identical or similar object does not mean that one can then refer to one of them with the X. Furthermore Garton does not allow that the indefinite article can be used linguistically to pick out a particular member of a group of identical or similar object even when those objects are physically present.

Garton's most interesting (1982) production experiment was number 8 which was published in 1983. Rather like Warden's Experiment I (1976) Garton manipulated the social conditions by having one in which the experimenter could see and one in which the experimenter was blindfolded. Different children took part in the two conditions. In each condition a model farmer was moved by the experimenter amongst toy animals constituting the array. Each time the farmer stopped beside an animal (Garton does not explain how she did this when she was blindfolded) the question 'Who is the farmer talking to?' was asked. In the blindfolded condition the blindfold was removed after the child had given some verbal information for the selection of a specific animal but if the experimenter deemed this description inadequate she replaced the blindfold and repeated the question. This she says was necessary in 'many instances'. In both conditions three arrays each comprised of one singleton, two similars and two identicals were used.

Garton found a significant effect of both social conditions and class types at least as far as singletons and identicals versus similars was concerned. Her summary table is shown below (Table 2.2).

Table 2.2. Summary of Determiners Elicited per Condition (Seeing vs. Blindfolder) and per Class Composition of the Arrays (adapted from Garton, 1983).

Determiner Usage	Seeing		Blindfolded	
	Singleton identical*	Similar	Singleton identical	Similar
Omission	.50	.47	.24	.20
the - deictic	.27	.00	.34	.00
the -deictic + gesture	.00	.26	.00	.00
the - exophoric	.00	.00	.00	.50
a - naming	.11	.18	.29	.21
this - deictic	.00	.00	.04	.04
that -deictic	.10	.06	.09	.05
(Other)	.02	.03	.00	.00
Total	1.00	1.00	1.00	1.00

*Class type

As can be seen in Table 2.2 overall the seeing condition elicited similar relative proportions of articles as in her previous experiments, with article omission being the most common. However, the blindfolded condition is the most interesting for here the children demonstrated a far more sophisticated awareness of the uses of the definite and indefinite articles than in any of Garton's previous experiments. Unfortunately, as can be seen in Table 2.2 Garton groups responses to singletons and identicals together which makes it difficult to tell exactly what was going on here. However, in spite of this, there is evidence of the young children's sensitivity to the differences between the two conditions. First of all article omission dropped to less than half in the blindfolded condition which suggests that when children are given a context in which it is necessary to linguistically specify a referent they will attempt to do so. Secondly, whereas no response to similars included a modifier in the seeing condition (the - exophoric) 50% of responses included such a term in the blindfolded condition. No such modifiers were used for singletons or identicals. This suggests that a child will linguistically specify an object if he can do so. There is further support for this suggestion from the kind of responses obtained when Garton made the children produce a second utterance in the blindfolded condition. From the details given in her thesis it is apparent that children tried very hard indeed to help the experimenter identify the correct animal : children either found a distinguishing feature on one of a pair of identical objects, e.g. the one with red on it referring to a small paint flaw, or used a spatial location such as the one near the first one, or, in the case of similars, gave as much detail as they could, e.g. the black cow sitting down when the other black cow was standing up (c.f. similar over determination in Karmiloff-Smith's (1979) Experiment 5). Garton, herself, says of such responses "The child is seeking to uniquely identify a specific animal and thus uses his linguistic resources to link the context with the language he uses". The pattern of responses elicited by this experiment suggests, then, that when the child deems it necessary to linguistically specify a particular referent he will do so if he has the linguistic means at his disposal. The referents with which the young child seems to have most difficulty are the identicals. Sixty

per cent of second utterances involved demonstratives and Garton says that the majority of these were elicited by identicals. It looks as if children want to distinguish between identical objects but do not have the linguistic means for so doing.

Thus this last experiment reveals the sensitivity of very young children to various article functions. Children do seem to take into account the status of a referent within a group and the knowledge of the listener, given the right experimental context, and her last experiment reveals a sensitivity which Karmiloff-Smith's experiments failed to uncover. This is in spite of the fact that some children may have considered a blindfolded experimenter to somehow know what was going on (c.f. Warden, 1976, Ex. I) for it was the experimenter who had set up the array and 'knew' where to put the toy farmer. The major weakness in Garton's work is that she never considers the identifying or individual use (Christophersen, 1939) of the indefinite article but only the generic use (Christophersen, 1939), nor does she examine the intralinguistic anaphoric function of the definite article, only the use of the after objects had been named. Both the identifying and anaphoric uses of the articles are tested in the experiments to be reported here. Furthermore, as was pointed out when discussing Karmiloff-Smith's work some of the difficulties of interpretation of Garton's work, may be due to the fact that her classifications of the articles are based on the status of a referent in the physical array and not on its status in the models of the speaker and listener.

2.3 The Current Experiments

With the exception of Karmiloff-Smith (1979) and Warden (1976, Experiment III) previous investigations have looked only at either preschool children (aged two to five years) or school aged children (aged five to ten years). The current investigation uses both preschool and infant school children and the age range covered, three to seven years, enables comparisons to be made with all previous studies.

The experiments reports in this thesis fall into two groups. The experiments in Chapter Four are similar to those in the traditional

approach and are mainly concerned with the effect on children's use of definite and indefinite descriptions of the knowledge of the listener. The experiments in Chapter Five are more like those of the functionalists and are mainly concerned with the effect of the composition of the referential array. The experiments were designed to investigate points raised in the discussion of previous experimental investigations and issues which arose during the current research.

There are five experiments in Chapter Four. Experiment 1 was designed to determine whether differences in materials were responsible for the differences in results between Warden (1976, Experiment III) and Emslie and Stevenson (1981). The results supported the suggestion that children found the Warden picture stories more difficult than those of Emslie and Stevenson and the discourse model theory was used to explain why difficulties in understanding and/or describing the pictures led to the pattern of article usage that was found.

The main purpose of Experiments 2 - 4 was to investigate Warden's (1981) suggestion that when children do use indefinite descriptions on first mention they do so because they intend to identify the referents for the listener. This was tested by having half the subjects describe an event to a listener who had no previous knowledge of that event (the Listener Ignorant Conditions) and half describe an event to a listener who had watched the event with them (the Listener Knowledgeable Conditions). In the former condition indefinite descriptions would be appropriate but in the latter they would not be necessary. In all three experiments videotapes of 'real-life' events were used to ensure that the apparently sensitive performances of preschoolers in previous experiments was not simply due to their following a fairy story pattern of article usage, a pattern with which they have been shown to be very familiar (Bennett-Kastor, 1983).

In Experiment 2 there was a significant effect of the listener knowledgeable/ignorant manipulation but no effect of a referents present/absent manipulation. However separate groups had been used in each condition so a really strong test of the hypothesis that children's choice of descriptions depends on their perception of the knowledge of the listener requires the use of the same children in the

two listener conditions. Experiment 3 included this manipulation. Experiment 4 used the same design and materials as in Experiment 3 but looked at how parents and children talked to each other. Since parents often assume a teaching role it was expected that they would conform to the kind of model presented in this thesis. However, it was found that the use of child/parent pairs changed both parents and child's perception of the task. Children were reluctant to speak in the listener knowledgeable condition and parents were reluctant to assume shared knowledge.

In the first four experiments there were several referents which seemed largely resistant to the listener ignorant/knowledgeable manipulation : patterns of article usage were found which were not predicted by the discourse model theory. It was, therefore, suggested that a person's general knowledge may sometimes have a greater effect on choice of article than the knowledge of the listener's mental model. Experiment 5 tested this suggestion.

There are four experiments in Chapter Five all of which examine the effect of the composition of the referential array on children's use of definite and indefinite articles and modifiers. In all the experiments in this Chapter the object to which the child had to refer was either the only one of its kind in the array (a singleton), was one of two or three identical objects, or was one of two or three similar objects which differed only with respect to colour or size.

The first experiment, Experiment 6, was an attempted replication of Karmiloff-Smith's (1979) Hide and Seek experiment. Although some of the results differed from hers, possibly because of minor changes in procedure, the main results concerning the effects of the composition of the array were very similar : children were highly discriminating in their use of the definite and indefinite articles and partitives, but rarely used colour modifiers when referring to similar objects. It was suggested that children may not have used modifiers because they did not perceive the task as one in which the exact identification of an object was important. Experiments 7 and 8 were attempts at creating a context in which the inclusion of a colour modifier in children's descriptions of similar objects was crucial in determining the outcome of a trial.

Experiments 6 - 8 differ from Experiments 1 - 5 not only in their

main focus of interest (the effect of the composition of the array versus the effects of the knowledge of the listener), but in the kinds of objects used (mainly inanimate versus mainly animate), in the kind of response elicited (article \pm modifier + N versus extended descriptions of several sentences) and in the purpose of the speaker's utterances (the updating of a 'shared' model constructed on the basis of perceptual information versus the construction and updating of a model on linguistic information only). The final experiment, Experiment 9, unites the two sets of experiments in that speakers had to tell a three picture cartoon story involving two identical, similar or different animate entities to a listener who could not see and had no previous knowledge of the pictures. Speakers, therefore, had to choose descriptions which would enable the listener to introduce the right number and kind of tokens into his model and subsequent references had to enable the listener to select which of these tokens needed to be tagged with the additional information. An attempt was also made to measure the communicative success of the children's descriptions.

CHAPTER THREE

GENERAL BACKGROUND TO THE EXPERIMENTS

3.1 Appropriate Usage and the Scoring of Responses

From the discussion of previous psychological studies of children's use of the articles it is clear that different researchers have classified the various uses of the articles in different ways and the different theoretical frameworks they adopt of hypothetical adult usage (which is rarely tested with adults) led to different experimental designs, different predictions concerning adult use, different criteria for specifying appropriateness, and different conclusions regarding children's use and understanding of the articles. It is necessary therefore to examine the question of 'appropriate usage' and to define the scoring procedure which is used in the following experiments.

A. Appropriate Usage

Workers in the 'traditional' approach (e.g. Brown, Maratsos, Warden, Emslie and Stevenson, Bennett-Kastor) scored responses as indefinite, definite and undetermined. Thus naming statements were categorised with identifying descriptions, and all definite descriptions put into the definite category. In spite of the fact that all researchers acknowledged the fact that there were circumstances in which the definite article could be used on first mention, this was largely ignored (as well as being partly misunderstood) and the appropriate first mentions were seen as being indefinites : for example Warden (1981) used just the three categories of indefinite, definite and undetermined and his analysis concentrated on the proportion of indefinite expression. He stated that 'children were still unable to consistently attend to the listener's perspective and remember to use identifying expressions'. However, Warden himself in the method section admits there are exceptions to the rule, notably the one of 'entailment' which we have called associative anaphora. In

Film A of his study he had the referents room, door, and wall which he says entail each other. He scored only one of these referents, whichever was mentioned first, and said it ought to be indefinite. Presumably he judged 'a man comes in ... the wall' as inappropriate. In Film B there was a lady who opened a car door. He scored both car and door and says that while he expects a car, the door would be acceptable. However, he does not separate out 'appropriate' definites from 'inappropriate' ones in his analysis, yet we have seen from the study of Zehler and Brewer that 92% of adults used a definite description for referents like door when they are one of a small number of predictable items in a given context (e.g. car). Warden does not say exactly what was included in his definite category. Did none of his subjects say a man ... his ladders, a lady ... her suitcase? Such descriptions uniquely identify the relevant entity but, of course, are not identifying expressions. It is perhaps not surprising that a mere eleven out of the eighty children used only the indefinite article in all their referring expressions. The adults did not either. At least two of the five referents in each story could have been mentioned first by appropriate definite descriptions.

In this thesis subjects' descriptions will be categorised as appropriate or inappropriate not simply as definite or indefinite. Such a scoring system was adopted by Hickmann (1980) though the reasons for her categorisation were somewhat sketchy. It remains to be explained what is meant in this thesis by appropriate and inappropriate.

The discourse model approach makes it clear that any description which enables a listener to construct a model which is similar to that of the speaker's is appropriate. The starting point for defining appropriateness is, therefore, a consideration of the contents of the speaker and listener's models at the beginning of the experiment. The speaker and listener may have the same perceptual information, as they would, for example, in a typical referential communication task where both have identical arrays, and it is the speaker's job then to provide a description which will enable the listener to pick out the relevant token which is already in his discourse model. Alternatively speaker and listener may not have the same perceptual information, the listener may be totally ignorant of the contents of the speaker's

model, in which case the task is one of providing information which will allow the listener to introduce the right number and kind of tokens.

The story-telling tasks of Warden (1976) and Emslie and Stevenson (1981) are examples of this second alternative. The way in which responses were scored in similar tasks in the current investigation can best be explained by examining what may have been going on in one of the published studies. The example is one of the three picture cartoon stories from Emslie and Stevenson (1981). The pictures were described thus.

- Picture 1 A woman and a little girl are standing beside a table. The little girl is reaching for a bottle of milk.
- Picture 2 The little girl has dropped the bottle of milk and is kneeling on the floor beside the broken bottle. The woman has her hands to her mouth.
- Picture 3 The little girl is kneeling on the floor and a cat is drinking the milk from the broken bottle.

Of course there was much more perceptual information available to the speaker than these brief descriptions contain : the pictures were coloured and the characters clothed distinctively, for example, the woman had long dark hair and was wearing a long red dress and the girl had short fair hair and was wearing a blue dress. The speaker saw all three pictures before he began speaking so his model was already constructed. What does the model contain? There will be a number of tokens representing the relevant classes. These will be individuating tokens, that is, each token will represent a separate, distinguishable individual, an individual who is unique in his model. There may be a token representing a woman linked with a token representing an individual wearing a long red dress. These links represent identity : these three individuals are one and the same. How much of this information the speaker will communicate to his listener depends on how relevant he considers this information to be. Heeding the Gricean principle of quantity he may choose only to communicate the fact that she is a woman, and indeed this may be the only information in his

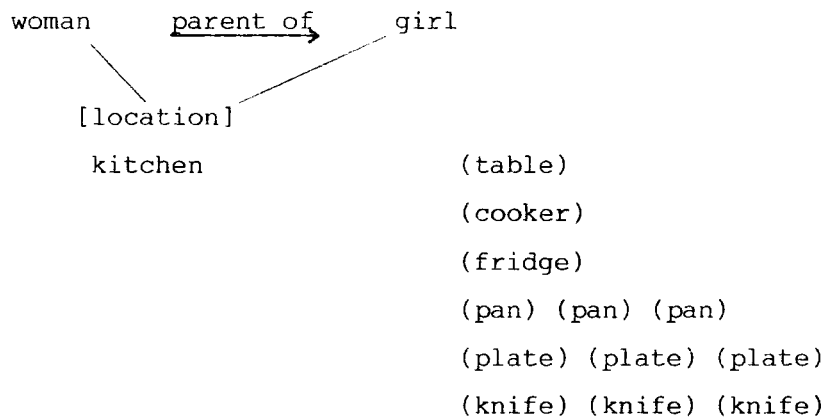
model. The appropriate way to communicate this information to his listener is therefore an identifying description a woman : this being an instruction to 'put one token representing the class of women in your model'.

What about the second character? Here the speaker's model may contain a token representing a girl linked by a token of identity to a token representing a fair-haired individual. Again the speaker may choose to identify her as a girl. However, the speaker may have assumed looking at the pictures that there was a relationship between these two individuals. When he constructed his model he may have linked these two individuals as parent and child. If what he wants his listener's model to contain are tokens representing not only the individuals but this relationship then when he mentions the second individual he will use a suitable individuating description. The listener's model will match his own if he says 'a girl and her Mummy' or 'a woman and her daughter'. Individuating descriptions like her Mummy or her daughter merely require the listener to select a token representing a member of the class of adult or child females and link it to the first individual with the relational link of 'parent of' or 'child of'.

Clearly descriptions which contain information about the class from which a token has to be selected plus the relationship between this and a previously identified referent enable the listener to construct a model similar to that of the speaker. These are not identifying descriptions but they are appropriate individuating definite descriptions.

Consider now the third referent table. Is the only appropriate description an identifying expression? Again this depends on the structure of the speaker's model and what he has already communicated to the listener. Just as the initial description of the three pictures was neutral with regard to the relationship between the girl and the woman so it was with regard to the context in which the incident took place. A glance at the pictures shows that the woman is cooking, an activity which takes place in a kitchen. If the speaker's model contains this information and he communicates this to the listener this linguistic trigger 'cooking' or 'kitchen' sets off a whole chain of associations and provides a context frame within which

other descriptions may be interpreted. General knowledge and knowledge of contexts (e.g. kitchens) tell one, for example, that a typical kitchen contains a cooker, a fridge, a table, several pots and pans etc. so the listener will have ready a set of tokens representing separate, potentially distinguishable entities so his model may be something like



If the speaker then says the table all the listener has to do is to put into his model the token representing a table that is already available and link it to the token representing kitchen. Notice that this presents no difficulty for the listener because his model never contained more than one token representing a member of the class of potential tables. This would not be true of the fourth referent 'bottle of milk'. General knowledge and knowledge of contexts would not lead one to expect or associate one bottle of milk with one kitchen. An indefinite description 'a bottle of milk' would be appropriate here although a definite description could be used if the speaker could supply an individuating description such as 'the bottle of milk on the table'. Such a description would enable the listener to select a token representing a member of the class of milk bottles which would be individuated by virtue of the linguistically specified link between that milk bottle and the table which is unique in his discourse model. Without this link the listener would have to assume the speaker was applying the Gricean principle of relevance and assume the bottle of milk was designating the only bottle of milk that was going to be relevant in the current discourse.

The fifth referent was cat. If the speaker's model contains only

a token representing a member of the class of cats with a link between the cat and the kitchen and/or the broken milk bottle then an indefinite description a cat will enable the listener to construct a similar model. However, once again the speaker may have inferred other links between the cat, the woman and the girl, for mother, daughter and kitchen create the context of a family home. General knowledge tells us that there is a high probability that associated with any family is at least one pet. It also tells us that if the pet is a cat or a dog, as opposed to a goldfish or a gerbil, there is a low probability that there is more than one cat or dog. The speaker may therefore judge that the definite description the cat will enable the listener to select one token representing a member of the class of cats and link it not only with a location link but with links to the two previously identified family members. The extent to which speakers will make this kind of inference and judge that their listeners will make the same kind of inference is likely to be very variable (c.f. Emslie and Stevenson, 1981).

From the above account it can be seen that it is possible for the speaker to word his descriptions so that the listener can construct a similar model without always using identifying expressions to introduce new entities. In practice, most speakers do use this strategy, their first mentions are predominantly indefinite, but it illustrates the point that one should not be misled into thinking that there is a general rule which says that all new entities must be introduced with indefinite descriptions. This would be defining novelty or non-familiarity in relation to linguistic form rather than in relation to discourse models. Our main interest does, of course, lie in children's use of both articles. If children do use the indefinite article to first mention a referent and do not use it inappropriately elsewhere this will be taken as an indication that they do not expect the listener to have either in his model a token for that entity or to be able to infer it from the context. A definite description on the other hand does presuppose that the listener can select a unique token. One must look carefully at the kind of model a speaker can construct from all the linguistic and non-linguistic information he has already been given to see what kind of links he might expect the listener to be able to make.

B. Scoring of Responses

In the narrative tasks in Experiments 1 - 5 and 9 when the listener has not seen the stimuli the speaker's first mention of referents will be scored as follows with [] indicating earlier mentions.

Appropriate : indefinite descriptions e.g. a woman and a girl are in a kitchen
 definite descriptions e.g. a woman and her daughter are cooking. [kitchen] ...
 the table [two little girls] ... the girl with the longest hair.

Inappropriate definite descriptions e.g. the woman and the girl are cooking. She dropped it.
 names e.g. It's a woman. NP's not in a sentence e.g. A girl. A woman. A bottle.

Undetermined Woman and girl are cooking.

As for second mention of a referent indefinite descriptions are inappropriate as they violate the principle of anaphoric conservation (Stenning, 1978). Definite descriptions are appropriate as long as there is not more than one token or one set of tokens matching the description already in the model. On second mention referents will be scored

Appropriate definite descriptions e.g. the woman put her hand to her mouth. She was frightened.

Inappropriate indefinite descriptions e.g. [a woman was cooking]. A woman put her hands to her mouth.
 definite descriptions which fit more than one individual e.g. [A girl and a woman were cooking]. She dropped it and she was putting her hands to her mouth.

When both speaker and listener have seen the same perceptual event, (e.g. Experiments 2, 3, 6), they can be assumed to have constructed similar discourse models. If an entity was the only one of its kind then definite descriptions are appropriate on first mention. If more than one entity fitting the description was present, for example, two little girls, a simple the + N would be inappropriate and the speaker must provide additional information so the listener can distinguish between the two (or more) tokens, e.g. the first one, the one on the left.

In what I have called typical referential communication task both speaker and listener have identical arrays (Experiments 7 and 8), i.e. the speaker has one set of objects and the listener has another (identical) set of objects and a screen separating the two arrays prevents the participants from seeing which object their partner is selecting. Speakers must take their listener's perception of the array into account when they describe a particular object. Responses will be scored according to the composition of the array.

<u>Singletons</u>	Appropriate	- <u>definite descriptions</u> e.g. Put <u>the dog</u> next.
	Inappropriate	- <u>indefinite descriptions</u> e.g. Put <u>a dog</u> next.
<u>Identicals</u>	Appropriate	- <u>indefinite descriptions</u> (where <u>a</u> is non-specific) e.g. Put <u>a horse</u> next. <u>partitives</u> e.g. Put <u>one of the horses</u> next. <u>definites with modifiers</u> e.g. Put <u>the horse that's beside the dog</u> next.
	Inappropriate	- <u>definite descriptions</u> e.g. Put <u>the horse</u> next.

<u>Similar</u>	Appropriate	- <u>definites with modifiers</u> e.g. Put <u>the black cow</u> next. <u>indefinite descriptions</u> e.g. Put <u>a cow</u> next. <u>partitives</u> e.g. Put <u>one of</u> <u>the cows</u> next.
	Inappropriate	- <u>definite descriptions</u> e.g. Put <u>the cow</u> next.

3.2 A Brief Introduction to the Design and Procedures

A. Subjects

Naturalistic studies (e.g. Bloom, 1970; Brown, 1973) have shown that the use of the definite and indefinite articles becomes stable around the age of three-years, that is children use the articles in at least 90% of the contexts in which adults would use them. The youngest children in this study were therefore at least three-years eight months old when the investigation began. The age range covered is from three to seven years. This enables comparisons to be made with most of the previous developmental studies. As far as possible the difference in mean age of the groups was twelve months.

All the subjects were drawn from two adjacent schools in South Shields : a nursery school and an infants school. The area was chosen because it was within a forty-five minute drive from where the experimenter lived, the experimenter had met the Nursery School Adviser who had said she was very keen for research to be conducted in her schools, the area provided universal nursery school education, and at that time neither of the schools was being used by student teachers or nursery school nurse trainees from the two local universities or the four polytechnics. The latter point was particularly important since the experimenter knew from her years as a practising teacher that frequent 'visitors' are an unwelcome disruption to normal school routine. The particular schools were chosen because they were situated between private and council housing areas. This would give a wide range of social backgrounds and avoid the middle class subjects who are often used in developmental studies. About half the children

from the nursery school went on to, and/or had brothers and sisters at, the infants school. There were about forty children in the nursery school who attended in the mornings and forty who attended the afternoon sessions. In the infants school there were six classes, two for each of the age groups, five, six and seven, with twenty to twenty-five children in each class. The experiments were conducted over two years so that the total population of available children was about three-hundred and ten.

Parent groups were also included in as many experiments as possible : every parent was the mother or father of a child in the nursery school. Unfortunately it was not possible to use parents in all the experiments for purely practical reasons. The experimenter found it difficult to recruit more than one or two parents a day, though the parents were all willing to 'help' the experimenter and showed a keen interest in what was going on in the school. Where parents are not included in an experiment, therefore, it was simply because time did not allow. The age of the parents ranged from twenty to thirty-five years.

The experiments were conducted between January to June 1979 and January to July 1980. Generally no subject took part in more than one experiment per year. If subjects did take part in more than one experiment it was always an experiment of a different kind, e.g. a story telling task and a referential communication task. These tasks were always several weeks apart but when the same subjects were used twice this is stated in the Introduction to the Experiment. Many children took part in one experiment in 1979 and one experiment in 1980. This is not indicated in the study. Even if the experiment was similar the experimenter was certain there were no carry over effects : the children did not recognise the experimenter in 1980 and could remember nothing about what she had done. There was one exception to this. When the experimenter returned to the nursery school in 1980 the head teacher introduced her to the school in assembly and asked if anyone remembered her. Only one hand went up. "I remember Mrs. Emslie", one boy said. "She makes great plasticine rabbits". Rabbit making was not part of any experiment.

B. General Procedure

The experimenter spent a block of three months in each of the schools in both 1979 and 1980. During the time she was conducting investigations in a particular school the experimenter went there every day (Council, General and Common Market elections permitting). In the nursery school she did everything that the nursery school nurses did from changing soiled pants to playing in the sandpit. In the infants school she took group work and story time, did 'yard-duty' etc. and generally involved herself in as many activities as possible. She was thus a very familiar figure to the children not just someone they had talked to once or twice before as in most previous investigations. The experimental sessions were not begun until the experimenter had spent at least three weeks in the nursery school and at least a week with a particular class in the infants school.

The actual experiments were conducted in the schools themselves. In the nursery school the head teacher's office was used. This room also housed the school pet rabbit, always had displays of interesting objects lying around and the children were quite used to wandering in there whenever they wished. The room was also used at story-time. The surroundings, then, were very familiar to the subjects and they felt quite at home there. In the infants school the experiments were conducted in what once had been the medical room. This room was also used by the Remedial teacher attached to the school so many children were used to going along there to read. It was also used by the head teacher to hear good readers display their skills as well as being used for its original purpose when, for example, grazed knees needed attention. All the children in the school knew the room and none seemed at all concerned about being asked to go there. None of the children was forced to take part in an experiment. The experimenter simply asked a child (or two children depending on the experiment) if they wanted to come and play a game, or look at some pictures or tell a story. Few children ever refused, in fact children often quite literally queued up for their 'turn' and even the seven-year olds would complain that they had not been asked to take part. If a child did refuse it was usually because something more interesting was going on elsewhere and when that activity was finished he/she was quite happy to come back and 'play' with the experimenter. The experimenter

was therefore confident that the optimum conditions possible in an experimental investigation of this kind prevailed.

Pilot studies were conducted with two or three nursery school children before any experiment, enabling any necessary modifications to be made to the procedure. These pilot studies will not be reported in this study. Age trends were also tested for in all experiments but these will only be reported where there were significant differences.

CHAPTER FOUR

THE EFFECTS OF THE KNOWLEDGE OF THE LISTENER

4.1 General Introduction

The five experiments to be reported in this Chapter are similar to those in the traditional approach to children's use of the articles in that they are mainly concerned with the effects of the knowledge, or ignorance, of the listener on children's choice of definite and indefinite descriptions.

In Experiments 1 and 5 speakers have to describe a three picture cartoon story to a listener who has no previous knowledge of, and cannot see, the drawings. Speakers must word their narratives in such a way that listeners can construct a mental model of the entities and relationships between them and can, on the basis of speakers second and subsequent mentions, update their model, attaching new information to the relevant tokens in their model. One would, therefore, expect mainly indefinite descriptions (or appropriate definites) on first mention and definite descriptions on second mention.

In Experiments 2 - 4 video tapes were used and in half the conditions speakers had a model construction task similar to that in Experiments 1 and 5 in that they had to describe the filmed events to a listener who had not seen the film. One would expect indefinite descriptions (or appropriate definites) on first mention in these listener ignorant conditions. In the other conditions speakers had a model description task in that they had to describe the events to a listener who had watched the film with them and could, therefore, be assumed to have already constructed a model of the events. One would expect definite descriptions on first mention in these listener knowledgeable conditions.

The main aim of all the experiments was to see whether speakers' descriptions depended on their perception of the knowledge of the listener. Other aims are explained in the introduction to the individual experiments.

4.2 Experiment 1 - Story Telling Task I

The aim of the experiment was to determine the reasons for the differences in results obtained by Warden (1976, Experiment III) and Emslie and Stevenson (1981, Experiment I). In Chapter Two it was suggested that there might be two reasons : procedural differences or material differences. Of these, the differences in materials seemed the most crucial. David Warden very kindly sent copies of his pictures so that this possibility could be explored.

Method

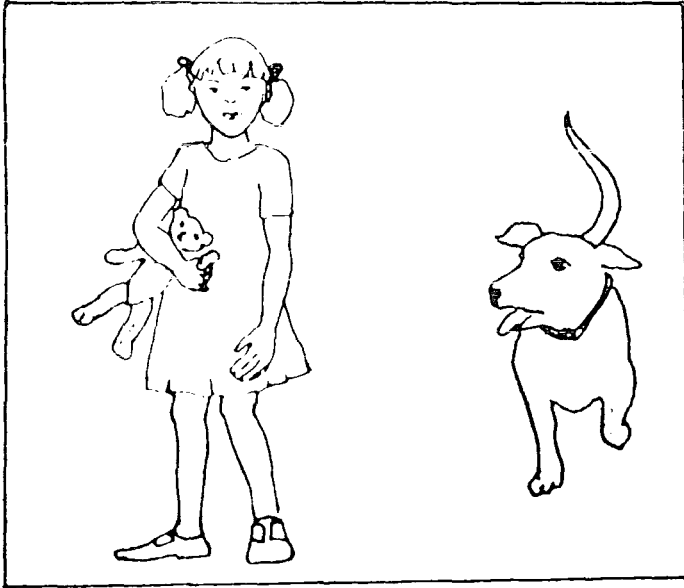
Subjects There were ninety subjects, twenty in each of the following age groups : four-year olds (3;8 - 4;7, mean age 4;2), five-year olds (4;11 - 5;8, mean age 5;4), six-year olds (5;10 - 6;3, mean age 6;0), seven-year olds (6;10 - 7;8, mean age 7;3) and ten parents (mean age approximately 25).

Materials Four cartoon stories comprising three pictures of sequential events were used. Two of these stories, EA and EB, were the same as were used in Emslie and Stevenson Experiment I (1981), and the other two stories, WA and WB, were the same as were used in Warden Experiment III (1976). Both EA and EB involved two animate and one inanimate referents and all referents were brightly coloured. (See Figures 4.1 and 4.2). Both WA and WB involved three animate and one inanimate referent and were drawn in black on white card. (See Figures 4.3 and 4.4). The stories may be described as follows.

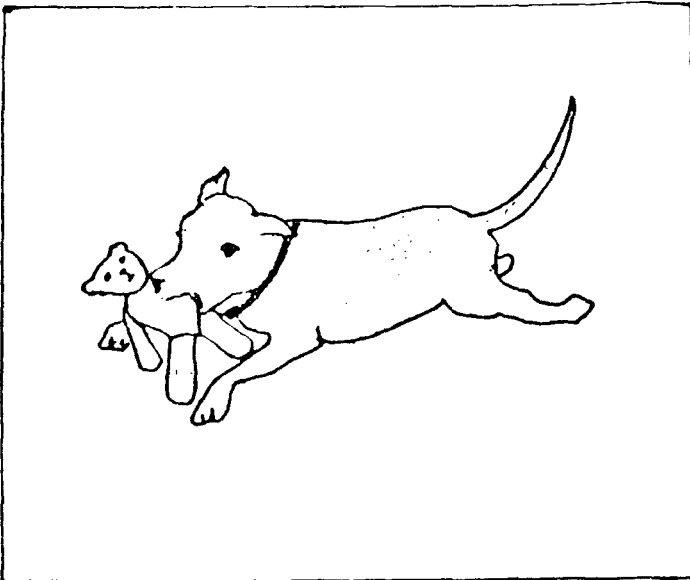
EA (Picture 1) A girl is holding a teddy bear and a dog is watching her. (Picture 2) The dog is running away with the teddy bear. (Picture 3) The girl is running after the dog who has dropped the teddy bear.

EB (Picture 1) A boy and a girl are fishing by a river. (Picture 2) The girl has fallen into the river and the boy is looking shocked. (Picture 3) The boy is helping the girl out of the river.

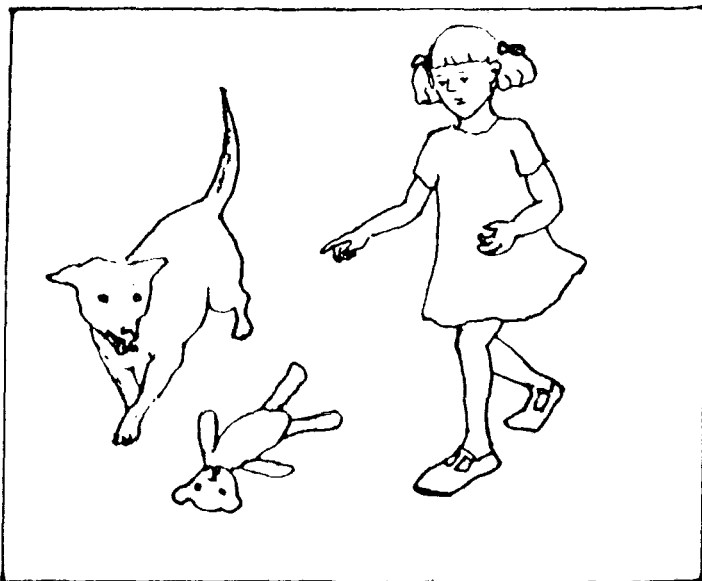
FIGURE 4.1 EMSLIE AND STEVENSON STORY A



Picture 1

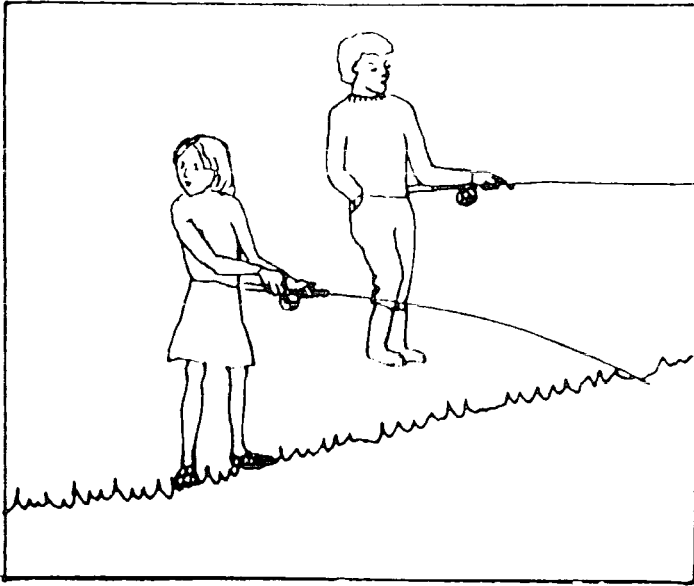


Picture 2

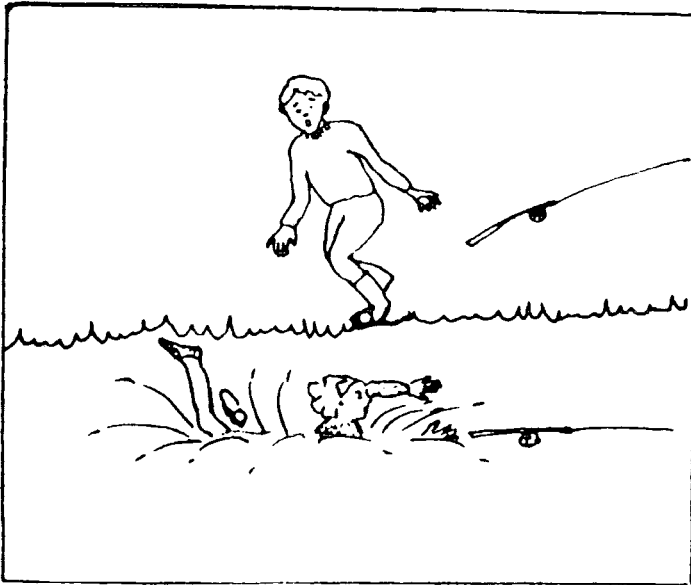


Picture 3

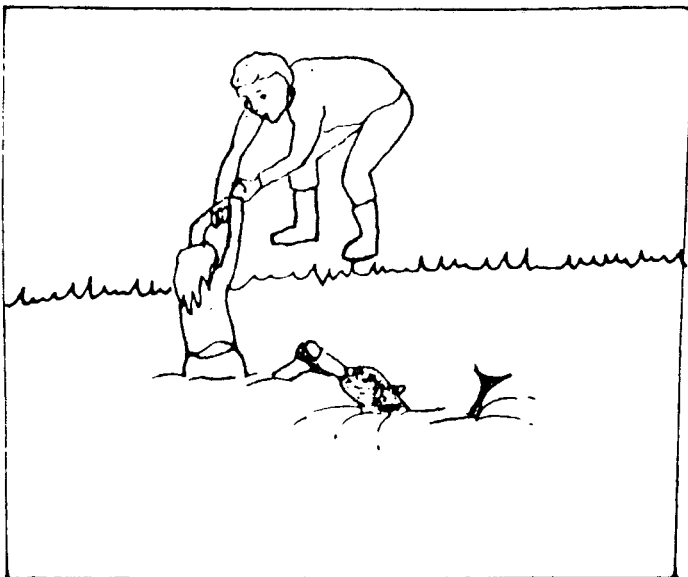
FIGURE 4.2 EMSLIE AND STEVENSON STORY B



Picture 1



Picture 2

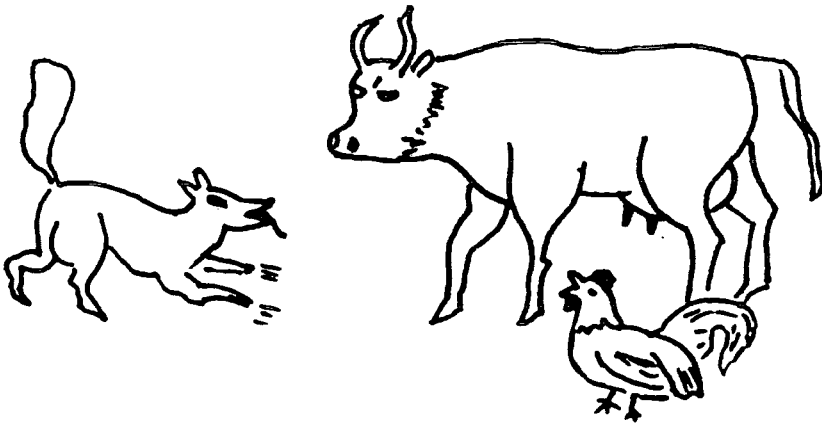


Picture 3

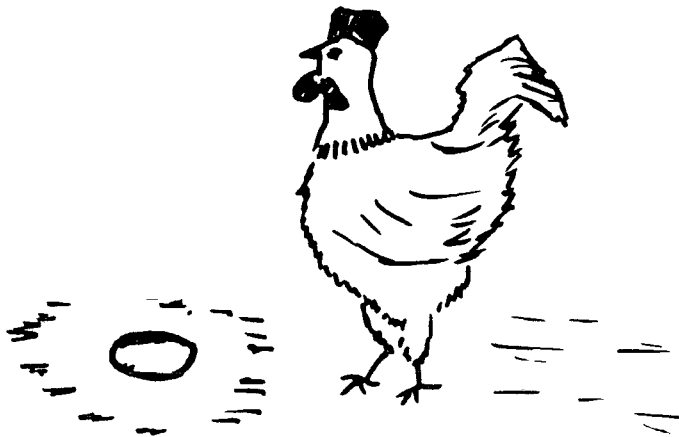
FIGURE 4.3 WARDEN STORY A



Picture 1



Picture 2



Picture 3

FIGURE 4.4. WARDEN STORY B



Picture 1



Picture 2



Picture 3



WA (Picture 1) A dog is chasing a hen. (Picture 2) A cow stops the dog, and the hen is hiding behind the cow. (Picture 3) The hen has laid an egg.

WB (Picture 1) A cat is walking under a tree and a bird is sitting in the tree. (Picture 2) A dog chases the cat up the tree. (Picture 3) The bird is flying away.

It was intended that each subject would mention all referents once and at least two referents a second time in the course of telling the story.

Procedure Exactly the same procedure was adopted for this experiment as had been used by Emslie and Stevenson (1981). Subjects were tested in same age pairs and seated at opposite sides of a table on which was placed a screen which could be adjusted until subjects could only see the top of their partner's head. There was thus no visual feedback, but speakers would not lose their awareness of the listener. Subjects were told that they were to be given three pictures which told a story. 'I want each of you to make up your own story. To see how good you are I am going to put this screen on the table so that the person who is listening can't see the pictures. The person who is telling the story will have to tell it very well, won't they, or the other person won't understand it'. The speaker was then told that he would see all three pictures first before he started telling his story and that Picture 1 was the beginning of the story, Picture 2 was the middle of the story and Picture 3 the end of the story. Speakers were shown all the pictures one at a time and allowed to study all three of them together until they had made up a story. The pictures were then removed and presented one at a time for the actual telling of the story. Speakers were then told 'Tell X (partner) your story and remember that X can't see your pictures'. Each subject told two stories, a W story and an E story. Half the subject pairs told the E stories first and half told the W stories first. The actual order of presentation for the children's groups was as follows.

Subjects	1st story pair	2nd story pair
1 - 4	W (A B)	E (A B)
5 - 8	W (B A)	E (B A)
9 - 12	E (A B)	W (A B)
13 - 16	E (B A)	W (B A)
17 - 18	W (B A)	E (B A)
19 - 20	E (A B)	W (A B)

The subject stories were tape recorded for subsequent transcription.

If the differences in the results of the previous studies were due to differences in procedure, especially Warden not having stressed that the speaker was addressing his discourse to the other child who could not see the pictures, then in this experiment the use of appropriate responses on both first and second mention should be the same for both sets of pictures. If the differences in previous experiments were due to differences in materials used then subjects should respond differently to the two sets of pictures. It was predicted that subjects would find the W stories more difficult than the E and S stories.

Results

Subjects responses were scored as appropriate, inappropriate or undetermined. On first mention appropriate responses were indefinite descriptions such as 'a cat was walking under a tree' or definite descriptions, e.g. 'a girl and her teddy'. Inappropriate responses were definite descriptions such as 'the girl was holding the teddy', 'she was holding ...' or naming statements such as 'It's a cat', and NPs not linked to VPs, e.g. 'a girl, a teddy, a dog'. On second mention of a referent appropriate responses were definite descriptions such as 'the dog dropped it'. Inappropriate responses were indefinite descriptions such as 'a hen laid an egg', and naming statements whether with an indefinite or definite article, e.g. 'A hen and a cow'. 'The boy, the girl'.

Since not all subjects mentioned the same number of referents each subject was scored for his percentage use of referring expressions. Details of the results are given in Appendix A Tables A.1 - A.5.

First Mentions

Table 4.1 shows the percentage use of each category of responses for the five age groups.

Age Group	Story	Appropriate			Inappropriate			Undet.
		Indef.	Def.Desc.	\bar{X}	Definite	Naming Statements	\bar{X}	Null
4 yr. olds	E	51.9	17.5	69.4	1.75	21.0	22.75	1.75
	W	12.7	-	12.7	20.6	61.9	82.5	4.8
5 yr. olds	E	60.0	14.5	74.5	10.9	12.7	23.6	1.8
	W	40.3	-	40.3	34.7	13.9	48.6	11.1
6 yr. olds	E	63.8	10.3	74.1	22.4	0.3	22.7	-
	W	53.2	-	53.2	36.4	10.4	46.8	-
7 yr. olds	E	65.0	15.8	80.8	17.5	-	17.5	1.7
	W	53.9	-	53.9	42.1	3.9	46.0	-
Parents	E	62.1	24.1	86.1	13.8	-	13.8	-
	W	61.5	-	61.5	30.7	5.1	35.8	2.6

Table 4.1. Percentage responses on first mention for the Emslie and Stevenson (E) and Warden (W) stories.

Within Stories

As can be seen in Table 4.1 all subject groups used more appropriate than inappropriate descriptions on first mention in the Emslie and Stevenson stories. Wilcoxon 1 tailed tests showed these differences were significant (4 year olds $N = 20$, $T = 36$, $p < .005$; 5 year olds $N = 19$, $T = 39.5$, $p < .025$; 6 year olds $N = 20$, $T = 28$, $p < .0025$; 7 year olds $N = 20$, $T = 21$, $p < .0005$; parents $N = 10$, $T = 5$, $p < .010$). However for the Warden stories there were no significant differences for the five, six, seven year olds or parents ($p > .1$, $N = 17$, $T = 70$; $N = 15$, $T = 63.5$; $N = 17$, $T = 78$; $N = 9$, $T = 15.5$ respectively) whilst the four year olds used significantly more inappropriate responses ($N = 19$, $T = 26$ $p < .005$).

Between Stories

All groups except the parents (N = 7, p < .1) used significantly more appropriate responses for the Emslie and Stevenson stories than for the Warden stories (4 year olds N = 17, T = 1, p < .0005; 5 year olds N = 14, T = 27.5, p < .05; 6 year olds N = 19, T = 37, p < .01; 7 year olds N = 17, T = 26, p < .01; Wilcoxon 1 tailed tests).

Second Mention

Table 4.2 shows the percentage of responses for each category when subjects mentioned a referent for the second time.

Age Group	Story	Appropriate	Inappropriate			Undet.
		Definite	Indef.	Naming Statements	\bar{X}	Null
4 yr. olds	E	93.3	4.4	-	4.4	2.2
	W	47.6	7.1	33.4	40.5	11.9
5 yr. olds	E	95.7	-	-	-	4.3
	W	60.9	17.0	14.6	31.6	7.3
6 yr. olds	E	96.2	3.8	-	3.8	-
	W	69.4	30.6	-	30.6	-
7 yr. olds	E	100.0	-	-	-	-
	W	79.6	18.4	-	18.4	2.0
Parents	E	100.0	-	-	-	-
	W	88.9	7.4	-	7.4	3.7

Table 4.2. Percentage responses on second mention for the Emslie and Stevenson (E) and Warden (W) stories.

Within Stories

As can be seen in Table 4.2 a surprisingly high percentage of responses in the Warden stories were indefinite, i.e. identifying expressions or naming statements. If we compare the percentages of appropriate and inappropriate responses within stories all the subject groups in the Emslie and Stevenson stories used significantly more appropriate than inappropriate descriptions on second mention (p < .0005, T = 0, N = 20 for 4, 6, 7 year olds, N = 19 5 year olds, N = 10 parents, Wilcoxon 1 tailed tests). However in the Warden stories

only the seven year olds and parents used significantly more appropriate than inappropriate responses (7 year olds $N = 16$, $T = 11.5$, $p < .0025$, parents $N = 16$, $T = 11.5$, $p < .0025$, parents $N = 10$, $T = 0$, $p < .0005$). The differences were not significant for the other groups (4 year olds $N = 17$, $T = 78$, $p < .1$; 5 year olds $N = 18$, $T = 54$, $p < .1$; six year olds $N = 19$, $T = 62.5$, $p < .1$, Wilcoxon 1 tailed tests).

Between Stories

All groups except the parents used significantly more appropriate descriptions on second mention in the Emslie and Stevenson stories than in the Warden stories (4 year olds $N = 12$; 5 year olds $N = 9$; 6 year olds $N = 10$; 7 year olds $N = 7$, $T = 0$ in all groups, $p < .0025$; 1 tailed Wilcoxon tests).

It is worth pointing out that in the Emslie and Stevenson stories there was an increase with increasing age in the use of the definite article and noun on second mention (4 year olds 69%; 5 year olds 78%; 6 year olds 90%; parents 91%) and a decrease in the use of pronouns, he, she, it (4 year olds 31%; 5 year olds 22%; 6 year olds 10%; parents 9%) despite the lack of ambiguity of the pronouns. This pattern was not found in the Warden stories where subjects of all ages avoided using the pronoun it which, had it been used, would often have been ambiguous.

Discussion

It is very clear from the results of this experiment that the differences found between the results of Warden (1976) and Emslie and Stevenson (1981) were not due to the procedure that was used but to the materials. There are very obvious differences between the way the same subjects describe the Warden pictures and the Emslie and Stevenson pictures.

Having said this it is necessary to isolate the factors in the Warden stories that were responsible for the differences and to suggest why they had the effect that they did on the kind of responses that were made.

First of all it was clear that many subjects did not recognise the referents in the second and third pictures as being the same as

the ones in the first or second pictures, hence the high percentage of indefinite responses on second mention. As Table 4.2 shows in this respect the youngest subjects were worse than the older subjects and even one parent thought the dog in WA was a lamb in the second picture. Secondly, the high percentage of naming statements on both first and second mention suggest that subjects either could not understand what was going on in the picture or could not describe it. As was pointed out in Chapter Two Emslie and Stevenson (1981) suggested that the spatial position of the referents was not easy to code verbally especially in Story A.

If we now look at what the subjects had to do in this task it is possible to see what effect the materials had on the processes underlying the use of definite and indefinite descriptions. First subjects look at picture 1 and see what individuals are involved and put tokens representing these entities into their discourse model, for example, a token representing a hen and a dog. Then they have to work out what actions are involved and link each token to the arguments of a verb, for example,

dog chase hen.

They then look at the second picture. If the entities are the same as in the first picture they can use these same tokens to update their model with the new information contained in the picture. If there is a new entity, like the cow in WA, then they will add a new token to represent a member of the class of cows. They then look at the third picture and repeat the process : if the entity is new (like the egg) add a new token, if it is old (like the hen) use the token already there to update the model. The first stage of the process for speakers then, is to construct a model for themselves. Subjects were then shown the pictures again, one at a time, and asked to tell the story to a listener who had not seen the picture. This is the point at which speakers have to take into account the listener's needs so that when they go back to the first picture they do not use a definite article for a referent which is unique in their model. They should use an indefinite article to identify the referent for their listener. Thus speakers should go through the three stages outlined many years ago by Flavell (1968) of coding the information for themselves, that is identifying individuals and their actions, taking into account the

needs of the listener and recoding the information for the listener.

From the data from the Warden and Emslie and Stevenson stories it is possible to identify breakdowns at several points in this process.

- (a) Subjects do not recognise the referents hence they are different entities in their models and so each must be introduced separately. This would account for the use of indefinite descriptions on second mention. The total number of subjects using one or more indefinite descriptions is shown in Table 4.3. Possibly this is also the reason for subjects using undetermined NP's on second mention and these are also included in the table.

	EMSLIE & STEVENSON		WARDEN	
	INDEF.	UNDET.	INDEF.	UNDET.
4 yr. olds	2	0	7	2
5 yr. olds	0	1	7	2
6 yr. olds	1	0	9	0
7 yr. olds	0	0	7	0
Parents	0	0	1	0
Total	3	1	31	4

Table 4.3. Total number of subjects using at least one indefinite or all undetermined NP's on second mention.

The table shows that very few subjects failed to recognise the referents in the Emslie and Stevenson stories but many subjects failed to recognise at least one referent in the Warden stories.

- (b) Subjects are either unable to understand the action in the pictures or are unable to code it verbally thus they tend to produce naming statements, e.g. 'That's a chicken. That's a fox' or 'Chicken, hen, dog', or 'There was a girl, a dog and a teddy'.¹

1. This is distinguished from an existential sentence containing a main verb, e.g. 'There was a girl and a dog and the girl was playing with the dog'. The type of statements mentioned in the text are included in the naming statement category as they were in Warden's study.

Table 4.4 shows the numbers of subjects producing such responses for each picture.

	EMSLIE & STEVENSON			WARDEN		
	1	2	3	1	2	3
4 yr. olds	5	-	-	15	9	9
5 yr. olds	6	1	-	7	8	7
6 yr. olds	3	-	1	4	3	2
7 yr. olds	-	-	-	1	-	-
Parents	-	-	-	-	-	1
	14	1	1	27	20	19

Table 4.4. Total number of subjects using naming statements for each picture in the two sets of stories.

In both stories there are subjects in the younger age groups who use this 'style' for the first picture but there are many more in the Warden stories. Moreover, whereas this rarely occurred with other than the first picture in the Emslie and Stevenson stories there were a large number for the second and third pictures in the Warden stories.

From this analysis it is possible to divide subjects into five main groups depending on the point at which their construction or description of their model broke down. An example from each category is given in Table 4.5.

Category 1 These subjects do not recognise the referents or understand/express the action. Their models seem to contain a large number of unlinked tokens and they simply produce a string of undetermined or indefinite NP's.

Category 2 These subjects recognise some of the referents and they understand/can express some of the actions. Their models contain fewer tokens than subjects in category 1 and some of these tokens are linked to arguments of the verbs. Their descriptions are a mixture of

naming statements and identifying expressions and definite references, e.g. 'A fox is running after the hen. A cow and a hen, and the hen's laid an egg'.

Category 1	A tree and a cat A tree, a cat and a dog A tree, a bird
Category 2	Dog's chasing a chicken Dog, cow and hen The hen's laid an egg
Category 3	The cat's walking under the tree and there's a bird in it The dog's chasing the cat And the bird's flied away
Category 4	A wolf's chasing a hen A fox is looking at a cow and the hen's there
Category 5	A dog is chasing a chicken A cow is looking at the dog and the chicken's side the cow The chicken's laid an egg in her nest

Table 4.5. Examples of Stories from each of the Five Categories.

Category 3 These subjects have recognised the referents, thus their models contain the right number and kind of tokens, and they have understood the action, thus their tokens are linked to arguments of the verb. However they are struggling to describe the contents of their model (there were often long pauses) and the breakdown seems to occur at the point where they must take their listener's model into account; some, if not all of their first mentions were definite descriptions.

Category 4 These subjects can express the actions and take into account the contents of their listener's model : all the tokens are linked to arguments of a verb and all first mentions are identifying expressions or individuating definite descriptions. However they fail to recognise some of the referents and produce identifying expressions to introduce what, in their model, is another not yet mentioned token. This happened particularly with Warden Story A picture 2 where subjects thought the dog was a wolf in the first picture and a fox in the second. These subjects are accurately describing the contents of their own model and are doing so appropriately as far as the needs of the listener is concerned.

Category 5 These subjects constructed the kind of model which was anticipated : all referents were recognised, each action was expressed, identifying expressions or individuating descriptions were used for all first mentions, and definite descriptions for second mention.

The number of children falling into these five categories for each story type is shown in Table 4.6. The eighty subjects in the Emslie and Stevenson stories are of course the same eighty subjects as in the Warden stories.

	EMSLIE & STEVENSON					WARDEN				
	1	2	3	4	5	1	2	3	4	5
4 yr. olds	-	1	-	1	18	6	8	2	-	4
5 yr. olds	-	2	3	-	15	6	3	7	1	3
6 yr. olds	-	1	-	-	19	1	4	7	4	4
7 yr. olds	-	-	7	-	13	-	-	14	4	2
Total	-	4	10	1	65	13	15	30	9	13

Table 4.6. Total number of subjects in each of the five categories in the Emslie and Stevenson stories, and Warden stories.

Table 4.6 shows the three main contrasts between the Emslie and Stevenson and Warden stories : sixty-six subjects correctly described

their models and took into account their listener's model compared to twenty-two with the Warden stories (categories 4 and 5). Four subjects did not recognise referents and/or could not understand/express the actions in the Emslie and Stevenson stories compared to twenty-eight in the Warden stories (categories 1 and 2). Ten subjects did not take their listener's model into account in the Emslie and Stevenson stories compared to thirty in the Warden stories (category 3). There is an understandable developmental trend in the Warden stories ($Z = 3.339$, $P < .001$ 1 tailed trend test) with the younger subjects mainly failing to recognise referents and describe actions and the older subjects mainly failing to take the listener's needs into account.

Three referents in particular seemed to bias the subjects towards definite or indefinite descriptions on first mention regardless of the kind of descriptions that were used for other entities in the same story. (See Table A.6 in Appendix A).

In Emslie Story A twenty-seven of the twenty-nine children who mentioned river/water used a definite description, usually after having used the verb 'fishing'. For twenty-four of these subjects this was the only definite description used. In Warden Story A twenty-five of the twenty-six children who mentioned egg used an indefinite description. For six subjects this was the only indefinite description used and for another eleven subjects this came after at least one definite description on first mention. In Warden Story B twenty-two of the thirty-five children who mentioned tree used a definite description. For four subjects this was the only definite description used and for another ten subjects it came after at least one indefinite description on first mention. Tree was the only referent which over all groups had more definite than indefinite descriptions on first mention : only the four-year olds in their 'That's a tree' or a + n responses used more indefinite than definite articles. That some entities consistently take the indefinite article whilst others consistently take the definite article is something which becomes apparent in several of the experiments in this thesis.

This experiment has shown that the differences in the results of Emslie and Stevenson (1981) and Warden (1976) were due to differences

in materials used. It has been suggested that the children found it more difficult to recognise the referents and describe the action in the Warden stories and that this is why younger subjects used a large number of naming statements. It was also suggested that the children who were grouped in category 3 found it difficult to take their listener's model into account because they were having difficulties in describing their own model and this is why they used a large number of definite descriptions on first mention. It seems possible that the inappropriate definite descriptions in Hickmann's (1980) seven-year old group may also have been due to a breakdown at this stage of the communication process for the cartoon films were more complex than the picture stories used in the current experiment involving, as they did, entities which were talked about by one of the animate participants.

There is one major assumption underlying the above suggestions. This is that children do know that when a referent is new for the listener they should use an indefinite or individuating description and that it is difficulty in coding the information for themselves that prevents them from using this knowledge to recode the message for the listener. That is, when children do use identifying expressions they are doing so because they are taking the listener's needs and knowledge into account : they intend to identify the referents for the listener. This can only be shown to be the case if a task is used which (a) does not create coding problems for any of the children and (b) creates two contexts, one in which the listener is ignorant thus the speaker does need to re-code the message and use identifying and individuating descriptions and one in which the listener has exactly the same information available and can, therefore, be assumed to have constructed a model which is similar to the speaker so that the speaker does not need to recode the information and definite descriptions can be used throughout. The next three experiments were designed to investigate this issue.

4.3 The Video Experiments

4.3.1 General Introduction

The main aim of Experiments Two, Three and Four was to test the suggestion that when children use indefinite descriptions they do so because they intend to identify new referents for the listener. The main experimental manipulation in all three experiments is, therefore, the knowledge/ignorance of the listener. The experiments were designed to investigate some of the points raised by Warden's 1981 video-tape experiment and some of the points raised by the current investigation.

Warden's (1981) video experiment attempted to find contexts which would encourage children's use of the indefinite article to identify referents for a listener. He thought it possible that the physical presence of listener or materials might have biased subjects in his 1976 study towards the definite article as might the static nature of the stimuli used. Warden (1981) used video-taped stimuli instead of cartoons and varied the presence/absence of the listener by having the listener in the same room as the speaker (though the listener could not see the television screen) or in an adjoining room where the speaker communicated by microphone. The presence/absence of the referents was manipulated by having the child speak either as the film was running or after the film had finished. As a working hypothesis Warden suggested that the absence of referents and/or audience would encourage the use of the indefinite article, thus the conditions in which the listener was in another room and where the child spoke after the film had finished should produce the highest percentage of indefinite descriptions. In fact Warden found no statistically significant effect of any of the manipulations although as he himself pointed out the most significant aspect of the study was that the majority of subjects between five and nine years did use indefinite expressions, but did so inconsistently. Since the majority of the indefinite expressions were directed at previously unidentified referents and could only be defined as identifying expressions Warden concluded that the children were intending to identify referents for their audience but that either the contextual manipulations had not simplified the contexts sufficiently to enable the children to surmount their egocentricity or that the children were not

sufficiently motivated to consistently take into account their listener's knowledge.

It was pointed out in the discussion of Warden (1981) in Chapter Two and in the discussion of the current Experiment I that the best way to test the proposition that children intend to identify referents when they use indefinite descriptions is to determine whether children will use them in the situation where they are needed, that is when there is asymmetry between the listener and speaker's knowledge, and not use them in the situation where they are not needed, that is when the listener is knowledgeable. In both listener conditions in Warden's (1981) study only the speaker could see the television screen, therefore in both conditions identifying expressions should have been used. There was not a condition in which identifying expressions need not have been used. In Experiments 2, 3 and 4 of the current study such different conditions were created by having the listener either watching the film with the speaker - these are termed the Listener Knowledgeable conditions - or the listener sat behind the television set where he could not see the screen - these were termed the Listener Ignorant conditions. The main difference, then, between the Warden 1981 experiment and the next three experiments in this study is that the listener is knowledgeable or ignorant, not ignorant physically present/ignorant physically absent. The main similarity between Warden's (1981) study and the current experiments is that in both studies video-tapes were used.

Warden used video-tapes because he thought static pictorial stimuli might bias 'normal' use of the articles towards the language of children's story books, in which the definite article is more predominant. Certainly this is true of many early reading books which have a picture at the top of the page and a sentence underneath. With school age children, then, it is possible that a story telling task might underestimate their understanding of the use of the articles. However, Emslie (1982) suggested that a story telling task might over-estimate preschool children's understanding of article usage since 'Once upon a time' stories tend to introduce the characters with identifying descriptions. It was noticeable that with the exception of Zehler and Brewer all the investigators who have suggested that preschool children have mastered the identifying use of the indefinite

article have used story telling tasks (Maratsos, 1976; Warden, 1976, Emslie and Stevenson, 1981; Bennett-Kastor, 1983). It is possible that when young children use indefinite articles to introduce new characters they are simply following a story telling format, a format with which they are very familiar (Bennett-Kastor, 1983). The word 'story' was used many times in Experiment I of this thesis so it seems important to show that the results which have been obtained in story telling experiments hold also for descriptions of more everyday events.

There is one further aspect of Warden's (1981) study which is investigated in Experiment Two. This is the effect of the presence/absence of the referent. Warden himself found no significant effect of this manipulation but as was discussed in Chapter Three, it is possible that the materials used and the scoring procedure adopted may have prevented such effects being shown. Warden (1981) admitted that at least one referent, door, might have elicited an appropriate definite description on first mention and yet such appropriate definite descriptions were not separated in his analysis. Secondly it seemed likely that his ladders, her car, might have been used. These responses are definite, but appropriate since they introduce a new referent and connect it to one already in the discourse model. And thirdly putting responses into only three categories (definite/indefinite/undetermined) is misleading in that it does not allow for nouns or verb phrases to 'trigger' scenarios in which there are slots available for probable entities allowing definite descriptions to be used on first mention, e.g. a man came in carrying a ladder and put it up against the wall. A discourse model theory not only scores responses differently it also makes different predictions with regard to the use of definite and indefinite descriptions. These predictions are presented in the introduction to Experiment Two.

The following three experiments have two things in common : all have conditions in which the listeners are knowledgeable and conditions in which the listeners are ignorant, and all three use video-tapes of everyday events. The particular aims of an experiment are presented in the introduction to that experiment.

4.3.2 Experiment Two - Video Task I

This experiment was designed to investigate the effects of the knowledge/ignorance of the listener and the presence/absence of the referents on children's use of referring expressions. Our main interest lies in the kind of expressions used to mention a referent for the first time. If it is the speaker's perception of the knowledge of the listener which affects his use of the articles there should be more identifying expressions in the listener ignorant conditions than in the listener knowledgeable conditions. Conversely there should be more definite descriptions when the listener is knowledgeable than when he is ignorant. When the listener is ignorant speakers should word their descriptions to enable the listener to construct a similar model and should therefore choose indefinite descriptions unless they can provide a definite description which uniquely identifies the referent for the listener. In the Listener Knowledgeable conditions speakers can assume the listener has already constructed a model which is similar to the speaker's and should use definite descriptions throughout, observing the anaphoric conservation principle. On the basis of Experiment One it is predicted that subjects will use more identifying expressions in the listener ignorant conditions than in the listener knowledgeable conditions.

As for the presence/absence of the referents it is expected that any effect would be seen more clearly in the younger age groups. Warden (1981) predicted that the physical presence of the referents would bias children towards the use of the definite article. Here, however, it is predicted that when referents are present children will be more likely to use indefinite descriptions than when the referents are absent. This is because when children are describing a film as it is being shown they are describing their own setting up of a model of the individuals and events. The referents are at this stage new to them - regardless of the state of the listener's knowledge - therefore it seems more likely that they would say a woman rather than the woman.

Method

Subjects Ninety-six subjects took part in the experiment.

There were twenty-four subjects in each of the following age groups :

four-year olds (3;9 - 4;3 years) five-year olds (4;9 - 5;3 years)
six-year olds (5;9 - 6;3 years) and parents.

Materials A National television camera WV-1350 E/B, zoom lens 1 - 1.8, F 12.5 - 75 mm and a Shibadow Time Lapse ½" low density video-tape recorder were used to make four short films which, when shown on a Shibadow 18" black and white monitor receiver comprised the experimental stimuli. The events depicted in these films may be described as follows:

- Film a: A little boy picks up a hammer and a nail. He starts to hammer the nail into a piece of wood but hits his finger. He shakes his hand and puts his fingers in his mouth.
- Film A: A woman comes into view carrying a duster and starts to dust a picture on the wall. She cannot reach the top of it and shouts to someone off screen. A man comes in carrying a chair. She stands on the chair, dusts the top of the picture and then shakes the duster in the man's face. He starts to sneeze and pulls out a handkerchief.
- Film b: A little girl is sitting on the floor beside a small table on which is a hat and a mirror. She puts on the hat, picks up the mirror, pulls some funny faces and then sticks her tongue out.
- Film B: A man is sitting in a chair reading a book and a woman comes in carrying a teapot and a cup. She offers him some tea and he nods. She pours out some tea and he takes a sip but burns his mouth. The man starts fanning his mouth and the woman is laughing.

It was expected that all subjects would mention the six underlined referents in Films A and B. Films a and b were short

practice films which were always presented before A and B respectively and responses to these films were not analysed.

Design and Procedure

The experimental layout is depicted in Figure 4.5. The subjects were tested in same-age pairs and took turns as speaker and listener, that is, one subject described films a and A and the other child described films b and B. The two children in each subject pair were run under the same experimental conditions.

There were four experimental conditions designed to test the effect of two variables, namely the knowledge/ignorance of the listener and presence/absence of the referents. In two conditions the listener sat behind the television monitor at L_1 and could not see the screen (listener ignorant) and in two conditions the listener sat beside the speaker at L_2 and they watched the film together (listener knowledgeable). Likewise in two conditions (one listener ignorant and one listener knowledgeable), the speakers were required to describe the film shown on the monitor whilst they were watching it (referents present), and in the other two conditions the speakers were asked to describe the film after it had been shown (referents absent). Thus the four between group conditions were:

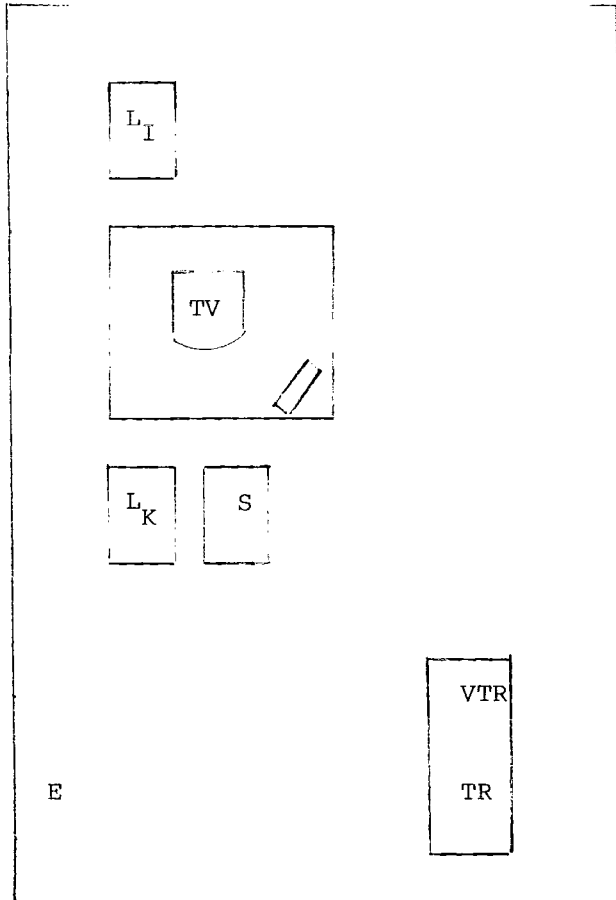
- I Speaker watches film on his own and talks whilst the film is running (listener ignorant, referents present : $L_I R_p$)

- II Speaker watches film on his own and talks after the film has been shown (listener ignorant, referents absent : $L_I R_A$)

- III Speaker and listener watch film together. Speaker talks whilst film is running (listener knowledgeable, referents present : $L_K R_p$)

- IV Speaker and listener watch film together. Speaker talks after film has been shown (listener knowledgeable, referents absent : $L_K R_A$).

Figure 4.5. the Experimental Layout



S = Speaker L_I = Listener Ignorant L_K = Listener Knowledgeable
 TV = Television Monitor VTR = Video-tape Recorder TR = Tape Recorder
 E = Experimenter

Figure 4.6. The Four Experimental Conditions

L I S T E N E R

	KNOWLEDGEABLE	IGNORANT
PRESENT	$L_K R_P$	$L_I R_P$
ABSENT	$L_K R_A$	$L_I R_A$

REFERENTS

These four conditions are summarised in Figure 4.6.

In the two listener ignorant conditions ($L_{I R_P}$, $L_{I R_A}$) listeners sat in a large chair at position L_I and if they did not complain (most of them did) that they could not see the television screen the experimenter said 'You can't see the screen from there, can you?'.
The listener ignorant conditions were always run first since there was the possibility that children would go back to the classroom and tell their friends what they had been looking at, consequently the listener might not, in fact, be ignorant. Parents were run over two days, four-year olds over three days and the five and six-year olds in one day. Subjects responses were recorded on a Hanimex Dolby cassette recorder and were subsequently transcribed.

Instructions

(a) Children : E first talked about watching television. How often did they watch it? Did they like it? Were they good at watching programmes and telling other people about them? E then said she had four short films, two for each of them. They would both have a turn at watching the films and telling their partner what was happening. Subjects in the L_I conditions were told that the speaker would sit at position S but that the listener would have to sit at L_I where they could not see the television screen. E wanted to see how good they were at telling the listener what was happening. Then after they had seen their two films their partner would have his turn. In the R_P conditions speakers were told to start talking as soon as the picture came on. In the R_A conditions speakers were told to watch the film but not to say anything until it had finished; just try to remember everything they saw so they could tell the listener about it.

(b) Parents : E explained that she was looking at the merits of television programmes in schools to see how they could help children to develop their language and at how they could be used to encourage children to talk to each other. However, it was necessary to look at the way adults would talk to each other about the same kind of films so when they were talking to each other would they do so as they would normally and not talk in the way they would if they were talking to their children.

Results

First Mention

Subjects responses on first mention of a referent were coded as:

Indefinite Descriptions	(i) identifying expressions, e.g. <u>a woman</u> came in carrying <u>a duster</u> . (ii) mensural classifiers, e.g. <u>a cup of tea</u> .
Appropriate Definite Descriptions	(i) individuating, e.g. <u>husband, Daddy</u> . (ii) possessive pronouns, e.g. <u>her picture</u> . (iii) associative anaphora, e.g. <u>the duster</u> after <u>was</u> <u>dusting</u> .
Definite Descriptions	(i) the definite article, e.g. <u>the man</u> . (ii) pronouns, e.g. <u>he, it</u> .

Details of the determiners used for each referent are given in Appendix B Tables B.1 -B.4 and the number of responses in each of the seven sub-categories is given in Table B.5 of the Appendix.

Not all subjects mentioned the same number of entities so each subject was scored for his percentage use of referring expressions.

Since the main interest lies in whether the knowledge of the listener affects the use of identifying expressions and definite descriptions only responses in those two categories will be analysed further, i.e. mensural classifiers (e.g. a cup of tea) and Appropriate Definite Descriptions are not included as they could be used in both listener conditions. (See Chapter Three for justification of this scoring procedure).

Figure 4.7 shows the mean percentage use of identifying expressions and Figure 4.8 the mean percentage use of definite descriptions in the four conditions.

Figure 4.7. Percentage use of identifying expressions on first mention in the Listener Ignorant/Referents Present ($L_{I}R_{P}$), Listener Ignorant/Referents Absent ($L_{I}R_{A}$), Listener Knowledgeable/Referents Present ($L_{K}R_{P}$) and Listener Knowledgeable/Referents Absent ($L_{K}R_{A}$) Conditions.

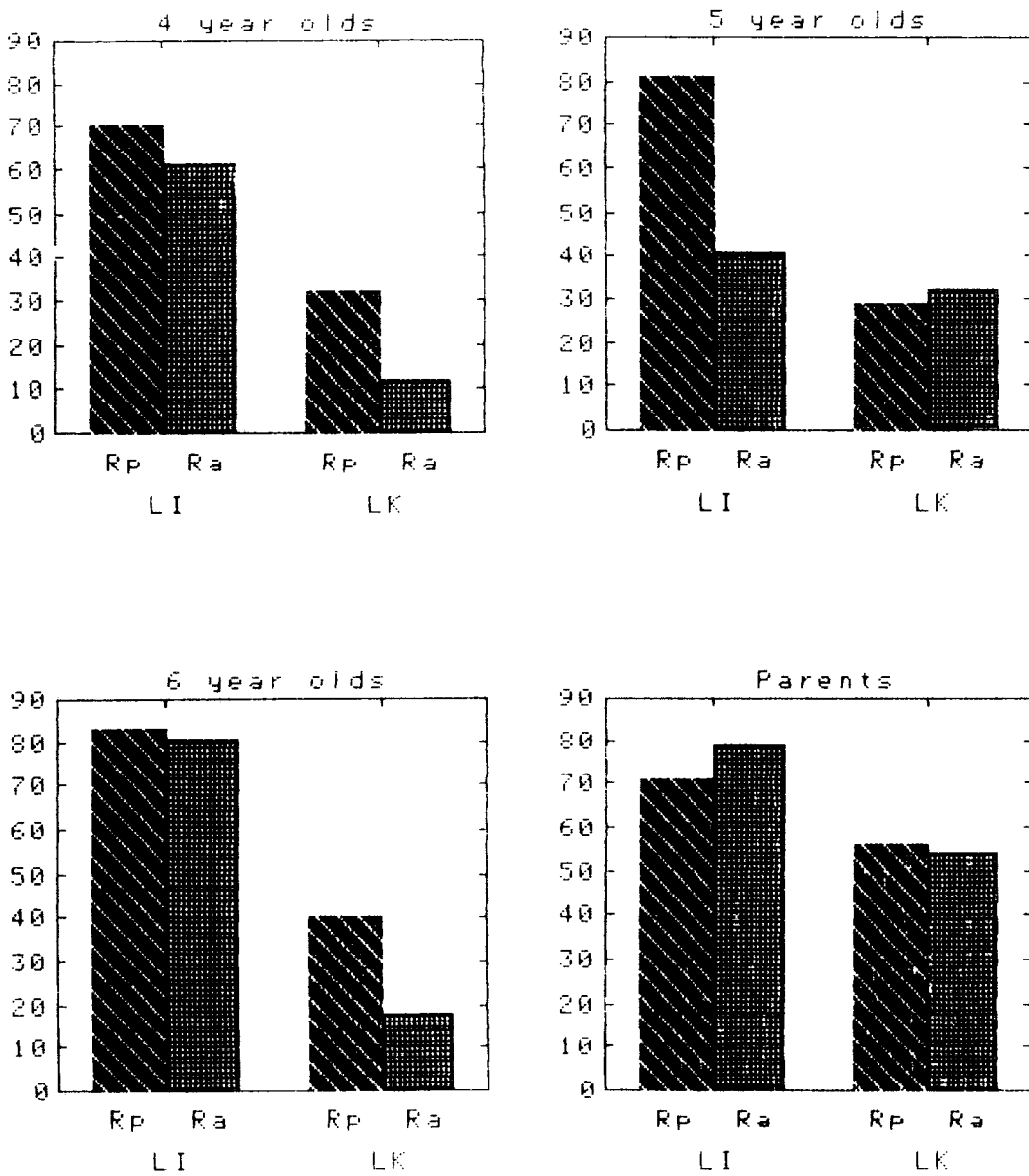
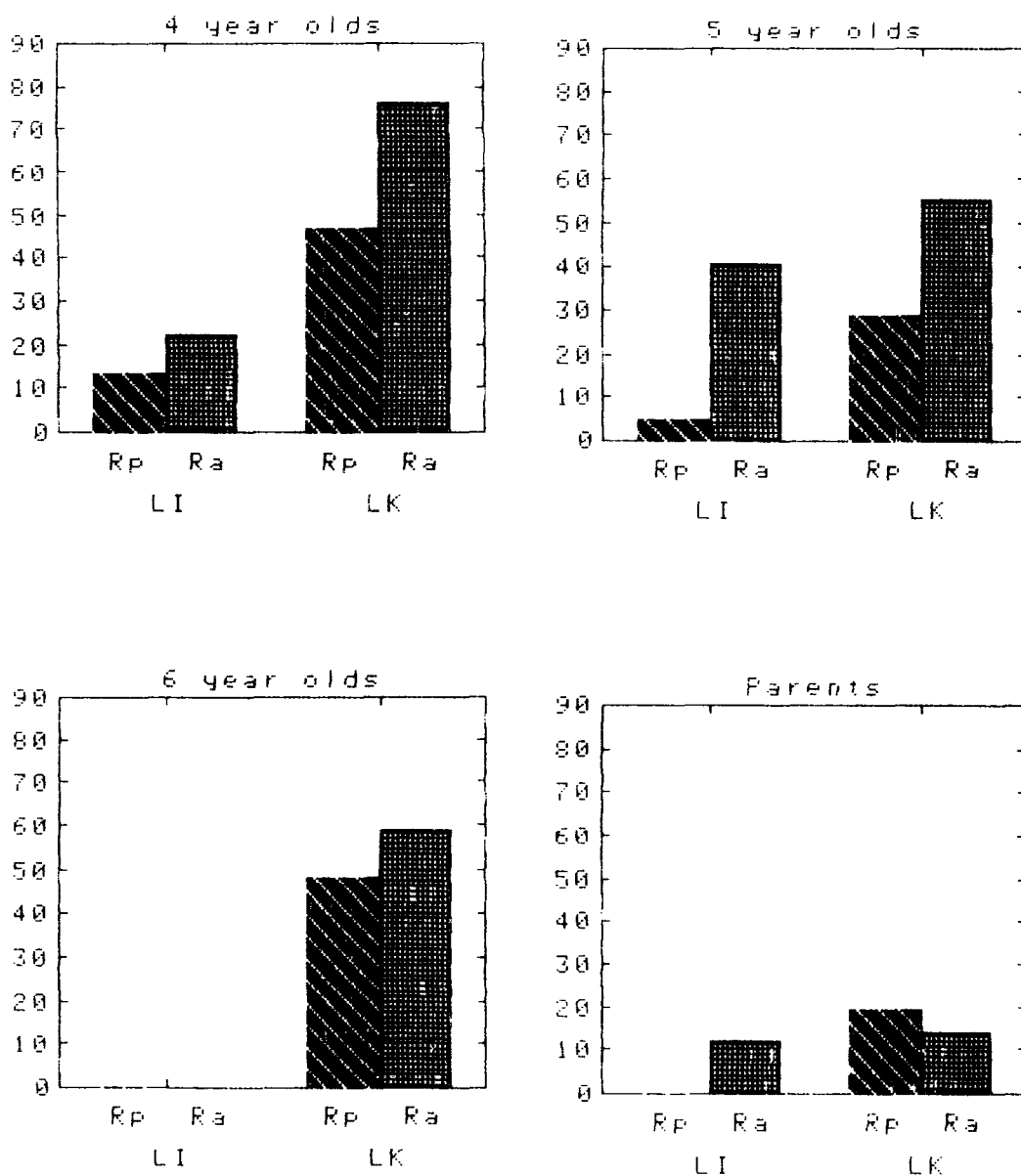


Figure 4.8. Percentage use of definite descriptions on first mention in the Listener Ignorant/Referents Present ($L_{I R_P}$), Listener Ignorant/Referents Absent ($L_{I R_A}$), Listener Knowledgeable/Referents Present ($L_{K R_P}$) and Listener Knowledgeable/Referents Absent ($L_{K R_A}$) Conditions.



There were no significant effects on either kind of descriptions of the presence/absence of the referents within either of the listener conditions except for a small effect on identifying expressions in the six-year old group in L_K ($U = 3.5$, $p < .05$ Mann-Whitney 2 tailed test). Data from the R_P and R_A groups within each listener condition were therefore combined and further analysis concentrated on the effects of the listener ignorant/listener knowledgeable manipulation.

As can be seen in Figure 4.9 all subject groups used more identifying expressions when the listener was ignorant than when he was knowledgeable. These differences were significant for all groups (4 year olds $U = 24.5$, $p < .01$; 5 year olds $U = 28$, $p < .01$; 6 year olds $U = 3$, $p < .001$; parents $U = 28.5$, $p < .01$; 1 tailed Mann Whitney tests).

Conversely, as can be seen in Figure 4.10 all groups used more definite descriptions when the listener was knowledgeable than when he was ignorant. These differences were significant for the three children's groups but not for the parents (4 year olds $U = 26$, $p < .01$; 5 year olds $U = 34.5$, $p < .025$; 6 year olds $U = 6$, $p < .001$; parents $U = 51$, $p > .05$; Mann Whitney 1 tailed tests).

Between Age Groups

Kruskal-Wallis tests revealed significant differences between groups in the use of indefinite descriptions in the Listener Knowledgeable Conditions ($H = 13.73$, $p < .004$) and in the use of definite descriptions in both the Listener Ignorant ($H = 8$, $p < .045$) and Listener Knowledgeable Conditions ($H = 14.47$, $p < .003$). The differences in the use of indefinite and definite descriptions in the Listener Knowledgeable conditions were due entirely to the parents who used significantly more indefinites than any of the children's groups (parents and 4 year olds $U = 21$, $p < .02$); parents and 5 year olds $U = 23.5$, $p < .02$; parents and 6 year olds $U = 22$, $p < .02$; 2 tailed Mann Whitney U tests) and, conversely, significantly fewer definite descriptions (parents and 4 year olds $U = 15.5$, $p < .002$; parents and 5 year olds $U = 28$, $p < .02$; parents and 6 year olds $U = 19$, $p < .002$; 2 tailed Mann Whitney U tests).

The differences in the use of definite descriptions in the Listener Ignorant Conditions, however, were not simply due to the

Figure 4.9. Percentage use of identifying expressions on first mention in the Listener Ignorant (L_I) and Listener Knowledgeable (L_K) Conditions.

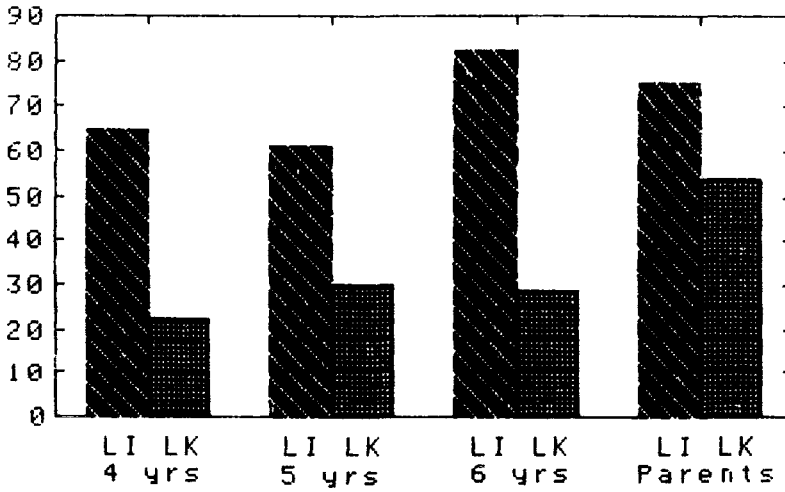
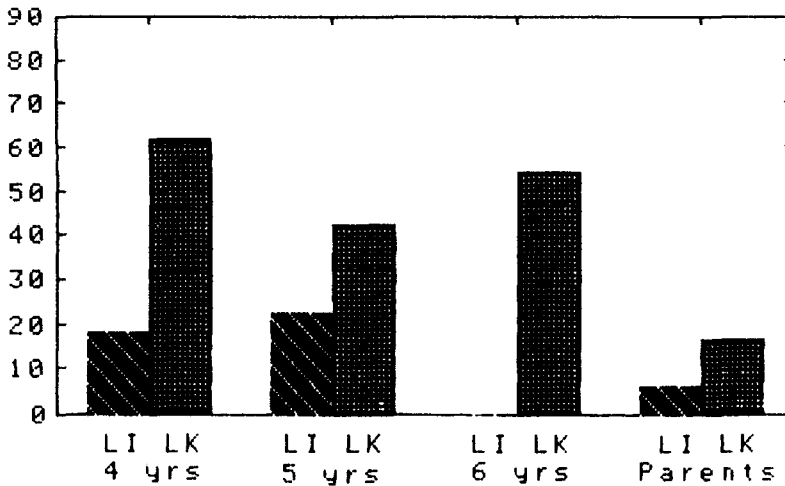


Figure 4.10. Percentage use of definite descriptions on first mention in the Listener Ignorant (L_I) and Listener Knowledgeable (L_K) Conditions.



parents, for even when this group was excluded there were still significant differences between group means ($H = 7.119$, $p = .028$, Kruskal-Wallis). A trend test confirmed a significant decrease with increasing age in the children's groups in the use of definite descriptions when the listener was ignorant, with parents performing at a similar level to the six-year olds ($Z = 2.552$, $p = .005$, 1 tailed test).

Second Mention

There were no inappropriate second mentions : all subjects who mentioned a referent for the second time used either a pronoun, e.g. she, he or the definite article, e.g. the woman, the chair. Table 4.7 shows the percentage use of these two categories of definite descriptions for each age group.

Age Group	Pronouns	Definite Article
4 yr. olds	81	19
5 yr. olds	64	36
6 yr. olds	66	34
Parents	60	40

Table 4.7. Percentage use of pronouns and definite articles on second mention.

Clearly subjects in all age groups had no problems maintaining reference within the linguistic context. Four-year olds use mainly pronouns and older children and parents approximately one-third definite articles and two-thirds pronouns.

Discussion

Overall, the main prediction that subjects would use more identifying expressions when the listener was ignorant than when he was knowledgeable was confirmed : the differences in the number of identifying expressions was significant for all age groups. It would appear that from the age of three years nine months children's choice of the article depends on their judgements of the listener's knowledge. When a referent is new to the listener the child will use a to instruct himn to add a new token to his model and when it is

familiar to the listener the child will use the or a pronoun because he knows the token fitting the description is uniquely identifiable in his listener's model. The parents also used more identifying expressions when the listener was ignorant but unlike the children did not significantly increase their use of definite descriptions when the listener was knowledgeable. In fact, the striking thing about the parents performance was their apparent reluctance to rely on the knowledge of the listener. Parents used, proportionally, almost twice as many indefinite descriptions when the listener was knowledgeable as the children. Grieve (1973) also found that twenty-one year old undergraduates used the indefinite article when the definite article would have been appropriate and he says that this apparent reluctance to rely on the knowledge of the listener may have been due to the subjects perceiving the task as one requiring objectivity.

The predictions concerning the effects of the presence or absence of the referents were not confirmed. Although the younger subjects tended to use more identifying expressions when the referents were new to them and they were constructing their own models than when they themselves had already constructed their representations, these differences were not significant. It seems reasonable to conclude, as did Warden (1981) that in this kind of experiment at least the presence/absence of the referents has little effect on the kind of descriptions used. What the experiment has shown is that it is the speaker's perception of the knowledge of the listener that affects the kind of expression used and this was true of all groups. However, a really strong test of this hypothesis would be to show that the same children will vary their use of the articles in different listener conditions. This is the purpose of Experiment 3.

4.3.3. Experiment Three - Video Task II

In Experiment Two the subjects who described a film when the listener was ignorant used significantly more identifying descriptions to first mention the entities in the film than did the subjects who described the same films when the listener was knowledgeable. As was pointed out there it remains to be shown that the same children will vary their model descriptions in different listener conditions. Experiment Three was designed to test this by having each subject

describe a video-taped film under two conditions. In one condition the listener could not see the film (L_I) and in the other condition the listener watched the film with the speaker (L_K). On the basis of the results in Experiment Two it is predicted that subjects will use more indefinite descriptions when first mentioning a referent in the listener ignorant condition (L_I) than in the listener knowledgeable condition (L_K) and conversely that speakers will use more definite descriptions when the listener is knowledgeable (L_K) than when the listener is ignorant (L_I). Parents were not used in this experiment.

Method

Subjects There were ninety-six subjects, twenty-four in each of the following age groups : four-year olds (3;8 - 4;7, mean age 4;2) five-year olds (4;11 - 5;6, mean age 5;3) six-year olds (5;10 - 6;7, mean age 6;1) and seven-year olds (6;10 - 7;5, mean age 7;1). None of these children had taken part in the previous experiment.

Materials The same equipment as had been used in the previous experiment was used to make four short silent films. Each film involved a boy, a girl, and three inanimate entities. The events depicted in these films may be described as follows:

Film A A girl is playing in a garden beside a swing. She is holding a teddy bear. She gets onto the swing with her teddy bear and starts swinging. A boy comes and asks for a turn. He has a few swings and then the girl tells him to get off. He shakes his head but the girl pulls him off. The boy is angry. He snatches the teddy bear and throws it into a tree.

Film B A boy and a girl are playing at dressing up. The girl puts a feather in her hair. The boy puts on a cowboy hat, picks up a gun and chases the little girl. He shoots her and she falls down. The boy takes the feather out of her hair and puts it in his hat.



Film C A boy is riding a tricycle. A girl comes with a skipping rope and starts to skip. Then she ties the rope onto the bike and pulls him along. The girl hurts herself and starts to cry. The boy picks a flower and gives it to her.

Film D A girl is playing with a train. She pushes the train into a tunnel. A boy is watching her. He gets a stick and puts it in front of the tunnel to stop the train. The girl shouts at the boy and takes the stick from him.

It was expected that subjects would mention the five underlined entities in each film.

Design and Procedure

The experimental layout was the same as in Experiment Two.

Subjects were tested in same-age pairs and took turns as speaker and listener. In the listener knowledgeable condition (L_K) speaker and listener watched the film together and after it had finished the experimenter said to the speaker 'Tell X what happened in that film'. In the listener ignorant condition (L_I) the listener sat behind the television monitor, the speaker watched the film and after it had finished the listener came and sat beside the speaker and the experimenter again said 'Tell X what happened in the film'. The two conditions were run at seven-day intervals. Half the subjects in each age group did the L_I condition first and half did the L_K condition first. The experimental design is shown in Table 4.8. Each subject's responses were recorded on a Hanimex Dolby cassette recorder and were subsequently transcribed.

Results

Subjects responses on first mention were scored as in Experiment Two. Details of the results are given in Appendix C Tables C.1 - C.5. There were no significant differences in the number of entities mentioned across conditions though there was a slight tendency to mention more referents when the listener was ignorant. Film B

	WEEK 1				WEEK 2			
	L_K		L_I		L_K		L_I	
	AB	CD	AB	CD	AB	CD	AB	CD
Subjects 1-6	✓							✓
Subjects 7-12		✓					✓	
Subjects 13-18			✓			✓		
Subjects 19-24				✓	✓			

Table 4.8. Experimental Design

elicited fewer references than the other three films but this was the same in both conditions. Since not all subjects mentioned the same number of referents each subject was scored for his percentage use of descriptions. (See Table C.6 in the Appendix).

Our main interest lies in whether the same child will vary his use of the articles depending on the knowledge of the listener. The appropriate definite descriptions will not shed any light on this question since such descriptions would be appropriate whether the listener had seen the film or not. It is the indefinite and definite description categories which should vary across conditions.

Figure 4.11 shows the percentage use of indefinite descriptions on first mention of a referent in the L_I and L_K conditions. The histogram shows that all age groups produced more indefinite descriptions when the listener was ignorant. One tailed Wilcoxon tests showed these differences were significant for the four-year olds ($N = 22, T = 7, p < .0005$) six-year olds ($N = 23, T = 56.5, p < .01$) and seven-year olds ($N = 23, T = 38.5, p < .0025$) but not for the five-year olds ($N = 21, T = 69.5, p > .05, 1$ tailed).

Figure 4.12 shows the percentage use of definite descriptions for the four age groups. As was predicted there is a reversal of the pattern for indefinite descriptions : all age groups used more definite descriptions when the listener was knowledgeable. Again 1 tailed Wilcoxon tests showed these differences were reliable for all age groups except the five-year olds (4 year olds $N = 23, T = 24, p < .0005$; 6 year olds $N = 18, T = 32, p < .01$; 7 year olds $N = 23, T = 34, p < .0005$; 5 year olds $N = 23, T = 83.5, P > .05$).

Figure 4.11. Percentage use of indefinite descriptions on first mention in the Listener Ignorant (L_I) and Listener Knowledgeable (L_K) Conditions.

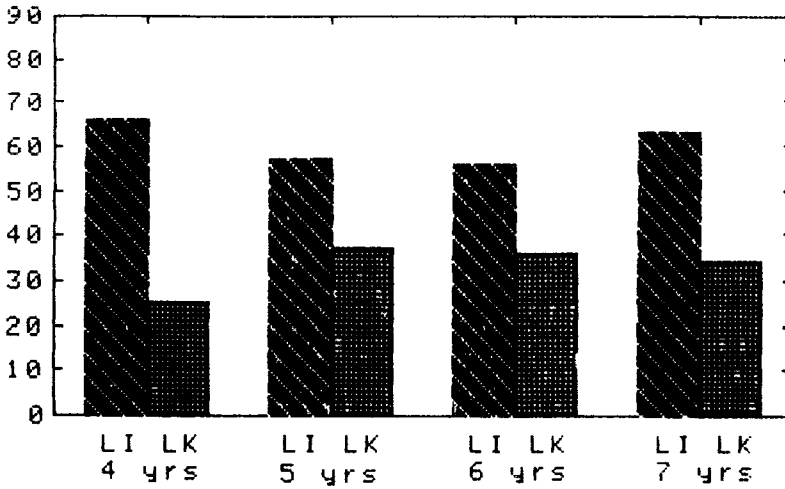
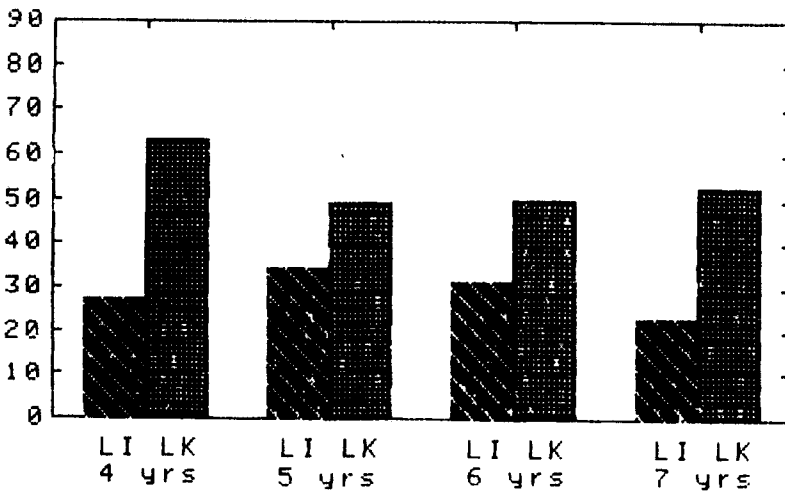


Figure 4.12. Percentage use of definite descriptions on first mention in the Listener Ignorant (L_I) and Listener Knowledgeable (L_K) Conditions.



Before discussing the results another experiment will be reported which used the same films but parent/child pairs : this is Experiment Four.

4.3.4. Experiment Four - Video Task III

In all previous experimental investigations into children's use of the articles subjects have been asked to talk either to a same-age listener (Warden, 1976, Experiment III, and 1981; Emslie and Stevenson, 1981; current investigation Experiments One - Three) or to the experimenter (Maratsos, 1976; Warden, 1976 Experiments I and II; Zehler and Brewer, 1982; Bennett-Kastor, 1983; Karmiloff-Smith, 1979; Garton, 1982, 1983). No-one has looked at how parents and children talk to each other in such tasks. Given that parents are the primary source of information in the language learning situation this is a surprising omission, especially when the language of pre-school children is being investigated.

Experiment Four investigates the way in which parents and their four-year old children talk to each other in the listener ignorant and listener knowledgeable conditions that were used in Experiment Three. Given the greater familiarity between child and parent it is possible that young children might assume more shared knowledge in the listener ignorant condition than has been the case in the previous experiments where children have been talking to same-age children. Our main interest, however, lies in the parents' performance. Since parents often assume a teaching role one might expect them to be particularly careful about their choice of description in the experimental situation. It is therefore expected that they will conform to the kind of model presented in this thesis.

Method

Subjects Thirteen parent/child pairs. Nine of the children were girls, four boys. Three parents were fathers, ten were mothers. The children were in the age range 3;8 - 4;5 and none of these subjects had taken part in either Experiment Two or Three.

Materials These were exactly the same as in Experiment Three.

Design and Procedure

Seven pairs were run in the listener ignorant condition first and six in the listener knowledgeable. The procedure was similar to that in Experiment Three except in the listener ignorant condition where the listener came out of the room with the experimenter and the speaker watched the film on his/her own. The experimenter then went back into the room with the listener to switch on the tape recorder and left parent and child on their own.

Results and Discussion

It proved impossible to implement the design as planned. There had been no problems in running the two conditions where children were paired with peers but there were great difficulties in persuading the children in this experiment to co-operate with their parents. Some children insisted that their parent did all the telling, some needed a lot of prompting or encouragement from parents 'Who was there?' 'What did they do?' "Then what happened?" etc. Some parents started prompting and questioning before the children had a chance to speak and one parent even proved not to be as co-operative as I thought : her daughter was giving a fairly lengthy description of one of the films and every time she paused her mother said 'I think that's enough' or ' That must be all' and finally 'Let's go and tell the lady we've finished'. Such difficulties give further indication of the importance of taking into account the place in which the experiments are carried out, the way in which the task is presented and the way in which it is perceived by subjects when interpreting experimental results (c.f. pp. 44-45 Ch. 2). These young children seem to have decided that 'school' was where they did things with other children and/or a teacher, hence their willingness to participate in the other experiments in this thesis, but this 'formal' setting was not where they did 'family' things like talk to their parents. In fact, more than one child said 'Go home now, Mummy'. So it seems that (a) the setting was wrong for child/parent interaction and (b) having a parent there introduced a different structure, for the child wanted to adopt a (presumably) set routine of Mum or Dad tells story, child listens. Parents, too, perceived the task in a different way from that intended

by the experimenter : they were often keen for it to be a question and answer session (i.e. parent asks question, child answers) especially in the listener knowledgeable condition.

Even greater problems arose trying to get the same subject pairs in the second condition. It had taken two weeks to run the first half of the experiment and by this time one father had changed his job and no longer brought his daughter to school, another, a merchant seaman, had rejoined his ship, some families had gone on holiday and some parents or children were ill. Only six pairs did both conditions and a further two children did the second condition with one of these six parents.

Subject's first mention of a referent were scored in exactly the same way as in Experiment Three, viz. three main categories of indefinite, appropriate definite, and definite descriptions and details are given in Appendix D, Tables D.1.A and D.1.B. The six subjects who completed both conditions are subjects 1-6. Child subjects 7 and 8 are those who did the second condition with someone else's parent; thus six adults and eight children did both conditions, seven adults and five children did one condition.

Because of the incomplete data the results will be presented in two ways. First we will look at the data for both conditions regardless of whether or not there was a second condition for some subjects. Since there are different numbers of subjects in each condition the results are presented for the percentage of responses in each category.

Our main interest lies again in the number of indefinite and definite descriptions in the two conditions.

Figure 4.13 shows the percentage of indefinite descriptions used on first mention in the two conditions for both groups and Figure 4.14 shows the percentage of definite descriptions for the two age groups.

There were striking differences in the percentage use of both indefinite descriptions and definite descriptions across conditions for the group of children but virtually no differences at all for the parents group, especially in their use of indefinite descriptions. Given that some subjects appear in both groups no statistical analysis will be attempted. However the general trends will be commented on after a consideration of the subjects who participated in both conditions.

Figure 4.13. Percentage use of indefinite descriptions on first mention in the Listener Ignorant (L_I) and Listener Knowledgeable (L_K) Conditions.

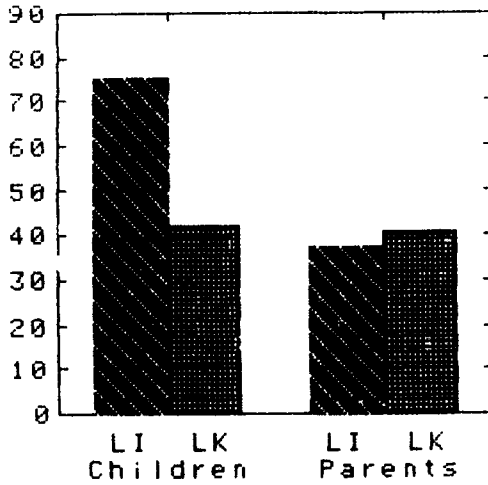


Figure 4.14. Percentage use of definite descriptions on first mention in the Listener Ignorant (L_I) and Listener Knowledgeable (L_K) Conditions.

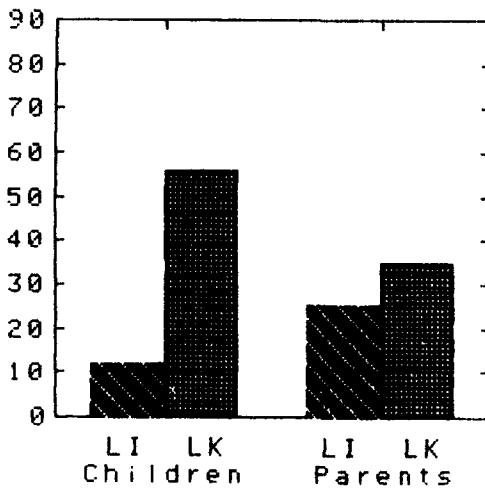


Figure 4.15 shows the percentage use of indefinite descriptions on first mention for those subjects who participated in both conditions (i.e. eight children and six parents). In the children's group six of the eight used more indefinites when the listener was ignorant and two used one fewer indefinite. In the parents group three used more and three used less.

Figure 4.16 shows the percentage use of definite descriptions on first mention. In the children's group all eight subjects used more definites when the listener was knowledgeable whereas again three parents used more and three used less.

Given the conditions under which the responses were obtained, and the fact that especially in the listener knowledgeable condition many children needed prompting and having been prompted tended to produce a+ n responses, it would be wise not to attempt to draw any firm conclusions from this experiment. It was interesting that most of the children changed their percentage use of indefinite and definite descriptions according to the knowledge of the listener but that parents did not. This was mainly because in the listener knowledgeable condition the parents started their descriptions by reminding the children of the individuals in the film. Typical opening remarks in the listener knowledgeable condition were 'That was about a little girl playing in the garden' or 'It's a story about a little boy and a little girl, isn't it?' Parents seemed unwilling to allow that their children had already constructed a model of the events which they could still remember and so saw their task mainly as one of helping the child to construct his model again. This was not the way four-year old children viewed the task at all : for them the listener ignorant condition seems to have been treated as a model construction task and the listener knowledgeable condition as a model description task.

4.3.5 General Discussion of Experiments Two, Three and Four

All the experiments have shown that young children are aware of the needs and knowledge of the listener. Their use of indefinite descriptions increases when the listener is ignorant and their use of

Figure 4.15. Percentage use of indefinite descriptions on first mention in the Listener Ignorant (L_I) and Listener Knowledgeable (L_K) Conditions for the 8 children and 6 parents who completed both conditions.

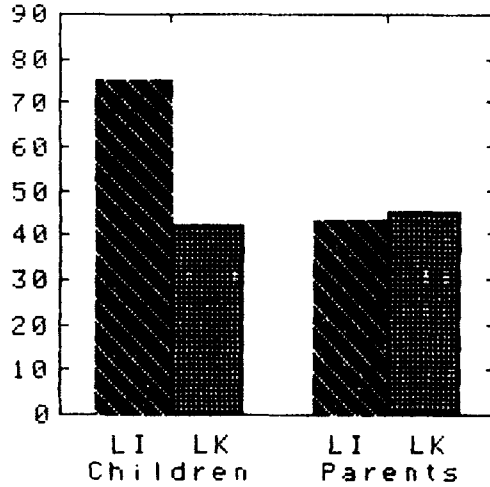
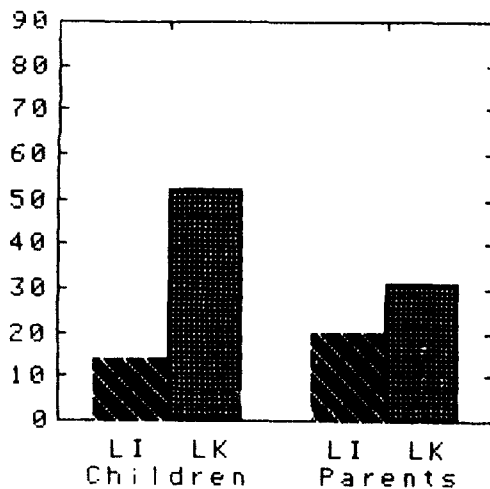


Figure 4.16. Percentage use of definite descriptions on first mention in the Listener Ignorant (L_I) and Listener Knowledgeable (L_K) Conditions for the 8 children and 6 parents who completed both conditions.



definite descriptions decreases. Conversely, when the listener is knowledgeable their use of indefinite descriptions decreases and definite descriptions increases. It seems reasonable to conclude that when children do use indefinite descriptions they are intending to identify previously unidentified referents for the listener. The experiments confirm the results of Experiment 1 and show that event description tasks like those in Experiments 2, 3 and 4, produce results similar to that of picture story-telling tasks like Experiment 1. It would seem that both kinds of task can be used to investigate children's use of the articles.

These experiments showed, as did Warden's (1981), that not all children use indefinite descriptions to introduce all referents. Warden found only about 14% consistency in the use of identifying expressions. In the two comparable conditions in Experiment Two ($L_{I R_A}$, $L_{I R_P}$) there was 50% consistency. But the theory of article usage described in Chapter Two allowed the production of other equally appropriate ways of mentioning a referent for the first time, ways in which the speaker could ensure that the listener could put a unique token into his model because of the description used and/or the specified links between tokens, e.g. her brother, or Mummy and Daddy or because of verb phrases like 'dusting' - the duster, 'skipping' - the rope. These were the kind of descriptions used by many parents, only 17% of whom, in fact, used identifying expressions consistently. Once again these experiments indicate the value of using parents as adult controls for they can reveal the pattern of normal adult usage in such situations. However, it is worth stressing that these appropriate definite descriptions were used far less frequently than identifying expressions which are the main device for introducing new referents to an 'ignorant' listener.

Contrary to the views expressed by some theorists (e.g. Karmiloff-Smith, 1979; Hickmann, 1980) children below the ages of seven or eight can establish referents within a linguistic context even when these referents are not physically present (Experiment 2 $L_{I R_A}$ and Experiments 3 and 4 L_I). Children can maintain reference intralinguistically as was shown particularly in the first three experiments. Thus the current experiments support the findings of Emslie and Stevenson (1981), Bennett-Kastor (1983) and Zehler and Brewer (1982).

However, although these experiments have served their intended purposes they have also raised some interesting problems. In particular there seem to be some referents which are largely resistant to the listener ignorant/knowledgeable manipulations. Why, in Experiments 2 and 3, did children sometimes use indefinite articles when the listener was knowledgeable and they could have used the definite article throughout? The discourse model predicts that when a referent is known to be unique in both speaker and listener's models a definite description will be used. This apparent over-use of the indefinite article is especially puzzling given the many reports of children's alleged bias towards the definite article (e.g. Hickmann, 1980; Karmiloff-Smith, 1979; Warden, 1976). An inspection of the Tables in Appendix B reveals that these seemingly inappropriate identifying expressions clustered around particular referents. In Experiment Two, Film B there was a man sitting in a chair reading a book. When the listener was knowledgeable the children said either the man or he but never the book : all subjects apart from two who used a possessive pronoun said a book and nine out of twelve subjects, including all six parents, who told the story also said a chair. In the same film no subject ever said the cup. In Film A in the listener knowledgeable condition fourteen of the eighteen subjects who mentioned it said a chair. This included all six parents. In Experiment Three Film C ended with a boy giving a girl a flower. In the listener knowledgeable condition thirty-seven of the thirty-nine subjects who mentioned it said the boy gave the girl a flower. Exactly the same pattern of usage was found with parents in Experiment Four.

The above examples are of the indefinite article being used when a discourse model would predict a definite description. The reverse happened in Experiment Three in the listener ignorant condition. In Film A in which a boy and girl were playing on a swing the boy threw the girl's teddy bear into a tree. Not one subject said a tree. All subjects, including the parents in Experiment 4, said the tree, the trees, or the bushes. The discourse model might accommodate these definite descriptions because of the previously mentioned referent swing. It might be argued that this noun triggers off a representation of a prototypical garden or park in which swings are

normally situated therefore these are either tokens or slots for tokens for trees in the implicit context. The definite description would then work because the action of the boy throwing the teddy bear singles out one particular tree or group of trees - the one in which the teddy bear was thrown (c.f. Sanford and Garrod, 1981, p. 167).

All four experiments have raised the point that some referents tend consistently to elicit the definite article, e.g. tree in Warden Story B Experiment I and Emslie Film A Experiments 3 and 4, whilst others consistently elicit the indefinite article, e.g. egg in Warden Story A Experiment I, chair, book and cup Experiments 2 Film B chair Experiment 2 Film A, a flower Experiments 3 and 4 Film C. One feature that seems to unite these items is that they are all inanimate objects.

By coincidence book and flower were two of the inanimate non-participants that subjects in Hickmann's (1980) study consistently referred to with the indefinite article. The use of the indefinite article with flower is particularly interesting since this was one of two objects (the other being banana) which consistently elicited a in MacWhinney and Bates (1978) study where they were looking at the effect of 'givenness' on article usage. Having seen a picture of a boy hugging a dog children would happily say of a subsequent picture where the verb had changed 'The boy is kicking the dog' but having seen a picture of a monkey eating a banana they would only say of a subsequent picture where the subject changed that 'a squirrel is eating a banana'. Similarly after having said 'A lady is giving a truck to a girl' they would happily say of a subsequent picture where the direct object changed 'The lady is giving a mouse to the girl' but after saying 'A cat is giving a flower to a bunny' they would not say 'The cat is giving the flower to a dog' where only the indirect object changed (see MacWhinney and Bates, 1978, p. 547 for details) MacWhinney and Bates suggest (pp. 552-553) that the absence of significant results on these two elements may have been due to children making the reasonable assumption that different animals would eat different bananas and that the cat would give each of his friends a different flower. "These results showed that these preschoolers evidenced a fairly high level of sophistication in using world knowledge to make judgements about newness". Karmiloff-Smith (1979)

also found that extra world knowledge played a role in article usage. Objects such as a match, a sheep and a flower, tended to be given the indefinite article irrespective of how many there were in the experimental setting whereas objects such as a watch, a ball and a church were given definite articles. She concludes that "not only the actual class extension of objects in the experimental setting but also the potential class extension is a factor influencing article usage (p. 121)".

If subjects sometimes use general knowledge in choosing an indefinite article (as well as when using a definite article) it seems reasonable to suggest that in the current experiments subjects may have been using their general knowledge that certain kinds of objects do not normally occur on their own; houses have many books, cups and chairs, gardens have many flowers. In Experiments 3 and 4, Film B the flower was, in fact, the only one in the garden. The film had been made in early Spring and none of the bulbs was flowering so the experimenter had deliberately planted out one daffodil. The results of these experiments seem to show that it is not just uniqueness in a model which controls the use and interpretation of definite descriptions as Johnson-Laird and Garnham suggest but whether an entity is typically one of a group of identical entities in the world. Speakers may choose the indefinite article because of its exclusiveness. Hence a person's general knowledge may sometimes have a greater influence on choice of articles than the knowledge of the listener's mental model. Experiment 5 was designed to test this proposition.

4.4 Experiment Five - Story Telling Task II

This experiment was designed to investigate whether or not the presence of several identical objects would influence subjects' use of the definite and indefinite articles. As was explained in earlier sections of this thesis a model theory would predict that definite descriptions would be used on first mention for entities which are known to be unique either in the immediate or larger situation of utterance, and for entities which are in some way associates of

previous noun or verb phrases. Such NPs or VPs would trigger a representation of prototypical situations or scenarios in which there was either one slot, for typically unique entities, or several slots, e.g. for shop assistants or waiters. A unique token could be placed in the model either because only one such token was available in the implicit context or because the whole segment in which the noun appeared limited the number of available tokens to one : the only one relevant to the current context. Thus the table was appropriate if it followed kitchen or cooking, the river was appropriate if it followed fishing as was the skipping rope if it followed skipping. However Experiments 2, 3 and 4 revealed that many subjects used indefinite descriptions of objects that were known to be unique in the listener's model. Such objects were inanimate and in the real world normally were one of several similar or virtually identical objects in a typical setting such as a house or garden. It was suggested that subjects may have been using the indefinite article because of its 'exclusiveness'.

In Experiment 5 subjects were asked to tell a three picture cartoon story to a same-age listener who could not see and had no previous knowledge of the pictures. Two versions of each story were used. In Version A two single inanimate objects appeared one of which would normally be unique in the depicted setting while the other would normally be one of several identical objects in that setting. In Version B several objects of these same two classes appeared, the several members of the class of normally unique objects violating both speaker and listener's expectations.

Two of the objects that were chosen were ones which in previous experiments had consistently elicited indefinite descriptions : these were cup and chair (Experiment 2), and one had elicited definite descriptions : table (Emslie and Stevenson, 1981). The fourth object was clock. This was chosen because it is normally a unique object (like table) and because it was one that Warden had used in one of his 1981 films. It was decided to include a picture version of one of Warden's stories to try to discover why most of his subjects, including some adults, used some definite descriptions on first mention.

Two further entities, one animate and one inanimate, were

included in each story to act as within subject controls for appropriate usage. These were entities whose introduction should not be influenced by general knowledge.

Interest lies in the kind of descriptions used to mention the four critical referents. Since the listener is ignorant of the context of the pictures the speaker may choose to use indefinite descriptions. If, however, the speaker thinks that general knowledge of the context will trigger a prototypical scene in which the clock or the table are unique, he may choose a definite description. General knowledge would not lead one to expect only one chair or one cup, however, so one would not expect definite descriptions to be used here. When there is more than one identical referent present a or one of the must be used. Thus one would not expect the clock or the table when expectations based on general knowledge are violated. It is therefore predicted that speakers will use the clock/the table in the single cases but use a/one of the (clocks/tables) in the multiple cases. Conversely it is predicted that speakers will use a chair/a cup in the single cases and a/one of the (chairs/cups) in the multiple cases.

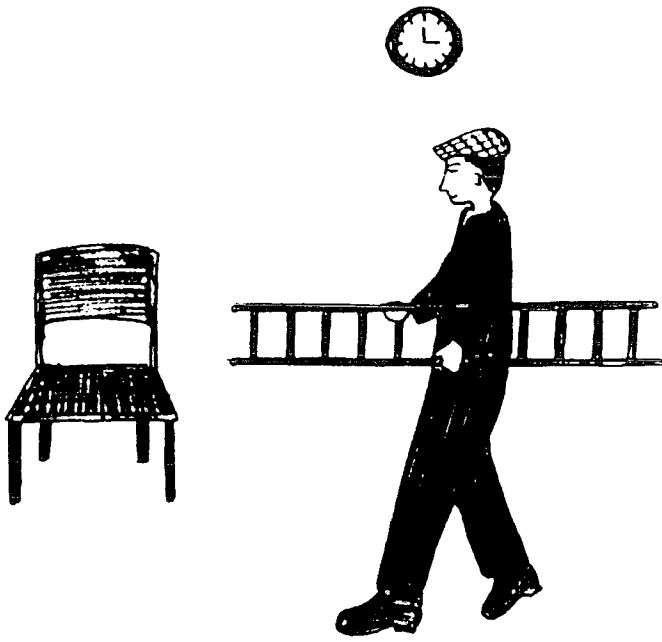
Method

Subjects Ninety-six subjects took part in the experiment; twenty-four in each of the following age groups : four-year olds (3;9 - 4;3), five-year olds (4;9 - 5;3), six-year olds (5;9 - 6;3) and parents.

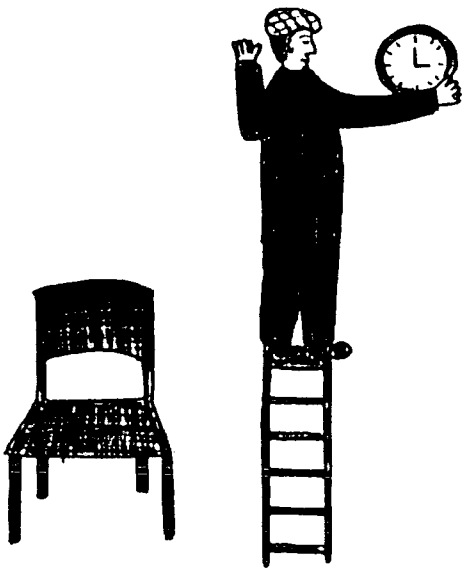
Materials Two three picture cartoon stories were devised which were balanced in referential content. Story 1 was a picture version of Warden's video film (1981, Film A). There were two versions of both stories. In Version A single referents were used and in Version B multiple referents were used. Each picture measured 6" x 6" and the pictures in Version A may be described as follows (see Figures 4.17 and 4.18) :

Story 1 Picture (1). A man is carrying a ladder and there is a clock on the wall and a chair at one side. Picture

FIGURE 4.17 STORY 1 VERSION A (SINGLETON)



Picture 1

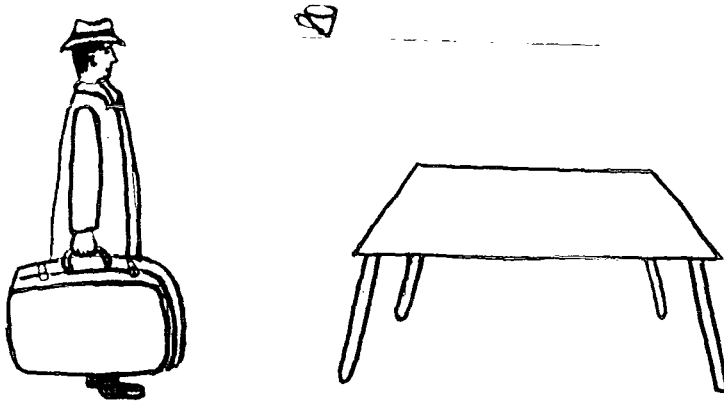


Picture 2

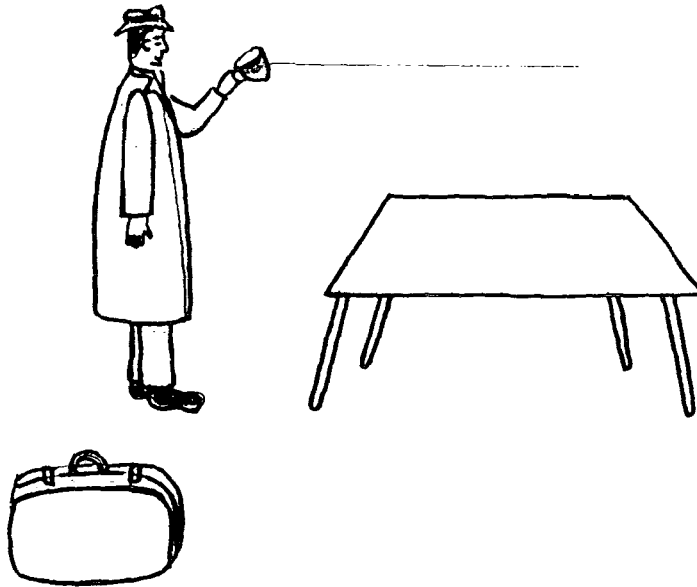


Picture 3

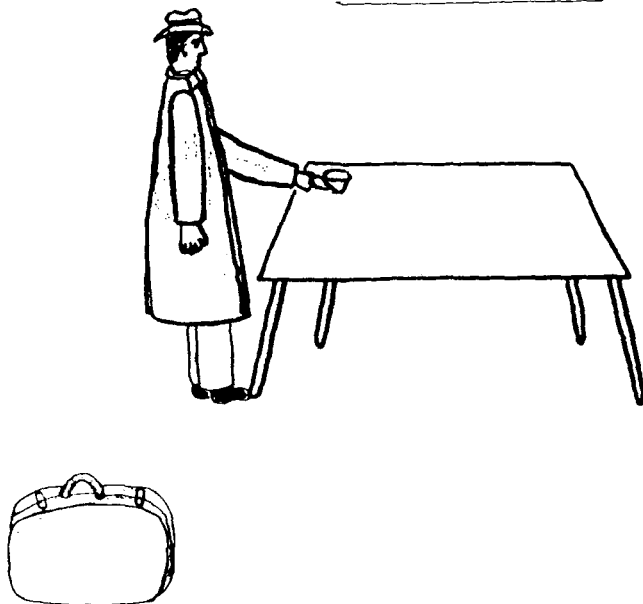
FIGURE 4.18 STORY 2 VERSION A (SINGLETON)



Picture 1

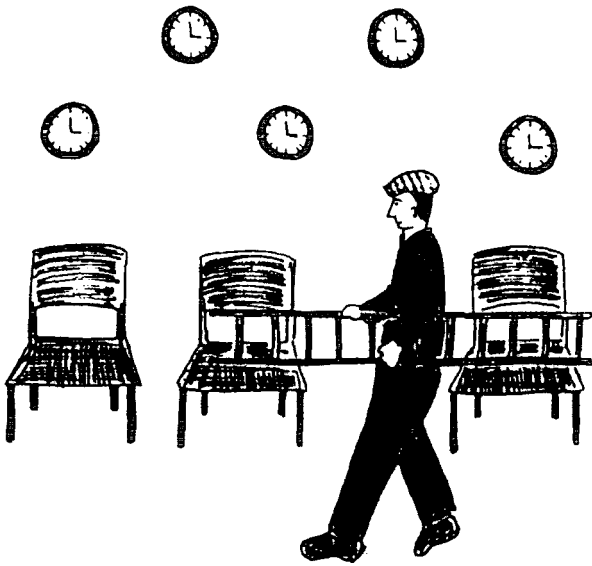


Picture 2

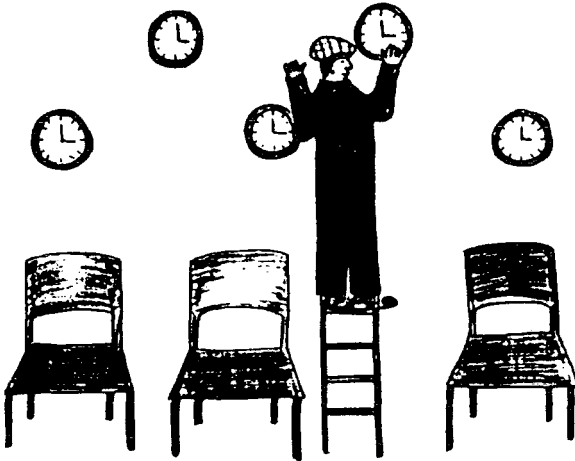


Picture 3

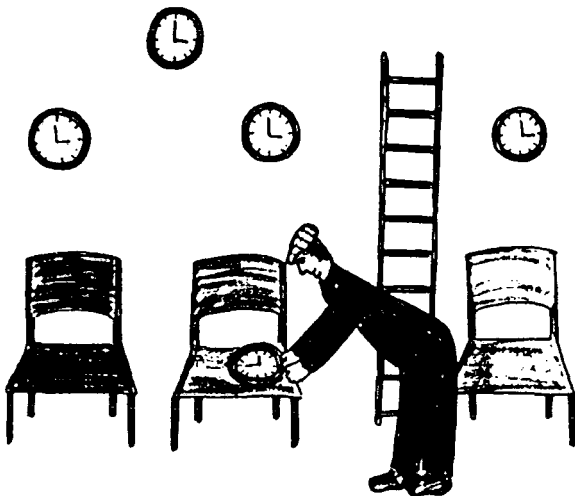
FIGURE 4.19 STORY 1 VERSION B (MULTIPLE REFERENTS)



Picture 1

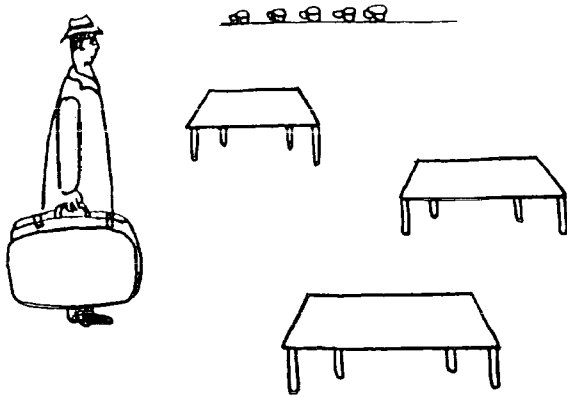


Picture 2

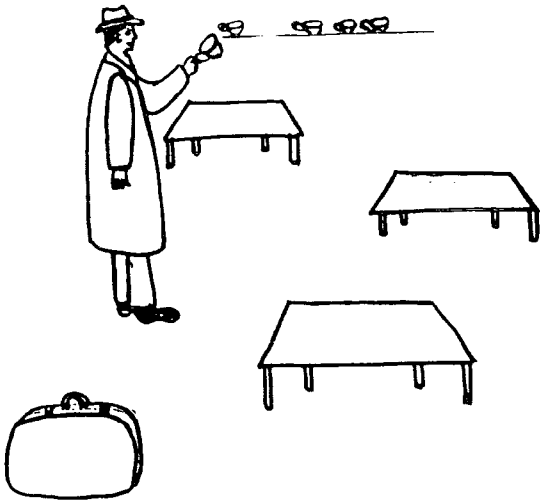


Picture 3

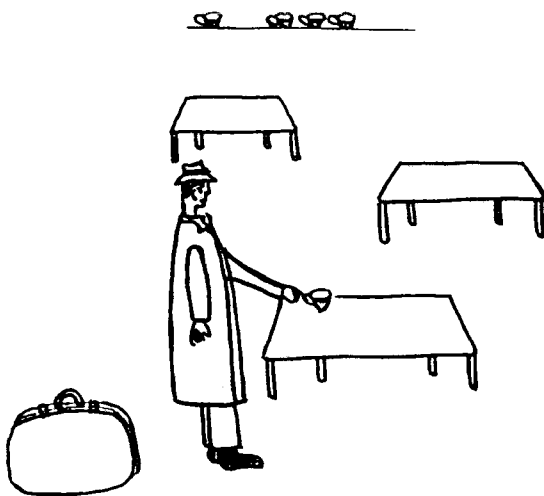
FIGURE 4.20 STORY 2 VERSION B (MULTIPLE REFERENTS)



Picture 1



Picture 2



Picture 3

(2). The ladder is up against the wall and the man is standing on the ladder taking down the clock. Picture (3). The man has come down the ladder and is putting the clock on the chair.

Story 2 Picture (1). A man is carrying a suitcase and there is a cup on a hook on the wall and a table to one side. Picture (2). The man has put the suitcase down and is reaching for the cup. Picture (3). The man is putting the cup on the table.

In the B Versions of these stories there were five clocks and three chairs, and five cups and three tables in stories 1 and 2 respectively (see Figures 4.19 and 4.20).

In both stories there were two single entities (man and ladder, man and suitcase), one entity which would normally be the only one of its kind in a room (clock or table), and one which would normally be one of several identical entities in a room (chair or cup).

Design and Procedure

Twelve subjects in each age group were given the A versions of the stories and twelve were given the B versions. Six subject pairs in each age group told Story 1 first and six told Story 2 first. Both subjects in each pair were in the same condition, that is they had either A versions or B versions.

The procedure was the same as in the story-telling task in Experiment 1. Subjects responses were tape recorded and subsequently transcribed.

Results and Discussion

Responses for man and suitcase/ladder were scored as follows : indefinite, e.g. a man, some ladders; individuating, e.g. his suitcase; definite, e.g. the man or undetermined, e.g. man.

Responses for the four critical entities, cup, chair, table and clock, were scored in the following way :

Version A (singleton) : indefinite, e.g. a clock; definite, e.g. the clock; undetermined, e.g. clock.

Version B (multiple referents) : asserted or presupposed partitives, e.g. a clock, one/one of the clocks, the second clock from the left; definite, e.g. the clock; undetermined, e.g. clock.

Details of the determiners used for each object are given in Appendix E Tables E.1 - E.4.

Our main interest lies in the determiners used in the two Versions for the critical entities clock, chair, table and cup. The data were only used from subjects who used appropriate determiners for the non critical entities, namely man and ladder in Story 1 and man and suitcase in Story 2. If a subject uses an identifying expression for man and an identifying expression or possessive pronoun for suitcase/ladders and then uses a definite description for one of the critical entities, e.g. clock, one can be more confident in concluding that there might be a reason for this definite description.

Version A (Singleton)

Table 4.9 shows the total number of subjects in each age group who mentioned both critical entities and used a man and a or his ladders/suitcase. It was predicted that subjects would use the clock/the table in Version A where they were singletons but use a chair/a cup.

Several interesting points emerge from Table 4.9. The first is that no subject in any age group violated expectations generated by general knowledge : the upper right-hand quadrant is empty. Secondly the upper left-hand quadrant shows that several subjects did not rely on general knowledge when describing their discourse model, they used identifying expressions throughout. The bottom left-hand quadrant contains the responses that were predicted if subjects were using knowledge of context, therefore saying the clock/a chair, or the table/ a cup. Only three such responses came in Story 1 (one each from 4, 5 and parents) and six from Story 2 (all from the youngest age groups). What was not predicted was that any subject would use definite descriptions for both critical entities. This came only once in Story 2 with the table/the cup, but nine times in Story 1 with the clock/the chair : three of these responses coming from six-year olds and three from parents.

		<u>a chair</u> the chair		<u>a/his cup</u> the cup		
4 yr olds	a clock	3	0	a table	0	0
	<u>the clock</u>	1	2	<u>the table</u>	4	0
		<u>a chair</u> the chair		<u>a cup</u> the cup		
5 yr olds	a clock	0	0	a table	1	0
	<u>the clock</u>	1	1	<u>the table</u>	2	1
		<u>a chair</u> the chair		<u>a cup</u> the cup		
6 yr olds	a clock	2	0	a table	3	0
	<u>the clock</u>	0	3	<u>the table</u>	0	0
		<u>a chair</u> the chair		<u>a cup</u> the cup		
Parents	a clock	2	0	a table	6	0
	<u>the clock</u>	1	3	<u>the table</u>	0	0

Table 4.9. Determiners used for the critical entities by subjects who had mentioned both entities and had used appropriate descriptions for man/ladder/suitcase. VERSION A

The underlined phrases indicate predicted responses.

Version B (Multiple Referents)

Table 4.10 shows the total number of subjects in each age group who mentioned both critical entities and used a man, a or his ladders/suitcase. It was predicted that subjects would use a/one of the for all critical entities where there were several such entities present, as there were in Version B. Such responses, which also included, e.g. 'the second cup from the right', are labelled APP (asserted or presupposed partitives) in the diagram.

The upper right-hand quadrant, which was blank in Version A is again blank for cup/table, but there are six (out of seventeen) responses in this quadrant for Story 1 : three six-year olds and one subject in each of the other age groups said the man put a/one of the clocks on the chair.

The upper left-hand quadrant contains the predicted responses but there were only eleven out of thirty-three responses which followed the predicted pattern, five of these coming from the four-year olds and five from the parents. Such responses were evenly spread across stories.

Turning now to the lower right-hand quadrant where the definite article was used for both critical referents there is only one such response for cup/table (surprisingly from a parent) and four for chair/clock, three of which came from parents.

Finally, the lower left-hand quadrant. One-third of all responses fell into this category. Of particular interest is the fact that ten of the eleven responses were in the cup/table story : two parents, five six-year olds and three five-year olds said that the man put a cup on the table.

Before suggesting possible explanations for the pattern of responses obtained one has to look again at the critical entities and the way in which they were involved in the story. Two entities, table and clock, had been used because they are normally unique in a given setting, and two entities, cup and chair, had been used because they are normally one of several identical or similar entities in a given setting. However, the way the pictures had been constructed cut across these pairings because both table and chair were the entities on which the other two objects, cup and clock, were placed. It seems possible then that subjects may not have been referring to particular

		<u>APP chair</u>	the chair	<u>APP cup</u>	the cup	
4 yr olds	<u>APP clock</u>	3	1	<u>APP table</u>	2	0
	the clock	0	0	the table	0	0
5 yr olds	<u>APP clock</u>	0	1	<u>APP table</u>	0	0
	the clock	1	1	the table	3	0
6 yr olds	<u>APP clock</u>	0	3	<u>APP table</u>	1	0
	the clock	1	0	the table	4	0
Parents	<u>APP clock</u>	2	1	<u>APP table</u>	3	0
	the clock	0	3	the table	2	1

Table 4.10. Determiners used for the critical entities by subjects mentioning both entities who had used appropriate descriptions for man/ladder/suitcase. VERSION B

The underlined phrases indicate the predicted responses.

entities when they mentioned chair and table but to particular locations. Locative phrases, as Eve Clark (1978, p. 88) has pointed out are usually definite. Subjects may have been using a definite article not to restrict the range of possible discourse entities to the only one relevant to the current context (c.f. Johnson-Laird and Garnham's (1980, p. 377) the man who lives next door to me ...) but the range of locations : the locative phrase would restrict tables or chairs to the one on which the cup or clock was placed.

With this point in mind one can look at the data again, and examine responses for all subjects, not only those who used indefinites for man and ladders/suitcase. When a listener knows nothing about the entities and events the speaker is talking about some subjects will introduce all new entities with indefinite descriptions or appropriate definites (e.g. possessive pronouns) where there is only one object of its class there. When there is more than one member of its class there they will use indefinite descriptions or what have been termed here asserted or presupposed partitives. The total number of subjects following this pattern which will be called Referential was thirty-seven (13 4 year olds, 3 5 year olds, 8 6 year olds, 13 parents).

A second group of subjects follow the above pattern except they use definite locative phrases for on the chair or on the table. Twenty-four subjects followed this pattern (5 4 year olds, 7 5 year olds, 7 6 year olds, 3 parents). This will be called the Locative group.

These two basic patterns account for sixty-one of the ninety-six subjects. The rest of the subjects will have to be accounted for in terms of the particular story and Version they told.

In Version A Story 1 (single chair/clock) four subjects, one in each of the age groups followed the referential pattern but used the definite article for clock which is normally unique in the prototypical context. Eight subjects followed the locative pattern but also used the for clock. One would be less confident that this pattern was anything other than subjects forgetting the needs of the listener as the story progressed were it not for the fact that three of the six parents who told this story version used this pattern (2 4 year olds, 3 6 six year, 3 parents) and only one subject, a five-year

old used this pattern of two definites for the last entities mentioned in the A Version of Story 2. It seems unlikely, therefore, that we can attribute either of the last two patterns to 'forgetfulness' or 'egocentricity'.

The four patterns outlined above account for forty of the forty-eight subjects who told the singleton versions of the two stories. The eight subjects not accounted for used either no determiners or a random pattern of determiner use including he or it for first mention of the man and ladder or suitcase. One seven-year old was included here and the other seven subjects, a high percentage indeed, were five-year olds.

Turning finally to the B Versions of the stories where multiple referents are involved, thirty-one of the forty-eight subjects who told these versions are accounted for by the referential or locative pattern. There was only one obvious pattern discernible in the data of the remaining seventeen subjects (3 4 year olds, 6 5 year olds, 4 6 year olds, 4 parents). Five subjects (1 5 year old, 4 parents) used the indefinite article for man and either a, some or his for suitcase/ladder but definite descriptions were used for clock, chair, table and cup even though there were several identical objects in the pictures. If these four parents were not being more forgetful of the needs of the listener than the children the only other possible explanation for the cup/the table, and the clock/the chair is that these adults were designating the only entity that was relevant to the current context.

Only twelve subjects remain unaccounted for in the B Versions of the story. Two subjects misunderstood the pictures, one subject used a single undetermined NP and used indefinites for the other three referents. One subject started with a definite description (the man) and then used three indefinite descriptions, and seven of the eight remaining subjects used no discernable pattern of determination at all, five of these, again, being in the five-year old group. It is worth pointing out that only one subject, a four-year old, used definite descriptions for every entity that was mentioned and that five-year olds are again the least consistent group.

All five experiments have shown that it is rare indeed for all subjects to use only identifying expressions to first mention a

referent, and that the kind of description used depends not only on the ignorance or knowledge of the listener, although in all experiments this was the over-riding factor, but on the class to which a particular entity belonged and the role it played in the events described. Typically entities which are small, inanimate, normally one of several identical entities in a given setting, and normally the direct or indirect object of the verb (that is, they have things done to them) are referred to with indefinite descriptions. In the first five experiments objects like flower, book, egg and cup fell into this category. They were all direct or indirect objects of their respective verbs.

Conversely, when a referent is new for the listener the speaker may still choose to use a definite description either because there has already been a linguistic trigger which provided a unique token or a slot for a unique token (e.g. wall/room - clock), because the definite description itself contributes to the identification by specifying the links by which this entity is to be attached to the established context (e.g. a relative clause or possessive pronoun), or the definite description specifies a location in an established context (e.g. in the tree or trees, on the chair, on the table).

One can begin to see why Warden obtained so many definite descriptions in his 1981 video experiment and why so few subjects used identifying expressions throughout their narrative. Story 1A in Experiment 5 involved the same action and a number of entities as Warden's Film A : fourteen on the twenty-four subjects here said the clock possibly because they judged that the clock was uniquely identifiable in the created context and twelve of the twenty-one subjects said 'the chair' in what seem very likely to be locative phrases. Furthermore in Warden's B film a lady put a briefcase on a table. Again this is a locative phrase and in Story 2A of the current experiment seven of the subjects who mentioned table did so with a definite description which was the only one they used in their narrative. Further experiments would of course, be needed to test the suggestion that locatives are definite, for example, one could create contexts to test for differences between making a table and putting something on a table. These kinds of further experiments should form part of a future study.

Finally, the pattern of indefinite article usage which was obtained in this and previous experiments with objects like book and flower leads one to question whether the differences Hickmann (1980) found between animate and inanimate objects was, in fact, not a result of animacy at all but of the role of the objects in the story. Hickmann found that her seven-year olds created animate referents approximately 50% of the time whereas they created inanimate referents approximately 80% of the time. However, the inanimate objects were, by design, always the direct object of verbs and, as we have seen, referents in object position tend to elicit the indefinite article regardless of the knowledge of the listener. It may be that the seven-year olds were not creating referents for the listener but would have used indefinite descriptions even if the listener had been knowledgeable. Having a listener knowledgeable condition would test for this.

4.5 Summary

The five experiments in this chapter have followed the traditional approach in that they have been mainly concerned with the effect of the knowledge of the listener on the speaker's use of indefinite and definite descriptions. The experiments have shown that children are aware of the needs and knowledge of the listener : when the listener is ignorant their use of indefinite descriptions on first mention increases and their use of definite descriptions decreases and the converse is true when the listener is knowledgeable. Apart from Experiment 5, which was designed to look at a few specific referents which had, in previous experiments, elicited unpredicted patterns of article usage, there was no systematic manipulation of the referential array. It is with the effect of the composition of the referential array on the use of definite and indefinite descriptions that the four experiments to be reported in Chapter Five are concerned.

CHAPTER FIVE

THE EFFECTS OF THE REFERENTIAL ARRAY

5.1 General Introduction

Whereas the experiments in Chapter Four were mainly concerned with the effect of the knowledge of the listener on subjects' choice of referring expression, the experiments in this chapter are mainly concerned with the effects of the composition of the referential array. With the exception of parts of Experiment 5, the referents in the pictures or videos of the experiments in Chapter Four were usually the only one of their kind, e.g. a girl, a teddy and a dog. The speaker's main concern, therefore, was whether or not the listener had a token for a particular object in his mental model. In the experiments in this chapter the objects to which reference had to be made were systematically manipulated so that sometimes objects were the only one of their kind in the referential array, sometimes there were two or three identical objects there and sometimes there were two or three similar objects which differed from each other on one dimension, either that of colour, or, as in the final experiment, size. The speaker's task therefore involves a consideration of the status of an object with respect to other objects so that the listener can distinguish between them.

Not only was the composition of the referential array systematically manipulated, the way in which the arrays were presented was also varied. In the first experiment in this chapter, Experiment 6, there was one referential array which was seen by both speaker and listener before each trial began but which was hidden from the listener's view when the description of an object was supplied by the speaker. In Experiments 7 and 8 there were two (identical) referential arrays and speaker and listener could see their own arrays, though not their partner's, throughout each trial. In Experiment 9 again there was only one referential array but in this, the final experiment, it could be seen only by the speaker.

As has been argued earlier in this thesis (e.g. Chapter One,

Chapter 2.2.B) it is not simply the status of a referent in an array that is the crucial factor in a speaker's choice of referring expression but the status of a referent in the mental models of speaker and listener. Thus, even when the principle concern of an investigation is the effect of the composition of the referential array, the starting point for considering what kind of description would be appropriate is the speaker and listener's knowledge. Failure to appreciate this crucial point was a serious weakness in the investigations of Karmiloff-Smith and Garton (see Chapter Two).

In the experiments in Chapter Four listeners either knew nothing at all about the entities and events in the pictures or films or they knew exactly as much as the speaker did about them. In Experiments 6, 7 and 8 in this chapter the listeners knew as much about the content of the speaker's model as the speaker knew about the listener's model before each trial began. However, once a trial had started the listener could not see which objects the speakers were manipulating. The speaker's task in Experiments 6 to 8, then, is to choose descriptions which would enable the listener to distinguish between tokens which were already in the listener's model, that is, the speaker's description should take into account the status of an object in the total array so that the listener can locate the relevant token in his mental model.

Experiment 9 differs from the first three experiments in this chapter in that the listener knows nothing at all about the composition of the referential array. The speaker's task, therefore, is to choose descriptions which would enable the listener to construct a model containing tokens for either identical, similar, or different referents and to distinguish between them on the basis of the speaker's subsequent descriptions.

The effect of the composition of the referential array was, of course, the main question addressed by Karmiloff-Smith and it is with a replication of one of her experiments that this part of the current investigation begins.

5.2 Experiment Six - The Paper Bags

The aim of this experiment was to see what effect the systematic manipulation of the composition of the referential array has on children's use of definite and indefinite descriptions. The method of investigation adopted was that used by Karmiloff-Smith (1979) in her Hide and Seek Experiment (see 2.2.A). Karmiloff-Smith found that although responses from all age groups showed some effect of the composition of the referential array (different objects, similar objects, identical objects) children's descriptions were also influenced by the form of the question (what did I do/hide?) and by who did the hiding (the experimenter or the subject). Unfortunately Karmiloff-Smith presents her results in such a way that it is impossible for the reader to determine the exact effects of all these factors and this makes interpretation of the results rather difficult. Given the sensitive performances of the children in the first five experiments of this thesis the levels of performance of the children in the Karmiloff-Smith study is surprisingly low. It seems necessary to see whether English speaking children perform at a similar level in this particular task which requires a different kind of response from Experiments 1 - 5 (just determiner + N or a single sentence) and which has the experimenter rather than a same-age child or a parent as the listener (Warden, 1976, found that having the experimenter as the listener produced a bias towards the definite article). Garton (1982) attempted a replication of the Hide and Seek Experiment with three-year olds and found they performed rather like the youngest subjects in Karmiloff-Smith's study, but no-one has looked at how four to seven-year old English children perform. It is possible, of course, that French speaking children are slow to fully master the uses of the definite and indefinite articles (e.g. Karmiloff-Smith suggests that the exophoric function of the definite article is not acquired until between the ages of five and seven) because the articles in French have many more functions than their equivalents in English. Karmiloff-Smith suggests, for example, that her five-year olds' low use of the indefinite article in the identical objects context in Hide and Seek may be due to their tendency to use the indefinite article in its numeral function. Since English has a

separate word, one, for the numeral function a replication with English speaking children may lend some support to her suggestion if it were found that five-year olds used one rather than a. This seems unlikely since we don't say, for example, 'You hid one boat' in English but it is possible that children would say one of the.

A second reason for the decision to replicate Karmiloff-Smith's experiment is that it is possible that the contexts that were created did not always make it necessary for the speaker to take into account the composition of the original array. Unfortunately it is impossible from the description of the experiment in her book to determine exactly what the procedure had been (see discussion in 2.2.A). In particular it is not clear what the contents of the listener's model were when the child was asked what had been hidden. Since the response one expects depends on the status of the referent in both speaker and listener models and not simply on the status of the referent in the physical array, one must be able to state what the speaker and listener models contain and what perceptual information is available to each participant if one is to say what kind of description should be used. One cannot tell from the procedural details whether Karmiloff-Smith's experimenter made it clear that she also knew the contents of the bag before an object was hidden, or if the remaining objects could be seen by one or both of the participants when the child answered the question; Karmiloff-Smith found, for example, that when the experimenter did the hiding there was a bias towards the definite article. But did the children really believe she had forgotten what she had hidden? If not, and especially if the remaining objects were visible, the definite article would have been appropriate no matter what kind of object had been hidden because the children judged (correctly) that the experimenter already knew, or could work out as easily as they could from what was left on the table, which object was being referred to. Obviously it is crucial to know who knew what and when if one is to judge whether descriptions are appropriate. It is impossible to work this out from the account given in Karmiloff-Smith's book. In this replication the contents of the speaker and listener's models will be spelled out at each stage in the proceedings.

In the current experiment the contents of each bag were tipped onto the table and the child named each item so it was clear that the listener's model of the array contained exactly the same items as the speaker's : both have exactly the same perceptual and linguistic information. The objects were then replaced in the bag. The next thing that happened was that one of the participants hid an object but it is possible that the exact procedure that was followed may have been different from that followed by Karmiloff-Smith. In her experiment it was not clear who, if anyone, closed their eyes when the child hid an object. In a pilot study for the current study this experimenter found that children not only insisted that the experimenter closed her eyes when they did the hiding but they insisted that the experimenter did the telling. The 'rules of the game' for them meant that the one who had his eyes closed did the telling. It was therefore decided to make both experimenter and child close their eyes when the child did the hiding and when the experimenter did the hiding. As it turned out, this was a complete charade since the children always cheated and opened their eyes when they were looking for an object in the bag and the experimenter always peeped too, though subtly enough so the children did not notice - which was how she knew the children were cheating. However, the main purpose was accomplished since the children were happy to do all the question answering when the game was played this way. This procedure of the experimenter closing her eyes when she hid an object also helped with the pretext that the experimenter did not know what she had hidden, thus, from the child's point of view the listener (the experimenter) was always ignorant.

The object that was selected for hiding was placed in a tall cardboard box out of view of both speaker and listener. The rest of the objects remained in the paper bag which was tilted towards the child so that only he could see what objects remained there. The child was then told to look in the bag and then the experimenter asked the hide/do question.

In sum, then, in the Paper Bags Experiment, at the start of each trial, speakers and listeners have exactly the same perceptual and linguistic information, but when an object is hidden by one participant the rest of the objects are concealed and available for

inspection only by the speaker. As far as the speaker is concerned the listener does not know which object has been hidden and cannot see which objects remain. The speaker's task, therefore, is to produce a description of the hidden object which relates it to the members of the original array so that the speaker can locate the relevant token in his model.

If children are as sensitive to the needs and knowledge of the listener as Experiments 1 - 5 showed they should vary their description according to the kind of object hidden. When an object is the only one of its kind in a perceptual array or mental model of that array the speaker should use the definite article. When an object is one of two identical objects the indefinite article or a partitive should be used, i.e. a + N or one of the + N. When an object is one of two similar objects which differ only with respect to colour then the definite article and an adjective should be used, for example, the green elephant. This is the only response type which will discriminate between descriptions which refer to the speaker's model of the original array and the listener's current model. Responses with a colour modifier take into account the fact that with similar items the listener has two tokens in her model which are distinguished by the colour information available in the original array. The inclusion of this information is vital if the listener is to know exactly to which token the information 'hidden' is to be attached. If a subject does not notice the colour or does not wish to use it he could respond a + N or one of the + N. Speakers should not use the definite article alone for identical or similar objects : the + N would violate the principle of unique identifiability (Stenning, 1978).

By looking at the pattern of determination across the three object types it is possible to see whether determiners are being used selectively to refer to the status of the object in the original array.

If the is used of an object because it is the only one of its kind in the original array that was seen by both speaker and listener (i.e. exophoric reference) and this is unique in the mental models of speaker and listener then the should be used for different objects trials only. If, however, the child is defining uniqueness in some

other way such as 'the only object in the box' or 'the one both speaker and listener are thinking about', that is, the is functioning deictically, which is what seems to have happened in some of the youngest subject groups in Karmiloff-Smith's experiment (e.g. percentage use of the + N to singleton, similar and identical objects was 56, 45, 50 for three-year olds; 70, 35, 39 for 5 year olds), then the incidence of the + N should be spread evenly over all three types of object.

If a is used of an object because of its 'exclusiveness' it should only be used for identicals and similars. If, however, it is simply being used to name an object, as may sometimes have happened in Karmiloff-Smith's experiment (e.g. percentage use of a + N to singleton, similar and identical objects was 32, 22, 24 for 3 year olds; 24, 53, 59 for 4 year olds; 36, 25, 52 for 7 year olds), then there should be an even distribution across all three object types.

If a colour modifier is used to enable the listener to distinguish between two tokens in his model of the referential array then modifiers should be used only for similar trials. In different object trials modifiers would be superfluous as the name of the object is all that is needed, and in identical object trials they would not help the listeners to distinguish between identical tokens. Karmiloff-Smith found that not until children were five years of age did they use modifiers on more than 50% of similar item trials and that no age group reserved such responses exclusively for similar objects (e.g. percentage use of modifier + noun to singleton, identical and similar objects was 10, 0, 29 for 3 year olds; 14, 22, 56 for 5 year olds; 15, 35, 65 for 7 year olds). Unfortunately it is impossible to discover what percentage of modifiers were colours in the Karmiloff-Smith experiment since she at no time explains what she means by 'relevant modifier'. Since she predicts only the use of colour terms, and does not mention 'other possible procedures' with similars, which she does with identicals, one is left with the impression that all she obtained were colour terms. But her subjects did use other modifiers such as another X, the other X for identicals and she includes these in the modifier category as relevant (p. 77) so one cannot assume no such responses were obtained in the similar trials although the table of results includes nothing other than 'relevant modifier (p. 76)'.

Although our main concern is with the effect of the composition of the referential array one must also consider the two other manipulations that Karmiloff-Smith included in her experiment, viz. the form of the question and the person who hid the object. Karmiloff-Smith varied the form of the question only on the different object trials and she found 'What did I hide?' resulted in a tendency simply to name the object, i.e. an indefinite article plus a noun whereas in response to 'What did I do?' those subjects who responded with verb plus article plus noun tended to use definite descriptions (Karmiloff-Smith, 1979, pp. 79-80). It remains to be shown that subjects will switch from referring to naming on the basis of the form of the question when, as in the current experiment, the context makes it clear that the listener already knows what kind of objects were in the bag but does not know which particular one is now in the box, and the speaker is explicitly told to look at the remaining objects in the bag before giving his response.

As for the effect of who did the hiding although this was a variable in all three kinds of object trials, Karmiloff-Smith only gives the figures for the singleton trials (p. 79) although she implies that the pattern holds for all trials (p. 86). The reason she gives for looking only at singleton trials is that 'only in this context are both definite and indefinite articles (without modifiers) correct (p. 78)'. Why she should think that the indefinite article would be correct here is never explained. The discourse theory would not judge a + N as appropriate when both participants already knew that these were different objects and clearly in Karmiloff-Smith's experiment both participants must have known since the experimenter showed the child the contents of each bag and the child named most of the objects (naming was supposed to take place only on the second eight trials but 'many subjects spontaneously named the objects as they were taken from the bag during the first eight items'). Given that the discourse model presented in this thesis would predict the + N responses for all singleton trials the pattern of responses that was found is surprising. Karmiloff-Smith found that when the experimenter did the hiding at all ages responses were predominantly definite, ranging from 67% to 97%, whereas when the child did the hiding definite descriptions dropped to anything between 28% (for the

8 year olds) to 81% (for the 9 year olds), with younger subjects (comparable to the age groups used in this experiment) ranging from 47% to 57%. Once again, because the exact procedure is not clear it is difficult to know whether this pattern of responses is typical of all subjects or whether it is simply due to the rather strange procedure, for example, the experimenter pretending to forget what she had hidden, the remaining objects being visible, or, as Karmiloff-Smith suggested as a possibility, to the child holding the hidden object in his hand. It does seem as if some of the younger subjects, at least, were judging that when the experimenter hid an object she knew what was hidden, therefore the could be used irrespective of object type and when the child hid an object the experimenter did not know what was hidden therefore a could be used. From the results of the first five experiments it is predicted that there will be no differences in the kind of expressions used because of who did the hiding since in the current experiment the remaining objects were hidden and available only to the speaker, the experimenter genuinely did not know what the child had hidden and apparently did not know what she herself had hidden since she closed her eyes, and the child did not hold the object in his hand, it was put in a box.

One final point : from the results of the only experiment in Chapter Four which attempted to systematically alter the number and kind of referents (Experiment 5) it became clear that there were factors over and above the composition of the array which affected the kind of description used. These factors were eliminated from the present experiment because there was no opportunity to use a locative phrase and none of the objects was of a class which is normally unique, thus one would not expect general knowledge factors such as those which seem to have influenced the choice of determiner in, for example, Karmiloff-Smith's (1979) work, to affect the choice of article in this experiment. In any case the context was not one for which any subject would have a prototype.

Method

Subjects

Fifty subjects took part in the experiment, ten in each of the following age groups : three-year olds (3;8 - 3;11, mean

age 3;10), four-year olds (4;2 - 4;7, mean age 4;5), five-year olds (5;0 - 5;9, mean age 5;5), six-year olds (6;5 - 6;9, mean age 6;7), seven-year olds (7;3 - 7;8, mean age 7;5). Several of these subjects had previously taken part in either Experiments 1, 3 or 4.

Materials Eight paper bags containing groups of four objects (3 for the 3 and 4 year olds to avoid memory problems) were used. Four bags contained four (3) totally different objects (e.g. a toy watch, an iron, a duck, a button), another two bags contained 2 (1) totally different objects plus two identical objects (e.g. 2 red motorbikes, a toy pan, an elastic band) and two bags contained 2 (1) different objects plus two similar objects of different colours (e.g. a red boat, a blue boat, a pot and a brick). Details of the contents of the bags are given in Appendix F Table F.9. Several reserve bags were prepared for the similar and identical trials. Hereafter totally different items will be termed Singletons.

Design and Procedure

Each child was taken in turn to the room where the experiment took place. Experimenter and child sat at opposite sides of a small table on which was a tall cardboard box. The experimenter told each subject 'I have some paper bags here with some toys in'. The experimenter then put one bag on the table and said 'I'm going to show you what is in the bag and then we are going to close our eyes and we are going to hide one of the things in the box and you have to tell me which one it is'. Before every trial the experimenter tipped the contents of the bag onto the table and said 'What have we got in this bag?' The child named each object and the objects were then put back into the bag and the bag was shaken.

The three variables that were introduced were exactly the same as in Karmiloff-Smith's experiment, viz.

1. Whether the child or the experimenter did the hiding.
2. Whether the experimenter asked 'What did I/you do?' or 'What did I/you hide?'
3. The grouping of the objects explained above.

After the bag had been shaken the experimenter said 'Close your eyes and I'll close mine. Now put your hand in the bag, take something out and put it in the box'. After the rustles had ceased

the experimenter said 'Have you done it? Right. Eyes open! Now, look in the bag and tell me what did you do/hide?' The bag was tipped towards the child so the experimenter could not see into it. The box in which the object had been hidden was so tall that neither subject nor experimenter could see what the hidden object was.

If in the identical and similar trials the child did not hide one of the identical or similar objects the trial was repeated using one of the reserve bags.

The test items which were exactly the same as in Karmiloff-Smith's experiment, were as follows:

	<u>Question</u>	<u>Expected Response</u>
1.	E hides 1 of 4 different objects. Do?	You hid <u>the</u> X
2.	E hides 1 of 4 different objects. Hide?	<u>the</u> X
3.	S hides 1 of 4 different objects. Do?	I hid <u>the</u> X
4.	S hides 1 of 4 different objects. Hide?	<u>the</u> X
5.	E hides 1 of 2 identical objects. Do?	You hid <u>a/one of</u> <u>the</u> X
6.	S hides 1 of 2 identical objects. Do?	I hid <u>a/one of</u> <u>the</u> X
7.	E hides 1 of 2 similar objects. Do?	You hid <u>a/one of</u> <u>the/the (blue) X</u>
8.	S hides 1 of 2 similar objects. Do?	I hid <u>the (blue)</u> <u>X/a/one of the X</u>

Order of presentation for all subject was 2, 1, 8, 7, 5, 6, 3, 4 which again was the same order as in the Karmiloff-Smith study.

Results

Subject responses were categorised according to the determiners

used, namely, definite, e.g. the watch; indefinite, e.g. a motor bike; definite and colour modifier, e.g. the blue boat; asserted partitive, e.g. the other car, one of the bikes; undetermined, e.g. boat (see Appendix F Tables F.1 - F.5 for details).

There was no effect of either who did the hiding or the form of the question. Responses to trials 5 and 6 (identicals) are therefore combined as are trials 7 and 8 (similar). Although there was no effect on the form of the question further discussion of singleton trials (1 - 4) will include only those when Do? was asked (i.e. trials 1 and 3) so that trials are compatible across object types (see Appendix F Tables F.6 - F.8 for details of singleton, identical and similar trials respectively).

Within Age Groups

By looking at the pattern of determination across the three object types it is possible to see whether descriptions are being used selectively to refer to the status of the object in the original array.

If the is used of an object because it is the only one of its kind in the original array which was seen by both speaker and listener then the should be used for singleton trials only. If, however, uniqueness is being defined in some other way, for example, the only object in the box, then the incidence of the + N should be spread evenly over all three types of objects. Table 5.1 shows the total number of the + N responses (out of a possible 20 responses) for each age group and each kind of object.

Age Group	Singleton	Identical	Similar
3 yr olds	20	5	5
4 yr olds	19	1	12
5 yr olds	19	7	8
6 yr olds	14	6	4
7 yr olds	20	3	2
\bar{x}	18.4	4.4	6.2

Table 5.1. Total number of the + N responses (out of a possible 20) for each object type.

Clearly the + N was a discriminating response for subjects in all age groups as they all used more definite article plus noun responses for the singleton trials. The difference was statistically significant for all groups except the six-year olds (3 year olds $Q = 15.68$, $p < .001$; 4 year olds $Q = 17.17$, $p < .001$; 5 year olds $Q = 7.81$, $p < .025$; 6 year olds $Q = 5.36$, $p < .1$; 7 year olds $Q = 19.35$, $p < .001$; 2 tailed Friedman tests corrected for ties). The other six responses for singletons in the six-year old age group omitted the articles altogether. Articles were not omitted for the similar trials and only one subject once omitted an article in the identicals trials. Article omission is selective for the six-year olds - reserved for singletons. One other aspect of Figure 5.1 is worth noting : the four-year olds reserved their other the + N responses (with one exception) for objects which were distinguishable in the original array, that is, not only singletons but similar objects of different colour. This does not take into account that this description was of no help to the listener.

Turning now to the indefinite article one can look across trials and determine whether it is being used selectively, i.e. used only for identicals and similars because of its 'exclusiveness' or whether it is being used non-selectively simply to name an object in which case there would be an even distribution across all three object types.

Age Group	Singleton	Identical	Similar
3 yr olds	0	7	7
4 yr olds	1	9	5
5 yr olds	0	4	4
6 yr olds	0	6	3
7 yr olds	0	9	6
\bar{x}	0.2	7.0	5.0

Table 5.2. Total number of a + N responses (out of a possible 20) for each object type.

As Table 5.2 shows subjects were not simply using a to name an

object : with one exception indefinite article plus noun responses were reserved for the identical and similar trials. The results are so clear cut that statistical confirmation is unnecessary.

If we now look at the asserted partitives, one of the/the other etc. where subjects explicitly referred to the fact that the object that was hidden was one of two objects in the original array it is clear from Table 5.3 that most subjects (who did not simply use a) did this only in the identical and similar trials. Again statistical confirmation is unnecessary.

Age Group	Singleton	Identical	Similar
3 yr olds	-	8	7
4 yr olds	-	10	3
5 yr olds	-	8	3
6 yr olds	-	6	6
7 yr olds	-	6	2
\bar{x}	0	7.6	4.2

Table 5.3. Total number of one/one of the/another/the other X responses (out of a possible 20) for each object type.

Although a + N and asserted partitives are totally appropriate for identical objects they are not fully informative for the similars. Table 5.4 combines the responses in Tables 5.2 and 5.3 and indicates that subjects did, in fact, use more of these responses in identical than in similar trials, but this was statistically significant only for four-year olds and seven-year olds (4 year olds $N = 8$, $T = 0$, $p < .01$; 7 year olds $N = 5$, $T = 0$, $p < .05$; Wilcoxon 2 tailed tests). The most informative response for similars would be to use a colour modifier : the + colour + N. Responses with a colour modifier take into account the fact that with similar items the listener has two tokens in her model which are distinguished by the colour information available in the original array. The inclusion of this information is vital if the listener is to know exactly to which token the

Age Group	Singleton	Identical	Similar
3 yr olds	-	15	14
4 yr olds	1	19	8
5 yr olds	-	12	17
6 yr olds	-	12	9
7 yr olds	-	15	8
\bar{x}	0.2	14.6	9.2

Table 5.4. Total number of a + N and asserted partitive responses (out of 20) for the three object types.

information 'hidden' is to be attached. The total number of colour modifiers used is shown in Table 5.5.

Age Group	Singleton	Identical	Similar
3 yr olds	0	0	0
4 yr olds	0	0	0
5 yr olds	0	0	3
6 yr olds	0	1	7
7 yr olds	0	2	10
\bar{x}	0	0.6	4.0

Table 5.5. Total number of the + colour + noun responses (out of 20) for each object type.

The most striking thing is the complete absence of colour modifiers in the two younger age groups and the very low number for the five-year olds. It is highly unlikely that this lack of colour modifiers is due to subjects forgetting what colour the hidden object was since for subjects who never used colour an extra trial was given at the end of the experiment after which the experimenter asked of the hidden object 'What colour is it?' All subjects replied with the

appropriate colour name. For those subjects who used modifiers this does seem to be a discriminating response (5 year olds $Q = 6$, $p < .1$; 6 year olds $Q = 11.47$, $p < .005$; 7 year olds $Q = 11.4$, $p < .005$; 2 tailed Friedman tests corrected for ties). As Table 5.5. shows colour modifiers were never used for singletons and were used either only for similars (5 year olds $N = 3$, $T = 0$) or used significantly more for similars than for identicals (6 year olds $N = 6$, $T = 0$, $p < .05$; 7 year olds $N = 5$, $T = 0$, $p < .1$; 2 tailed Wilcoxon tests).

Between Age Groups

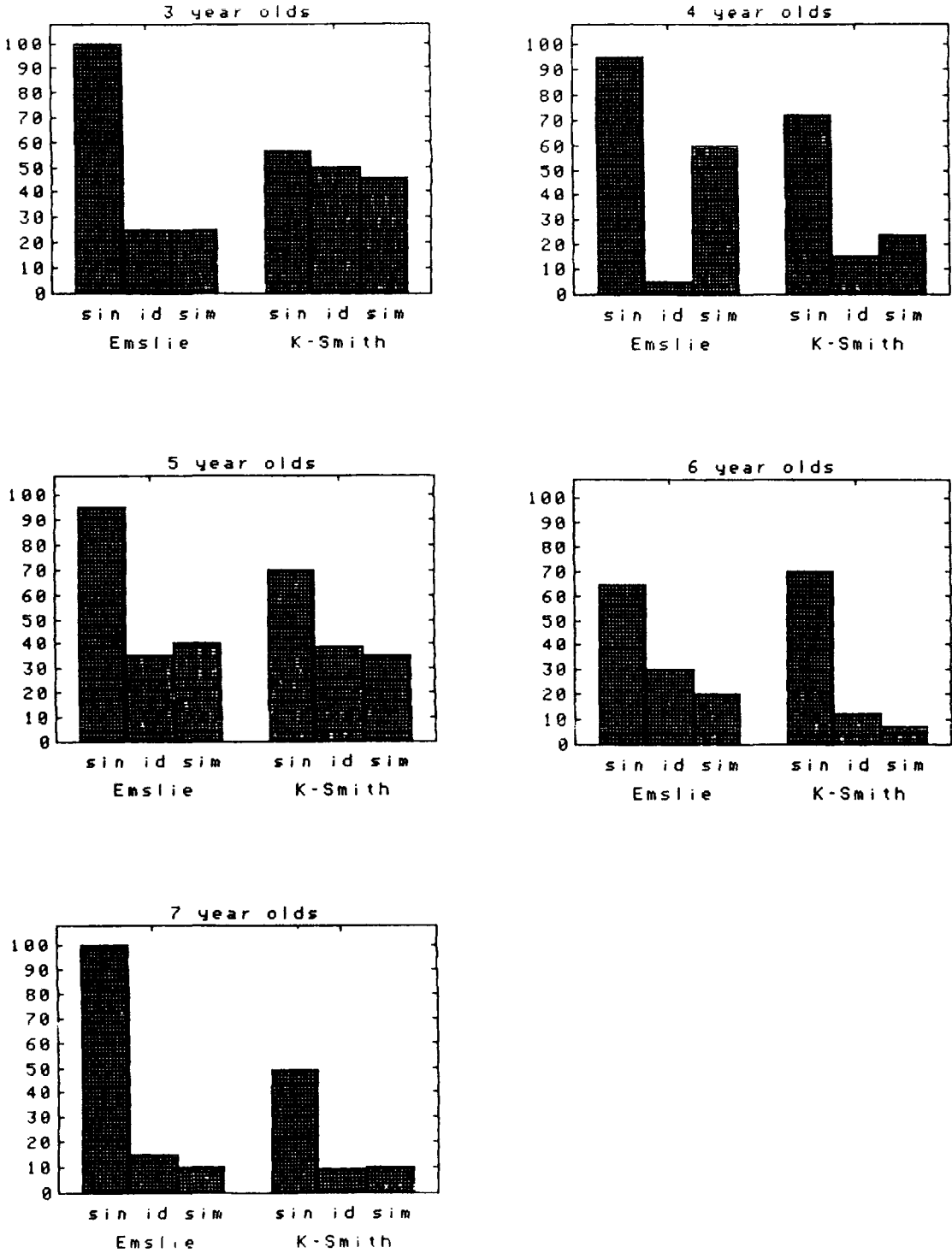
The only significant difference was in the use of the + colour + N responses ($H = 19.834$, $p < .001$, Kruskal-Wallis) and 2 tailed Mann Whitney U tests confirmed that the significant differences were between the two younger and two older age groups : three-year olds versus six-year olds and four-year olds versus six-year olds $U = 20$, $p < .05$; three-year olds versus seven-year olds and four-year olds versus seven-year olds $U = 15$, $p < .02$. The difference between the five and seven-year olds was not significant ($U = 25.5$, $p < .1$).

Discussion

The experiment has shown that children do take into account the composition of the referential array when they choose a description : responses vary according to the status of an object in the total array. Thus, when an object is the only one of its kind in an array (i.e. a singleton) children will use the + N to refer to it and when an object is one of two identical or similar objects children will use a + N or a partitive such as one of the + N to refer to it. Less frequently, and only from about the age of five, children will discriminate between similar objects by including a colour modifier in their referring expressions. To what extent do these results match the results of Karmiloff-Smith's experiment with French speaking children?

Figure 5.1 shows the percentage use of the + N responses to singleton, identical and similar objects in the current study and in Karmiloff-Smith's (1979) Experiment 2. Although the percentage use of the + N is fairly comparable in the similar and identical trials in the two studies (averaging 26.5% in the current study and 24.6% in

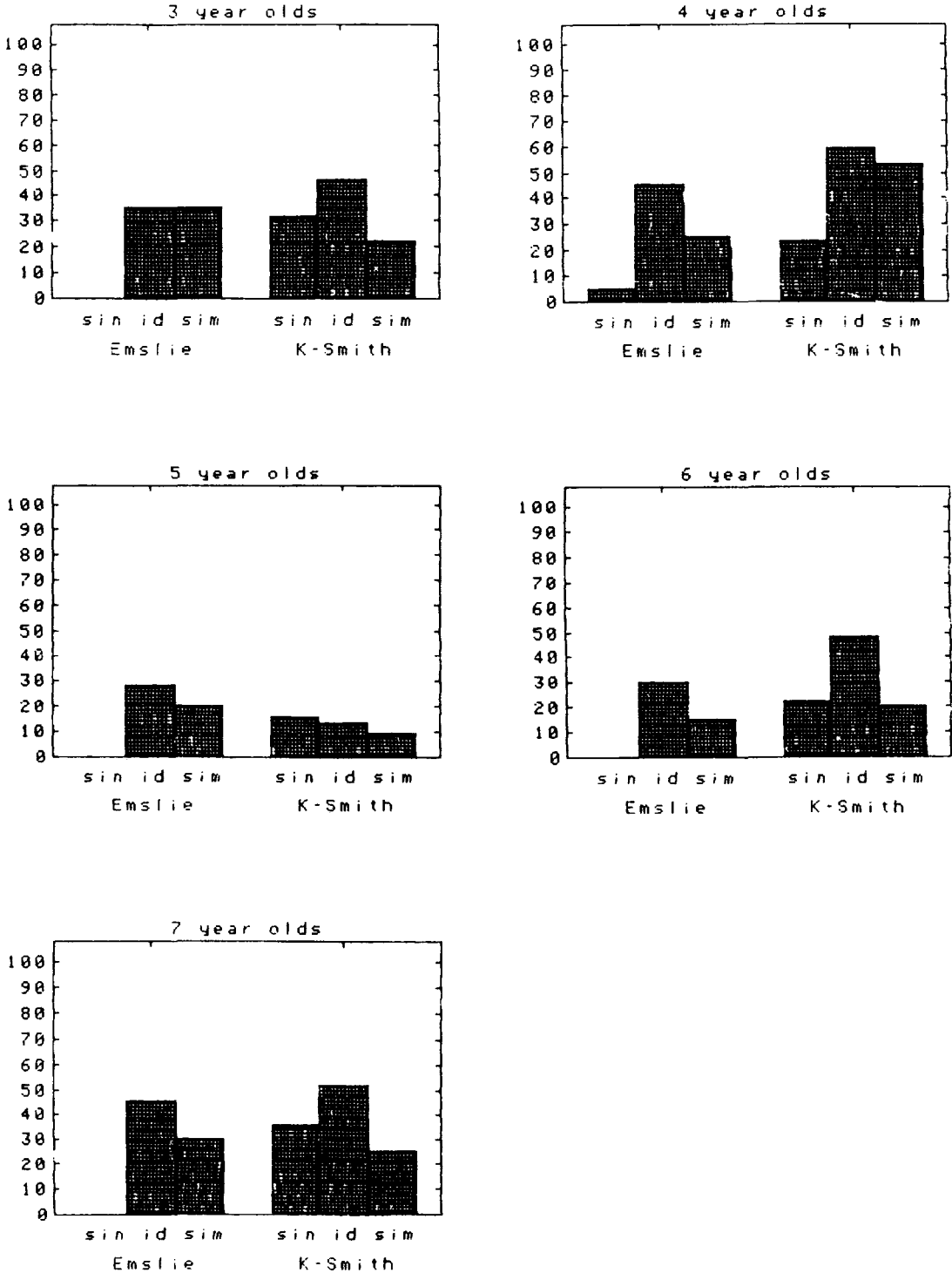
Figure 5.1. Percentage use of the + N responses to the singleton (sin), identical (id) and similar (sim) objects in the current study (Emslie) and Karmiloff-Smith (K-Smith) Experiment 2 (1979).



Karmiloff-Smith's study) the responses to singleton trials are much higher here (91% as against 63%). As will be shown later, this increased usage is mainly due to the elimination of the tendency simply to name objects : in the Paper Bags Experiment even the three-year olds used the + N significantly more for singletons than for similars or identicals. Karmiloff-Smith argues that before the age of about five the definite article functions deictically, marking the object under joint focus of attention and that the exophoric function (indicating a single entity in the exophoric context) is not acquired until somewhere between the ages of five and seven, but there is no support for this suggestion in the current experiment. If the definite article was functioning deictically, the use of the + N would have been fairly evenly distributed across the three different kinds of objects rather as it was with Karmiloff-Smith's three-year olds in her Experiment 2, but this was clearly not the case in the current study. The experiments in Chapter Four and this first experiment in Chapter Five suggest that in English speaking children at least both the deictic and exophoric functions are acquired by the age of three. Even in children as young as this there does seem to be the understanding that if an entity is unique in both speaker and listener's models then they can use the definite article. As was noted in the results, there was a slight tendency for four-year olds to use the +N for a similar object of a different colour which suggested that some subjects may have been taking into account the unique status of this coloured object in their model of the total array, that is, it was, for them, a discriminating response since they did not use it for identicals, but, for the listener this description violated the unique identifiability principle. A similar tendency in four-year olds only was also found in Karmiloff-Smith's study though the differences between identicals and similars (24% vs. 15%) was not so great as in this study (60% vs. 5%).

Turning now to the use of the indefinite article it was clear that subjects in this experiment were using a because of its 'exclusiveness' and were not simply naming objects for, with a single exception, a + N was never used for singletons. Figure 5.2 shows the percentage use of a + N responses to singletons, identicals and similars in the current study and in Karmiloff-Smith's Hide and Seek

Figure 5.2. Percentage use of a + N responses to the singleton (sin), identical (id) and similar (sim) objects in the current study (Emslie) and Karmiloff-Smith (K-Smith) Experiment 2 (1979).



Experiment. The much higher percentage of a + N responses in Karmiloff-Smith's singleton trials (36% even in the 7 year old group) suggests that a substantial proportion of a + N responses in the identical and similar trials may also have been naming rather than referring. The tendency to name in Karmiloff-Smith's Hide and Seek Experiment may, as was suggested in the introduction to this experiment, have been due to the fact that the remaining objects were visible and the identity of the missing object so obvious that some subjects interpreted the question as a request for a name. It is also possible that subjects may have been unclear as to what the experimenter did, or didn't know. The procedure is not clear to readers of her book and may not have been clear to the subjects in her experiment, hence the tendency to over-use a. In the current experiment the procedure was clear and simple and this may be why the results were different.

As far as the use of asserted partitives are concerned Karmiloff-Smith gives the percentage of one of the plus another plus the other only for identical trials where she sees them as "other possible procedures". Figure 5.3 therefore shows the percentage use of such partitives only in the identical object trials in the two experiments. Included in the current experiment percentages, though shown separately, is the percentage use of one which, as was explained earlier, does not exist as a separate morpheme in French. As can be seen in Figure 5.3 one responses were few and although even without them there are more asserted partitives (except in the 5 year old group) in the current study than in Hide and Seek the percentage of such responses is fairly low. Karmiloff-Smith says that only from nine onwards did children use the indefinite partitive one of the X's. In Paper Bags there were one or two instances of one of the in all age groups though the total number of subjects using the indefinite partitive was very low.

Karmiloff-Smith, it will be remembered, suggested that the low use of a + N responses in her five-year olds may have been due to their tendency to use the indefinite article in its numeral function. The Paper Bags Experiment lends little support to this suggestion since only 15% of five-year old's responses involved one (as did 10% of 3 year olds and 5% of 6 year old's responses) and five-year olds

Figure 5.3. Percentage use of one/one of the/another/the other responses in the Identical objects trials in the current study (Emslie) and Karmiloff-Smith (K-Smith) Experiment 2 (1979).

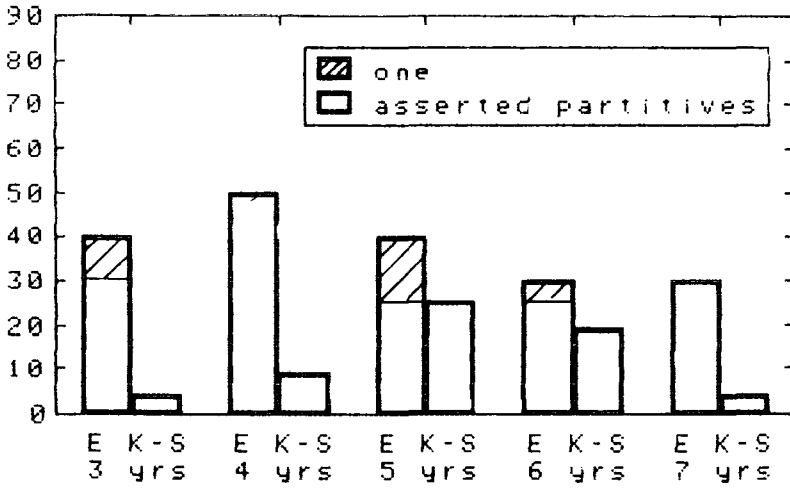
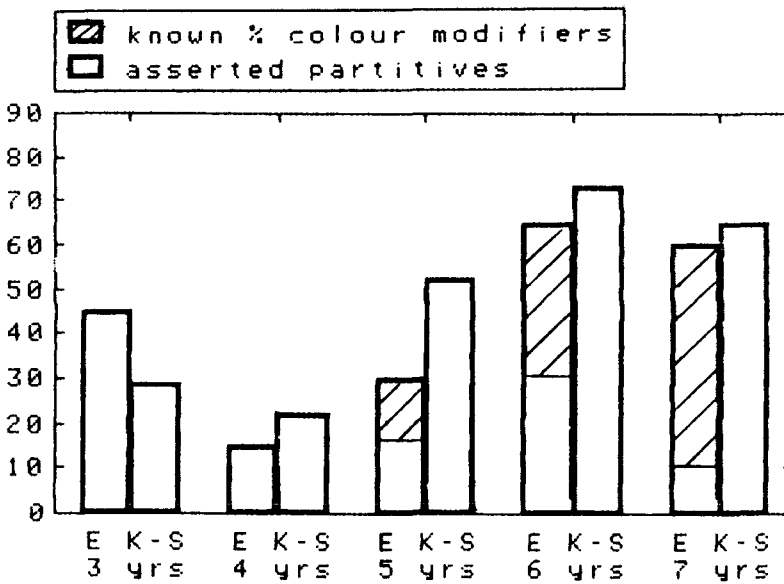


Figure 5.4. Percentage use of modifier + noun (the + colour + N, plus asserted partitives) in the Similar objects trials in the current study (Emslie) and Karmiloff-Smith (K-Smith) Experiment 2 (1979).



used no more indefinite partitives than any other group.

Turning now to the use of modifiers, it was found that it was not until the age of five and above that children began to include an appropriate colour modifier in their descriptions and even by the age of seven to eight only 50% of responses from subjects in the Paper Bags Experiment included the colour information which made it possible for listeners to distinguish between the tokens for the two similar but different coloured objects in their mental models. Figure 5.4 shows the percentage use of modifiers in the similar object trials in the two studies. Since Karmiloff-Smith does not explain how many of her modifiers were colours the totals for Paper Bags includes other modifiers such as the other. As can be seen in Figure 5.4, Karmiloff-Smith too, found a low percentage use of modifiers in the three and four-year olds but she found many more in her five-year olds. If, as Karmiloff-Smith implies, most of the modifiers in her experiment were colours, then all her subjects were much better than were the subjects in Paper Bags at including the information which made it possible for the listener to attach the information 'hidden' to the right token.

Finally to the differences in results with respect to the form of the question and who did the hiding. Karmiloff-Smith found that in response to Do? subjects tended to furnish a definite referring expression whereas for Hide? they tended to use a + N which she saw as simply naming the object. This difference was not found in the current experiment. Possibly because children were always asked to look in the bag before they answered the question they may have been more likely than in Karmiloff-Smith's experiment to see the task as one of referring and not naming. Karmiloff-Smith also found subjects tended to use a + N when they hid the object and the + N when she did the hiding, which, as was discussed earlier, suggests that they thought the experimenter did not know what was missing when they hid an object but did know what was missing when she hid an object. Again this was not found here perhaps because of the child being encouraged to consult the remaining items before replying and also perhaps because the slight changes in procedure in this experiment had convinced the children that the experimenter really did not know what she had hidden, therefore the experimenter was ignorant both when they hid an object and when she hid an object.

The slight changes in procedure which were made to Karmiloff-Smith's Hide and Seek seem to have removed any interaction between the effects of the composition of the referential array and the form of the question or the identity of the hider and have enabled the children to demonstrate their mastery of the definite and indefinite articles. Although subjects had no difficulty whatsoever in judging whether an indefinite description was needed, and made comparatively few errors in their use of the definite article, their use of colour terms in the similar object trials was disappointing, being non-existent in the three and four-year old groups and reaching only 50% by the age of seven. One can either argue, as Karmiloff-Smith does, that young children do not "consistently understand the determinor function of modifiers, but rather their descriptor function (p. 85)" or one can ask whether it was reasonable to expect young children to use colour terms in a task such as this; after all, nothing tangible depended on the exact identification of an object. If one could find a task where the inclusion of a colour term was crucial in determining the outcome of a trial then one would be in a much stronger position to argue that young children did or did not appreciate that the definite article + modifier + N performed this function. Such a task was devised for Experiment 7.

5.3 Experiment Seven - The Farmyards

The aim of the experiment was to investigate in more detail the ability of young children to take into account the status of an object in the referential array and in particular to look at their ability to furnish descriptions which would enable the listener to distinguish between similar objects of different colour. In the Paper Bags Experiment children were very good at using the indefinite article appropriately, made few mistakes in their use of the definite article but were very poor at using colour modifiers to enable the listener to distinguish between similar objects. However it was suggested that one could not conclude that young children do not use modifiers as determinors (as opposed to descriptors) unless one has a context in which it is essential to distinguish between similar objects. In the

context of the previous experiment it might be argued that it did not really matter whether a subject said a boat/one of the boats or the red boat : as long as he did not say the boat he would not be violating the principle of unique identifiability. The Farmyard Experiment was designed to create a context in which the child saw some purpose in providing colour modifiers.

Same-age pairs played a game where the listener had to arrange some objects in the same order as the speaker. Both subjects had identical farms with four fields in which were (1) a singleton (2) two different animals (3) three identical animals (4) three similar animals of different colour. Both subjects knew that they had identical arrangements at the beginning of the game. A screen was then placed between the two farms and on the basis of the speaker's instructions the listener had to line up four or eight animals so that when the screen was removed both subjects had the same animals in the same order. The only means of ensuring that this happened in the similar objects group was for the speaker to include a colour modifier, e.g. the white/brown and white/black and white cow. Without this information the listener would not know which of the three animals to choose. In an attempt to determine whether or not the listener found the speaker's instructions clear or ambiguous the time interval between the speaker's message and the listener's selection of an animal was recorded.

Method

Subjects Fifty subjects took part in the experiment, ten in each of the following age groups : three-year olds (3;8 - 3;11, mean age 3;10) four-year olds (4;1 - 4;7, mean age 4;4) five-year olds (4;11 - 5;9, mean age 5;5) six-year olds (5;10 - 6;9, mean age 6;3) seven-year olds (6;10 - 7;8, mean age 7;3).

Materials These were : (a) two model farms which had a brown path down one side with a barn at the top, a line of four white squares going down the path and four green fields separated by fences; (b) 18 model animals. Each farm had a black horse, three identical pink pigs, a brown and white cow, a black and white cow, a white cow, a sheepdog, and a lamb; (c) a black screen 10" high.

Design and Procedure

Subjects were brought into the experimental room in same-age pairs and seated at opposite sides of a small table on which were two farms. The layout of each farm is shown in Figure 5.5.

The experimenter pointed out that both subjects had their own farm on which was a barn, a road, four white squares and four fields with exactly the same animals in them. Each subject was then asked to say what he had in each field. This was to ensure that all subjects recognised the animals and could name them, and that they knew that their partner had exactly the same number and kind of animals in each field. Subjects were not asked for colour descriptions.

Subjects were then told that they were going to play a matching game. Each was going to have a turn at lining up four (or eight) animals, one (or two) on each white square, and telling the other person which animals to put on his squares so that at the end of the game they would see if they both had the same ones. The black screen was then placed on the table between the farms and the experimenter explained that they wouldn't be able to see what the other person was doing so the person who was speaking would have to say each one very carefully so that the listener would know which animal to pick up.

When both both had their four (eight) animals lined up the experimenter would take the screen away so they could see if they had the same animals in a line. Subjects were asked to help each other to "get it right".

Three variables were manipulated :

1. Whether the experimenter or the subject chose the animals which the subject described for the listener.
2. Whether the animals were singletons, similar or identical.
3. Whether four or eight animals were lined up.

Test items were as follows :

Block A

		<u>Expected Description</u>
1.	Subject 1. E chooses	
	(a) horse	the horse
	(b) pig	a/one of the pigs
	(c) brown cow	the brown cow
	(d) lamb	the lamb

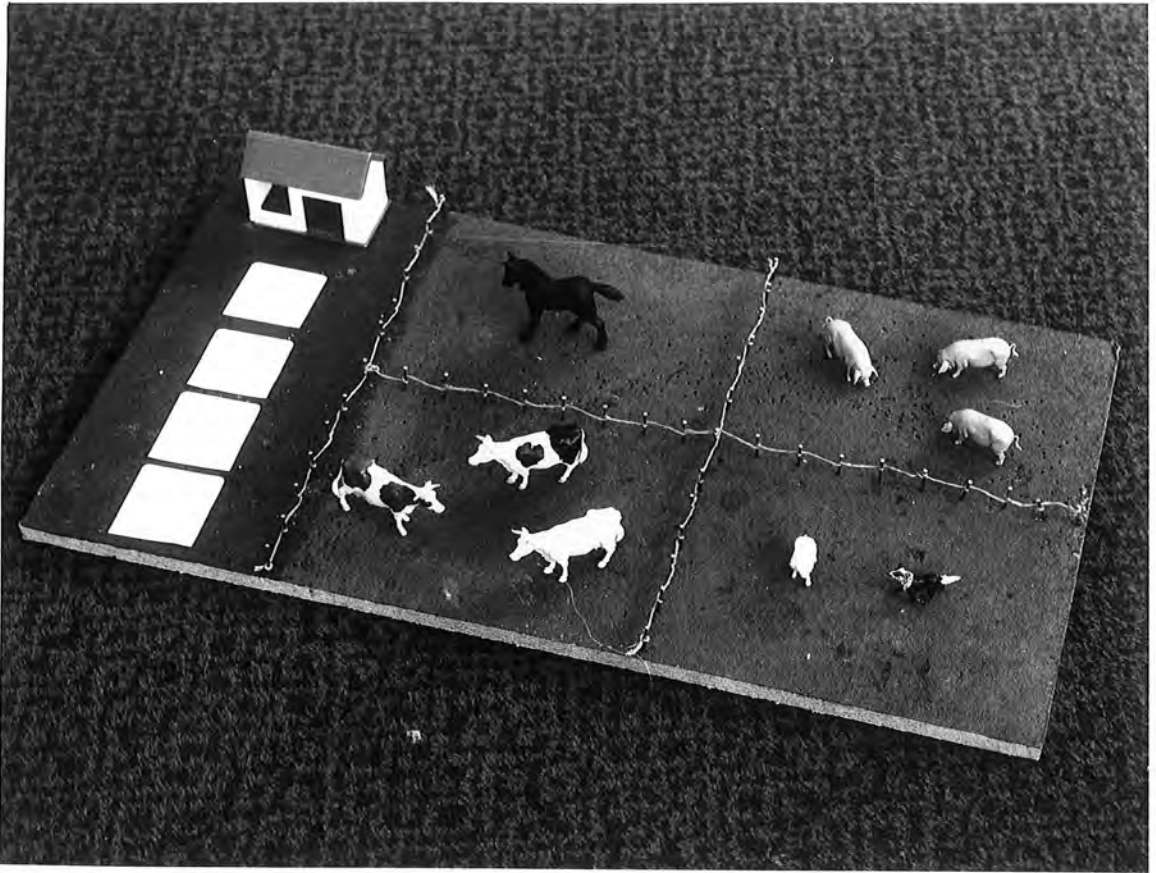


Figure 5.5. Layout of both Farmyards.

		<u>Expected Description</u>
2.	Subject 2. E chooses	
	(a) white cow	the white cow
	(b) dog	the dog
	(c) pig	a/one of the pigs
	(d) horse	the horse

Block B

3. Subject 1 chooses his own 4 animals
4. Subject 2 chooses his own 4 animals

Block C

Before each block of trials, that is before test items 1, 3 and 5, the experimenter told subjects that they could ask any questions they liked if they were not sure which animal to pick up. When the experimenter chose the animals (Block A) she gave no verbal instructions but simply pointed to an animal. The child then moved that animal and told the listener which one he was picking up.

There were two trials in each block, one for each subject, making six trials in all. After each of the six trials the screen was removed and the experimenter picked up the animal(s) from the speaker and listener's first square, held them together and asked the listener 'Are they the same?' If the listener said 'Yes' the experimenter asked the speaker the same question. If the listener said 'No' and did not give any explanation the experimenter asked 'Why not?' This was repeated for each pair of animals. After each trial subjects counted how many animals were correct.

After trials 3 and 4 the experimenter asked the listener 'Are there any you weren't sure about?' This gave the listener a chance to indicate whether or not he felt the message was adequate.

Subjects responses were recorded on a Hanimex cassette recorder to which was connected a hand held push button which enabled a 3.6 KHZ marker tone to be recorded on the cassette tape. E pressed the button as soon as the listener picked up an animal so that when the tapes were later transcribed the time that elapsed between the end of the speaker's message and the listener's selection of an animal could be recorded. The experimenter had a sheet on which to record whether or not the listener's choice was the same as the speaker's.

Results

Speakers' descriptions were scored according to the determiners used, namely, the X, a/one of the Xs, the (colour) X, or null, i.e. X. Details of these ^{descriptions} and ^{listeners responding} times are given in Appendix G Tables G.1 - G.5.

The three and four-year old subjects became very bored with the game by the end of Block B and so were asked only to place four animals in Block C.

Our main interest lies in the use of colour modifiers which are essential for the similar objects (cows) and superfluous for the

singletons or identicals. Figure 5.6 shows the percentage of responses which included colour modifiers for the three kinds of objects in the three blocks of trials.

Within Age Group Differences

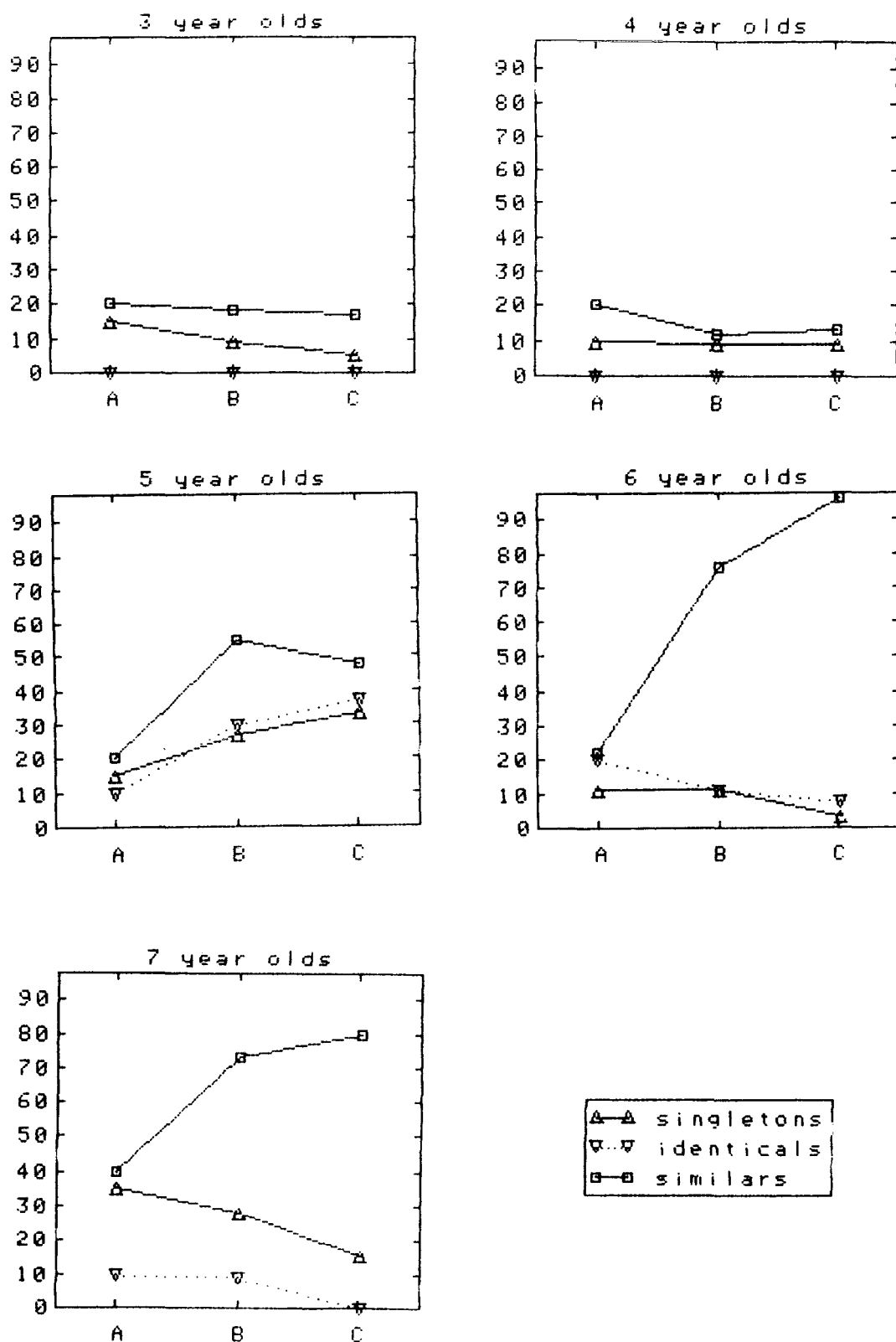
As can be seen in Figure 5.6 the percentage use of colour modifiers in the three and four-year old age groups is very low : indeed rather than increasing their use of such modifiers for similars across trial blocks the percentage actually decreases from A to C. Three and four-year olds did not use significantly more for similars than for singletons or identicals (3 year olds $Q = 2, p > .2$; 4 year olds $Q = .15, p > .2$, Friedman tests corrected for ties).

Although the six and seven-year olds used few colour modifiers in Block A, and did not use significantly more for similars than for identicals or singletons, in blocks B and C the six and seven-year olds were very discriminating in their use of colour modifiers (6 year olds $Q = 17.48, p < .001$; 7 year olds $Q = 17.5, p < .001$; Friedman tests corrected for ties) with only an odd response to identical objects including a modifier in Blocks B and C and there were very few such responses to singletons in these blocks either. The five-year olds like all other age groups used few modifiers in Block A but unlike the other age groups actually increased their use of colour modifiers across trials for all object types so that by Block C colour modifiers were used for 33% of singletons, 38% of identicals and 48% for similars. Such differences are, of course, not significant ($Q = 4.67, p < .2$; Friedman test).

Between Age Group Differences

There were no significant differences between age groups on the first block of trials with only four subjects in the seven-year old group and two in all the other age groups using colour modifiers. However there were significant differences on Blocks B and C ($H = 15.947, p < .003$; $H = 17.263, p < .002$ respectively; Kruskal-Wallis tests) where the number of subjects using colour modifiers increased in the older groups and decreased in the two youngest groups. A trend test confirmed a significant increase in the use of colour modifiers with increasing age between the ages of four, five and six ($Z = 2.529,$

Figure 5.6. Percentage of responses which included a colour modifier for singleton, identical and similar objects in trial blocks A, B and C.



$p < .006$; 1 tailed test) with the three-year olds performing at the same level as the four-year olds and the seven-year olds performing like the six-year olds.

To understand why the younger subjects failed to increase their use of modifiers across trials whilst older subjects did so quite markedly it is necessary to examine the responses to the question 'Are they the same?' and see whether listeners asked for clarification during a trial and/or hesitated before making their choice. Subjects were scored as hesitating if they took at least twice as long to select a similar object (cow) than any identical or singleton.

Three-Year Olds (See footnote 1 on P206)

Block A Ten similar objects. Only one subject pair used colour modifiers. The eight inadequate descriptions resulted in the selection of the wrong cow. Two inadequate descriptions led to hesitations but no subject asked for further information. When the screen was removed one subject said spontaneously 'Mine's white and hers is brown and white' but when asked if the cows were the same all subjects said 'Yes'.

Block B Six similar objects. Only one description included a colour modifier. The five inadequate messages resulted in the selection of the wrong cow. There was only one hesitation and no requests for further information. When asked if the cows were the same all subjects replies 'Yes'.

Block C Twelve similar objects. Only two descriptions included colour modifiers. Nine of the ten inadequate messages resulted in the wrong cow being chosen. There were no hesitations and no requests for further information. All subjects said that the cows were the same.

Four-Year Olds

Block A Ten similar objects. Only two descriptions included colour modifiers. Five of the eight inadequate descriptions resulted in the wrong cow being chosen. There were three hesitations and one subject asked 'Which cow?' When asked if the cows were the same all subjects replied 'Yes'.

Block B Nine similar objects. Only one description included a colour modifier. Seven of the eight inadequate descriptions resulted in the wrong cow being chosen. There were no hesitations and no requests for further information. All subjects said the cows were the same.

Block C Nine similar objects. Only one description included a colour modifier. All eight inadequate descriptions resulted in the wrong cow being chosen. There was one hesitation and one request for further information. All subjects said the cows were the same.

Five-Year Olds

Block A Ten similar objects. Only two descriptions included colour modifiers. Six of the eight inadequate descriptions resulted in the selection of the wrong cow. There were two hesitations and no requests for further information. When asked if the cows were the same all subjects replied correctly, that is, when the cows were the same they said 'Yes' and when the cows were different they said 'No'. In the latter case listeners spontaneously said 'It's the wrong colour' or, e.g. 'his is brown and mine's white'. However, none of the listeners who then had to choose a cow in Block B included colour information in their own description, though two of their listeners hesitated before choosing a cow.

Block B Nine similar objects. Five descriptions included colour modifiers. All inadequate messages resulted by chance in the correct cow being chosen. There was one hesitation and no requests for further information. All subjects correctly said that the cows were the same. The one subject who hesitated after an inadequate message made no reply when he was asked if there was any animal he wasn't sure about. When the screen was removed and the cows were the same colour the speaker said 'How did you know I was having white?' The listener just shrugged his shoulders and smiled.

Block C Twenty-nine similar objects. Fourteen descriptions included colour modifiers. Ten of the inadequate descriptions resulted in the wrong cow being chosen. There was one hesitation and

no requests for further information. All subjects replied correctly to the question 'Are they the same?' and gave colour differences as their reasons for saying 'No'.

Six-Year Olds

Block A Ten similar objects. Only one subject pair used colour modifiers. All eight inadequate messages resulted in the selection of the wrong cow. There were four hesitations and no requests for further information. All subjects replied correctly to the question 'Are they the same?', that is, on the two occasions when the cows were the same by chance subjects said 'Yes' and on the eight occasions they were different subjects said 'No', although one speaker disagreed with a listener's 'No' and only agreed after the listener had said 'But one's brown and one's black'. All listeners spontaneously gave colour differences as the reasons for saying no. Again none of the four listeners who had received inadequate messages on trial 1 used colours when it was their turn but two of their listeners hesitated before choosing a cow.

Block B Thirteen similar objects. Ten of the descriptions included colour modifiers. Two of the inadequate descriptions resulted in the wrong cow being selected. There were two hesitations and no requests for additional information. When asked if there were any animals he wasn't sure about the listener who hesitated in trial 3 pointed to the cow and said 'Yes, this one. It's black and white and he said "cow"'. However, when it was his turn in trial 4 he just said 'cow' and 'cow'. His listener hesitated and said afterwards 'I wasn't sure about that cow and that cow'.

Block C Twenty-six similars chosen. Twenty-four descriptions included colour modifiers. The two inadequate descriptions came from the same subject pair. There were hesitations after both of these descriptions. The listener in trial 5 asked 'Which cow?' and when it was his turn in trial 6 and he said 'Cow' his listener just glared at him until after an interval of six seconds the speaker added 'White'. All subjects responded correctly to the question 'Are they the same?'

Seven-Year Olds

Block A Ten similars chosen. Four descriptions included colour modifiers. Two of the six inadequate descriptions resulted in the wrong cow being chosen. There were two hesitations and no requests for further information. Nine of the subjects responded correctly to the question 'Are they the same?' One listener said 'Yes' when the cows were different but the speaker immediately said 'No. One's brown and one's white'. None of the listeners who had received inadequate messages in trial 1 used colour modifiers when it was their turn to speak in trial 2 but both of their listeners hesitated.

Block B Ten similar objects. Seven descriptions included colour modifiers. There were two hesitations after inadequate messages and one subject asked 'What colour?' without hesitating. Only one inadequate message led to the selection of the wrong cow. All subjects responded correctly to the question 'Are they the same?' Only one of the two subjects who received an inadequate message in trial 3 said there was a cow she wasn't sure about. When the screen was removed she said to the speaker 'You should have said "The white cow"'. However, when it was her turn in trial 4 she too said 'The cow' and her listener said 'You should have said "Pick up the brown cow"'.
.

Block C Twenty-six similar objects. Twenty descriptions included a colour modifier. There were hesitations after all six inadequate messages and three requests for further information. Only two inadequate descriptions resulted in the wrong cow being chosen and all subjects correctly replied to the question 'Are they the same?'

Turning briefly to the other kinds of responses as can be seen in Figures 5.7 and 5.8 the pattern of usage of definite and indefinite descriptions was much as expected : All age groups used more the +N responses for singletons than for similars or identicals though the differences were significant only in Blocks B and C (Block B : 3 year olds $Q = 7.1, p < .05$; 4 year olds $Q = 5.42, p < .05$; 5 year olds $Q = 3.7, p < .2$; 6 year olds $Q = 7.6, p < .025$; 7 year olds $Q = 5.47, p <$

Figure 5.7. Percentage use of the + N for singleton, identical and similar objects in the trial blocks A, B and C.

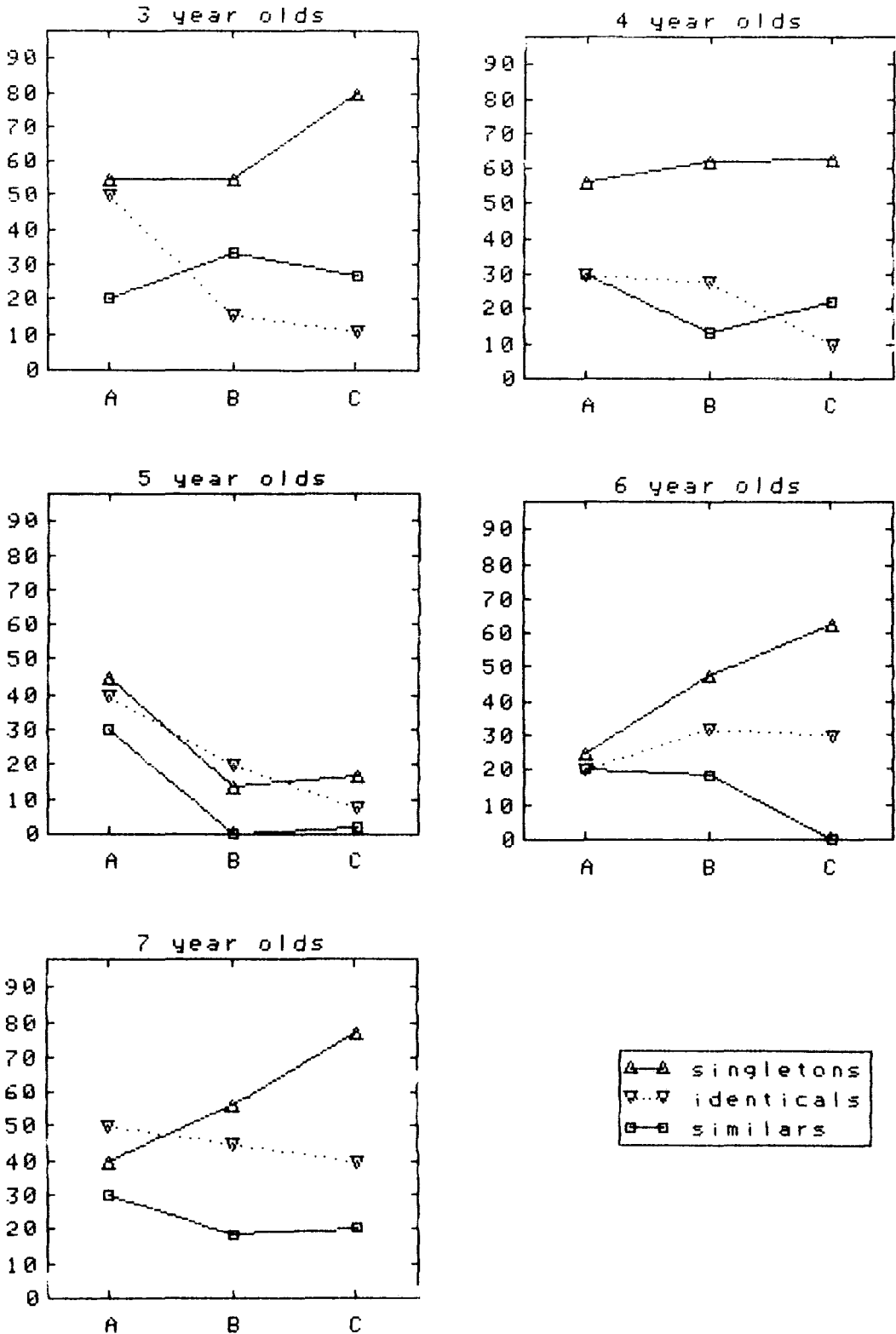
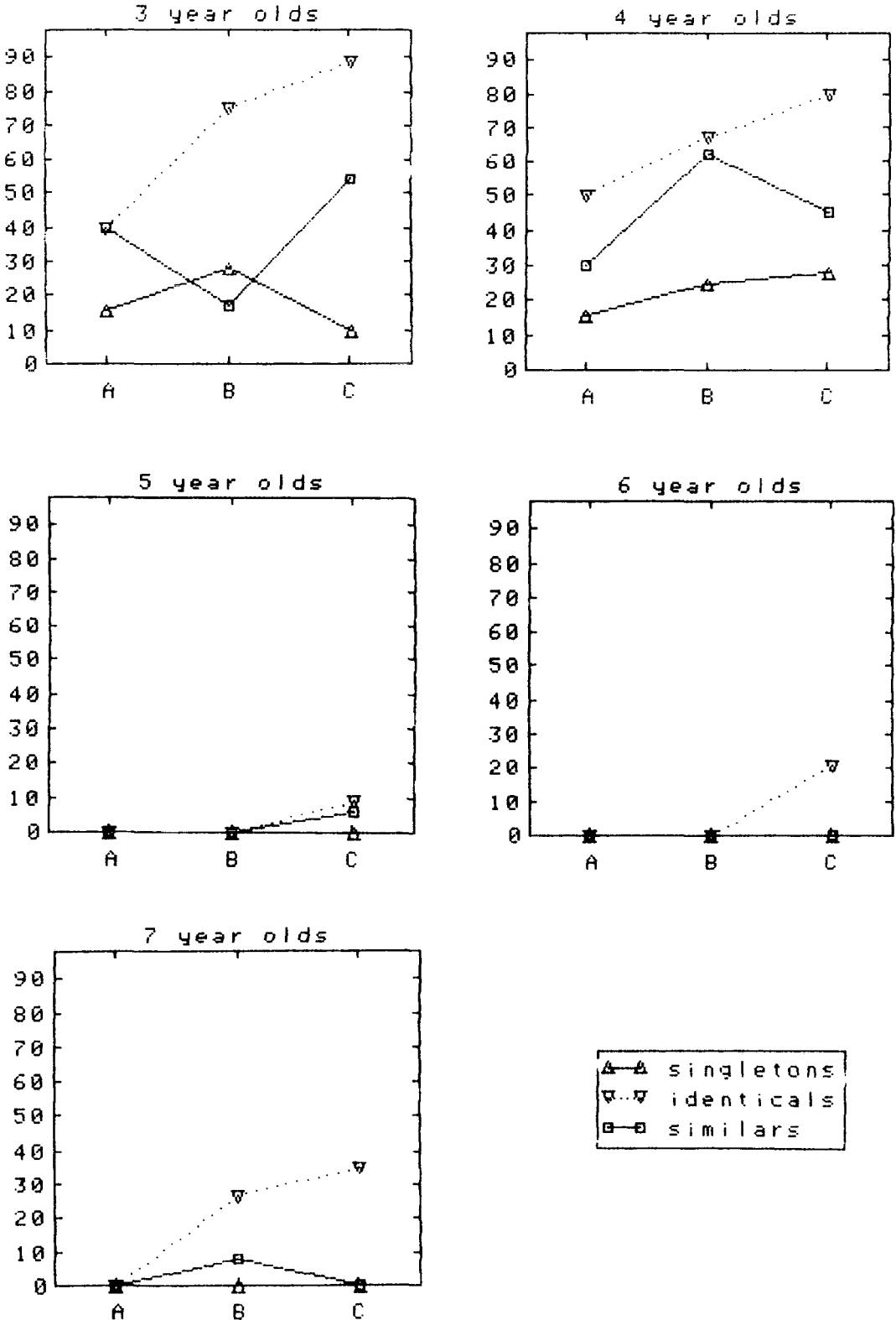


Figure 5.8. Percentage use of a or one of the for singleton, identical and similar objects in trial blocks A, B and C.



.05; Block C : 3 year olds $Q = 15.68$, $p < .001$; 4 year olds $Q = 17.18$, $p < .001$; 5 year olds $Q = 7.81$, $p < .025$; 6 year olds $Q = 5.36$, $p < .1$; 7 year olds $Q = 19.35$, $p < .001$; Friedman tests corrected for ties), and more indefinite descriptions for identicals than for singletons or similars though again the differences were not significant in Block A, were significant only for 3 year olds in Block B ($Q = 6.9$, $p < .05$) but were significant for all groups in Block C (3 year olds $Q = 16.27$, $p < .001$; 4 year olds $Q = 14.1$, $p < .001$; 5 year olds $Q = 9.76$, $p < .01$; 6 year olds $Q = 12.5$, $p < .001$; 7 year olds $Q = 16.19$, $p < .001$; Friedman tests corrected for ties).

Finally, there was a greater incidence of underdetermined NPs than in any of the previous experiments (see Figure 5.9), especially from the five and six-year old age groups. For the six-year olds article omission was mainly confined to the singleton and identical trials but for the five-year olds article omission was around the 50% mark for all three kinds of objects.

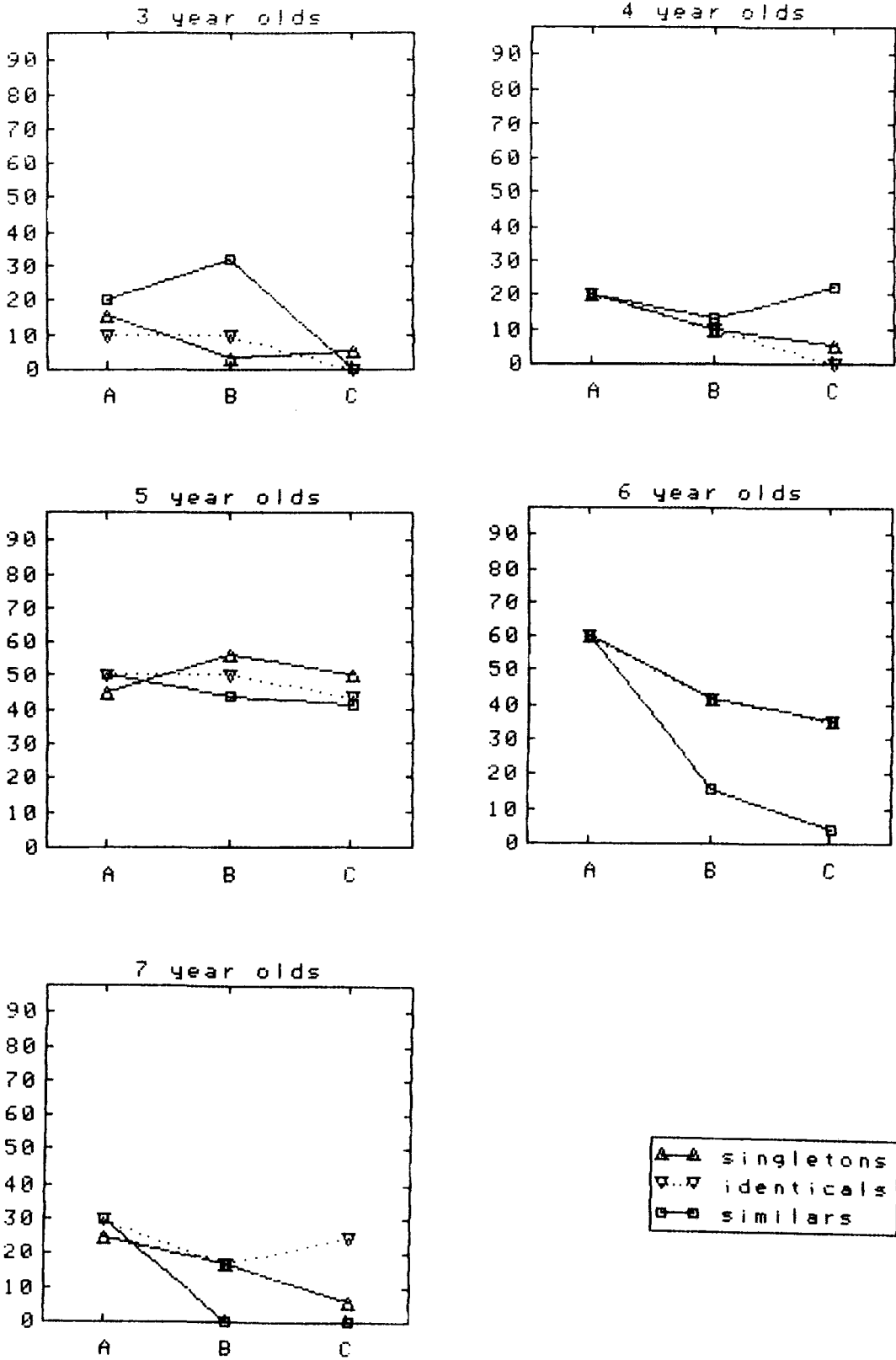
Between Age Groups

The only difference between age groups was in the use of undetermined NPs for both identical and similar objects in Block C ($H = 12.12$, $p < .05$; $H = 9.727$, $p < .05$, respectively, Kruskal-Wallis tests).

Discussion

The major question addressed by this experiment was whether or not, given a context in which it was essential to distinguish between similar objects of different colour, children would include a colour modifier in their descriptions. The answer that emerged was a qualified one : it depended on the age of the child and on the particular block of trials being considered. In the first trial block very few subjects used colour modifiers : the percentage of responses which included such a modifier was around the same low level for all age groups (7 year olds 40%, all other groups 20%). In the second and third block of trials the younger subjects continued to perform at a very low level whilst the older subjects greatly increased their use of colour modifiers so that for them the + colour + N was the dominant response for similar objects.

Figure 5.9. Percentage use of undetermined NPs for singleton, identical and similar objects in trial blocks A, B and C.



To understand why it was that so few subjects used the + colour + N in Block A and why older subjects dramatically increased their use of such responses in Blocks B and C whilst younger subjects did not one needs to consider what exactly was involved in the task the subjects were doing. There would seem to be at least two stages involved in the child's description of a similar object. First he must realise that it is necessary to distinguish between the similar objects and then he must realise that the linguistic means for enabling the listener to make this distinction is a response of the form the + colour + N. It would appear that in the first block of trials few subjects realised that it was necessary to distinguish between the similar objects for not only was the percentage use of modifiers low there were very few hesitations on the part of listeners. However, both speaker and listener were given feedback when the screen was removed for the animals were held up in pairs and the experimenter asked 'Are they the same?' It then became clear at this feedback stage of Block A that three and four-year olds' perception of the task was very different from that of the six and seven-year olds and that the reason for the different ways of viewing the task lay in the differences in understanding of one word which had been used both in the instructions of how the game was to be played and in the question that was asked at the end of each trial. That word was the word SAME.

As Donaldson and Wales (1970) and others (e.g. Sinha and Carabine, 1981) have pointed out 'same' can mean 'same one' (e.g. Allan is wearing the same shirt he wore yesterday) or it can mean 'same kind' (e.g. Martin and Allan are wearing the same shirt). Moreover, within the latter category one may speak of objects being the same when they are (a) alike with respect to all observable attributes (e.g. identical brown cows); or (b) alike with respect to at least one observable attribute but different with respect to at least one other (e.g. different coloured cows).

In the Farmyards Experiment the experimenter had intended the children to interpret 'same' as in (a), that is, that children should match the brown and white cow with the brown and white cow, the black and white cow with the black and white cow. This, indeed, was how the six and seven-year olds interpreted the word 'same' for they always

replied correctly when the experimenter held up two animals and asked if they were the same. The younger subjects, however, interpreted 'same' as in (b), that is, they matched objects which were alike with respect to at least one observable attribute, e.g. horns and udders, but different with respect to at least one other, e.g. colour. This is why they said the animals were the same even when the two cows the experimenter was holding were different colours, and why there were so few hesitations on the part of the listeners.

The three and four-year olds, then, saw the task as one in which they had to match classes of animal (e.g. cows, horses, pigs) rather than identical class members. The experiment has failed to test whether, when they appreciate the necessity to distinguish between class members, they appreciate that the linguistic means for doing so is the + colour + N.

The results for the six and seven-year olds show that when they realise that it is necessary to distinguish between similar objects they appreciate that the pertinent linguistic form is the + colour + N. The fact that six and seven-year olds are highly discriminating in their use of colour modifiers is clear evidence for their having acquired, in Karmiloff-Smith's terms, both the descriptor and determinor functions of such definite descriptions.

The five-year olds performance was very mixed : all subjects seemed to appreciate that 'same' meant 'same colour' for they always replied correctly to the question at the end of each trial and gave different colours as the reason for their negative replies, but only about half the subjects ever used colour modifiers in their descriptions. Since those children who used them were as likely to include colour modifiers in their descriptions of singletons and identicals, one cannot conclude that they were being used of similars to reflect the status of the object in the referential array. The performance of the five-year olds, especially in Block C, tends to suggest that, in Karmiloff-Smith's terms, definite descriptions with modifiers were being used in their descriptor rather than their determinor function. However, the fact that five-year olds were very bored with the game - no listener ever asked for further information even when he admitted he was not sure which one to choose - and speakers seemed very reluctant to help their partner 'get it right' -

almost 50% of responses to all objects being noun only - suggests that in the Farmyards Experiment these five-year olds may have done themselves less than justice. They may even have thought they were supposed to be playing a guessing game.

One further point needs to be made about subjects' performance in this experiment : although there was an improvement across trial blocks, for example six-year olds increased their use of colour modifiers from 20% in Block A to 76% in Block B, there was no improvement within trial blocks, that is no improvement between trials 1 and 2, 3 and 4, 5 and 6. This was probably because of the competitive nature of the game. Listeners counted how many animals they had correct at the end of a trial, and their philosophy seemed to be 'If the speaker doesn't help me to get it right, I'm not helping him to get a better score'. Possibly the competitive element made some children less likely to increase their use of appropriate descriptions. Another reason why improvement across trials was not as great as it might have been is that in this task the listener could, by chance, select the correct cow, thereby depriving a speaker of feedback from an inadequate description. It was noticeable that the five-year olds' performance in Block C deteriorated after all inadequate messages in Block B resulted, by chance, in the correct cow being chosen.

One final point on subjects' use of colour modifiers in this experiment : all age groups used a small percentage of colour modifiers with singletons and nearly all such responses were of one particular animal - the horse. It was rare indeed for a subject to say the white lamb or the black and white sheepdog but many subjects said the black horse. Maybe Lloyd's Bank television advertising campaign was having some effect !

The Farmyards Experiment has shown that the kind of descriptions children use depends on their interpretation of the purpose of the task. The three and four-year olds seem to have seen the task as one requiring a matching of classes of animals while the six and seven-year olds saw the task as one of also taking into account individual membership of classes. The three and four-year olds, rather like their counterparts in Karmiloff-Smith's (1979) Experiment 5, interpreted 'same' more broadly than the older children. In

Karmiloff-Smith's study there was a single referential array which could be touched by both speaker and listener and whereas children of six and over interpreted 'same' as 'same one' three and four-year olds interpreted it as 'same kind'. In the Farmyards Experiment, a similar pattern of age differences emerged; six and seven-year olds interpreted 'same' as 'identical' whereas three and four-year olds interpreted 'same' as 'same in some way'.

As far as the three and four-year olds are concerned, then, the experiment has not served its intended purpose of providing a task where subjects appreciate the necessity for including information which will allow listeners to distinguish between three similar but different coloured objects. The task which is needed will have to be one where the outcome of a trial is judged according to some criterion other than the verbal one of 'sameness'. The experiment should also be one where it will be impossible for the speaker to be deprived of feedback by the listener selecting the correct item by chance, and one in which the competitive element, which may lead to deliberately misleading descriptions, is removed. Such a task was devised for Experiment 8.

5.4 Experiment Eight - The Balances

The aim of the experiment was again to see if subjects could choose descriptions which would enable the listener to select a particular member of a set of similar but different coloured objects. The experiment was designed to eliminate three factors which may have influenced subjects' use of adjectives in Experiment 7. Firstly, it seemed clear that younger subjects interpreted 'same' to mean 'member of the same class'. In the current experiment the use of 'same' was avoided both in explaining what the task was about and in judging the outcome of each trial. Secondly, the competitive element in Experiment 7 may have led some subjects to give inadequate descriptions deliberately. This was eliminated by having the experimenter as the listener in all trials. Thirdly, in the previous experiment listeners could choose the correct animal by chance thereby depriving the speaker of the opportunity to see the effect of an

inadequate description. In the current experiment the experimenter was the listener and she could always ensure that an inadequate description resulted in the wrong item being chosen.

Method

Subjects Fifty subjects took part in the experiment. There were ten in each of the following age groups : three-year olds (3;8 - 3;11, mean age 3;9) four-year olds (4;1 - 4;6, mean age 4;4) five-year olds (5;0 - 5;9, mean age 5;5) six-year olds (6;2 - 6;9, mean age 6;5) seven-year olds (7;0 - 7;8, mean age 7;4). None of these subjects had taken part in Experiment 7.

Materials Two balances separated by a 22 cm. high wooden wall. On one side of each balance was a small bucket, 4 cm. deep and 6 cm. in circumference, in which weights were placed. On the other side of the balance was a metal tray measuring 16 cm. x 16 cm. As can be seen in Figure 5.10 when the trays were heavier than the buckets neither speaker or listener could see the other subject's tray. When the buckets were heavier than the trays, the trays rose above the wall and could be seen by both participants (see Figure 5.11).

There were two sets of stimulus items which were cardboard cut-outs of animals mounted on thick cardboard bases so that they stood up easily. Both sets consisted of a singleton, two identical animals and two similar animals of different colour.

In order to ensure that it was essential for the speaker to use the colour of the similar animals the weights of the two similars differed from one another and from the rest of the animals. The weight of each animal was varied by using metal strips of different thickness along the base. Details of the objects and weights were as follows:

<u>Set 1</u>	<u>Weight</u>
one guinea pig	10 gms.
two brown dogs	10 gms.
a red rabbit	15 gms.
a blue rabbit	5 gms.

Figure 5.10. Participant's view at the beginning of the first trial.



Figure 5.11. Participant's view at the end of a successful trial.



Set 2

one guinea pig	10 gms.
two goldfish in bowls	10 gms.
a ginger cat	15 gms.
a green cat	5 gms.

one lead weight for each bucket : weight 34 grammes.

Design

The subjects' task was to remove one animal at a time from his or her tray and tell the experimenter which one she should take off. Subjects had to try to make both trays go up together. There were three blocks of trials. The first block used the animals in Set 1, the second used the animals in Set 2, and the third used all the animals in the two sets except for the guinea pig, the second guinea pig being removed so there was still a singleton in the third block.

In blocks one and two the total weight of each set was 50 grammes and the bucket weighed 34 grammes. Removal of any two of the identicals or singleton would make the tray rise as would any one of these three items plus the red rabbit or ginger cat. Removal of one of these three items plus the blue rabbit or the green cat would not decrease the tray's weight enough to make it rise. In the third block of trials the tray would only rise if at least six animals had been removed not including either the lightweight green cat or blue rabbit.

Procedure

When subjects were brought into the room the 34 gramme weights had already been put in each bucket so that the buckets were resting on the balance base and the trays were in the air. The experimenter explained that these two 'things' were balances. 'When I put some things on the tray the tray goes down and when I take them off the tray goes up again'. The experimenter demonstrated this with a collection of objects such as a pencil sharpener and a wooden block. The experimenter then continued 'I've got some animals here to put on the trays, we'll put them on and make the trays go down'. E then picked up the guinea pigs and said 'We'll each have one of these. What are they?' E then picked up two dogs in each hand and said

'We'll each have two of these. What are they?' E finally picked up a red and blue rabbit in each hand and said 'And now we'll have these. What are they?' This procedure ensured that (a) all subjects recognised the animals and could name them and (b) all subjects knew both they and the experimenter had the same number and kind of animals on their trays.

On the first trial with each set of items the experimenter arranged the animals on the trays in pairs so that it was as obvious as it could be that two of the animals (dogs or goldfish) were identical and two (rabbits or cats) were similar. Figure 5.10 illustrates the view each subject had at the beginning of a trial.

The experimenter then explained to the subject that they were going to play a game where they would take one animal off at a time until the trays went up. The subject would choose an animal, tell the experimenter exactly which one to take off then they would both take their animals off and see if the trays went up. What the subject had to do was to make the trays go up together. The experimenter said 'Which one shall we take off first?' The subject made her reply and the experimenter said 'Let's take it off now. Which one shall we take off next?' This continued until one or both of the trays went up.

If the subject did not say the colour of the rabbit or cat the experimenter pretended to take off an animal but did not actually do so until either (a) the subject's tray went up, which meant she had removed the heavier animal so the experimenter removed the lighter animal or (b) the subject had named two animals including a similar and her tray had not gone up which meant she had removed the lighter animal in which case the experimenter removed the heavier animal. In either case the discrepancy was obvious because one tray went up and the other didn't. The experimenter said 'Oh! That's funny. Yours has gone up and mine hasn't' (or vice versa). 'You said "take off ..."' and the experimenter repeated exactly what the subject had said, leaving the similar animal until last, and held up each animal she had removed so that subjects could compare it to the one they had removed and the experimenter asked 'Did I get it right?' If the subject said 'No' and did not volunteer any further information he or she was asked 'Why?' If subjects said 'Yes' the experimenter said 'Is mine exactly like yours?'

After each trial the animals were replaced on the tray which made a satisfying bang as it hit the table.

The number of trials for each block varied according to which animals were chosen and whether or not subjects achieved the desired result of giving descriptions which were adequate enough to get both trays going up together. If subjects chose identicals and/or singletons on the first trial the experimenter said 'Can we see if we can do it with some other animals?' Trials continued until subjects reached criterion which was the use of colour terms for two successive sets of similar animals. This means that criterion could be reached in a minimum of two trials in Blocks 1 and 2 and in one trial in Block 3 where there were two sets of similar animals available in each trial. There was a maximum of six trials in Blocks 1 and 2 and two trials in Block 3 to ensure that subjects did not become bored or upset at failure. After the first block of trials the experimenter said 'Let's see if we can do it with some different animals' and presented Set 2 items in the same way as Set 1. After the second block of trials the experimenter said 'Let's put all the animals on together and see how many we have to take off before the trays go up'.

Each subjects' responses were recorded on a Hanimex Dolby cassette recorder and were subsequently transcribed.

Results

Subjects' responses were scored as in the previous experiment. Subjects did not become bored in this experiment as they had in Experiment 7. In fact the younger subjects did not want the trials to end and for several days afterwards asked if they could play the balance game again.

Our main interest lies in whether or not subjects use the + colour + N for the similar animals (cats and rabbits), and how quickly subjects reached criterion which was the use of colour terms for two successive trials involving similar animals (see Appendix H Table H.1 for details). Table 5.6 shows the mean number of trials to criterion for each age group in each block of trials. Since subjects were free to choose whichever animals they wished there was no control over how many trials involving only singletons or identicals came before or between the trials where similars were chosen. In Table 5.6 only the

Age Group	Block 1		Block 2		Block 3	
	N	\bar{X}	N	\bar{X}	N	\bar{X}
3 yr olds	7	2.6	7	2.4	8	2.2
4 yr olds	9	2.7	9	2.4	9	2.2
5 yr olds	9	3.6	10	2.6	8	2.0
6 yr olds	10	2.6	10	2.2	10	2.2
7 yr olds	10	2.6	10	2.2	9	2.0

Table 5.6. Number of subjects in each age group (out of 10) reaching criterion in each block of trials and mean no. trials to criterion.

trials involving similars have been counted. The minimum possible number ^{of trials} in the first two blocks was two, and in the third block was one so in order to make Block 3 comparable to the other blocks the mean number has been multiplied by 2. N is the number of subjects in each age group (out of 10) that reached criterion.

Several interesting points emerge from Table 5.6 The first thing is that the majority of three and four-year olds did use the + colour + N. Four three-year olds and five four-year olds used such descriptions from the very first trial (see Table H.1 Appendix H for details) and another two three-year olds and three four-year olds began using colour modifiers after just one omission. The seven three-year olds who reached criterion did so in an average of 2.6 trials in Block 1 and 2.4 in Block 2. By Block 3 seven of the eight who reached criterion used the + colour + N throughout the first trial. The nine four-year olds who reached criterion in Block 1 did so in an average of 2.7 trials which was reduced to 2.4 in Block 2 and eight of the nine subjects in Block 3 used colour terms throughout the first trial. Only one three-year old and one four-year old failed to reach criterion on all blocks of trials.

The second interesting point is that the five-year olds were the slowest to reach criterion in the first block of trials although the difference between them and the other groups was not significant. Nine subjects eventually reached criterion but only three subject used

colour modifiers from the first trial and on average it took 3.6 trials to criterion. By Block 2 all subjects reached criterion but in the third block of trials only eight subjects reached criterion, using colour modifiers appropriately throughout the first trial.

All six and seven-year olds reached criterion in the first trial block : five subjects in each age group using colour modifiers from the very first trial and four others did so from the second trial. However, one seven-year old failed to reach criterion in Block 3.

Before concluding that even three and four-year old children can take into account their listener's model of the perceptual array, when they appreciate that this is what the task requires, it is necessary to see whether or not the choice of determiners depended on the status of the referent in the total array. Experiment 7, for example, revealed that although five-year olds increased their percentage use of modifiers this was not done on a selective basis because the increase was for all object types including those for which modifiers were superfluous.

As Figure 5.12 shows all subject groups were highly discriminating in their use of colour modifiers (3 year olds $Q = 15$, $p < .001$; 4 year olds $Q = 18.2$, $p < .001$; 5 year olds $Q = 20.3$, $p < .001$; 6 year olds $Q = 17.6$, $p < .001$; 7 year olds $Q = 19$, $p < .001$; 2 tailed Friedman tests corrected for ties). There were very few colour + N responses to singletons or identicals in any age group and, including descriptions with colour modifiers where articles were omitted, this was the dominant response for similars for all age groups.

Turning now to the other responses, as Figure 5.13 clearly shows the + N was a discriminating response for all age groups, being used significantly more often for singletons than for identicals or similars (3 year olds $Q = 11.8$, $p < .005$; 4 year olds $Q = 12$, $p < .005$; 5 year olds $Q = 7.54$, $p < .05$; 6 year olds $Q = 13$, $p < .001$; 7 year olds $Q = 7.5$, $p < .05$; 2 tailed Friedman tests corrected for ties).

Indefinite descriptions, too, were discriminating responses for all groups in that they were used mainly for identicals (3 year olds $Q = 18.1$, $p < .001$; 4 year olds $Q = 12.7$, $p < .001$; 5 year olds $Q = 7.54$, $p < .05$; 6 year olds $Q = 13$, $p < .001$; 7 year olds $Q = 7.5$, $p < .05$; 2 tailed Friedman tests corrected for ties). As can be seen in

Figure 5.12. Percentage use of the + colour + N and null article + colour + N for singleton (sin), identical (id) and similar (sim) objects.

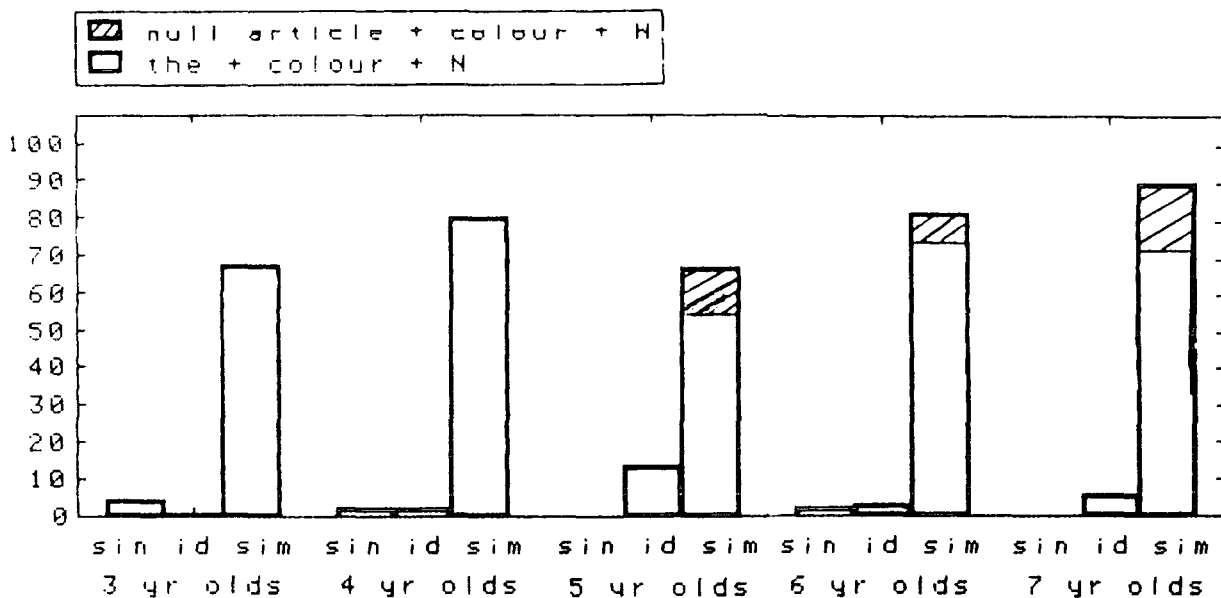


Figure 5.13. Percentage use of the + N for singleton (sin), identical (id), and similar (sim) objects.

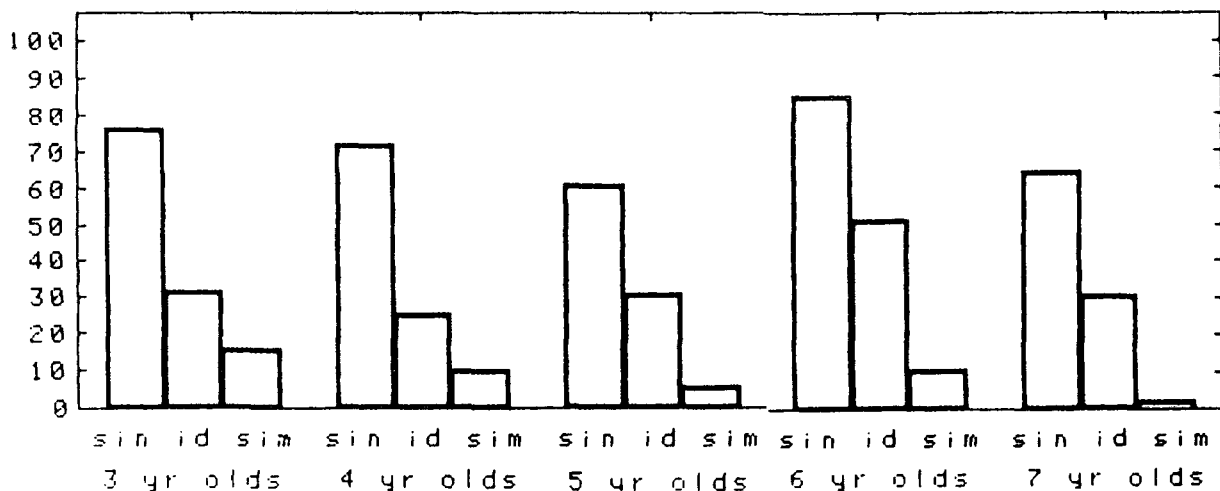


Figure 5.14. Percentage use of indefinite descriptions for singleton (sin), identical (id) and similar (sim) objects.

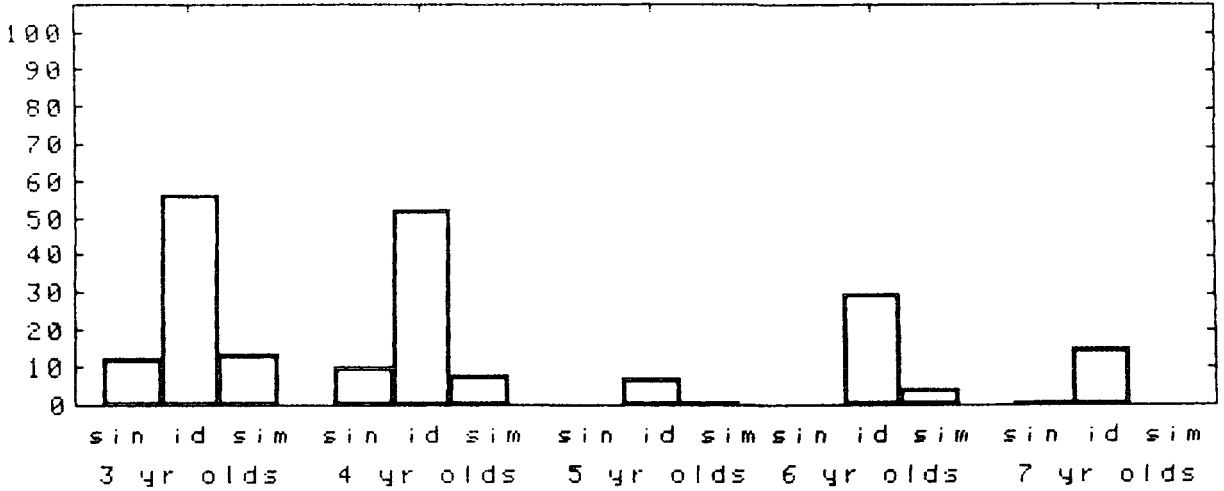


Figure 5.15. Percentage use of undetermined (noun only) responses for singleton (sin), identical (id), and similar (sim) objects.

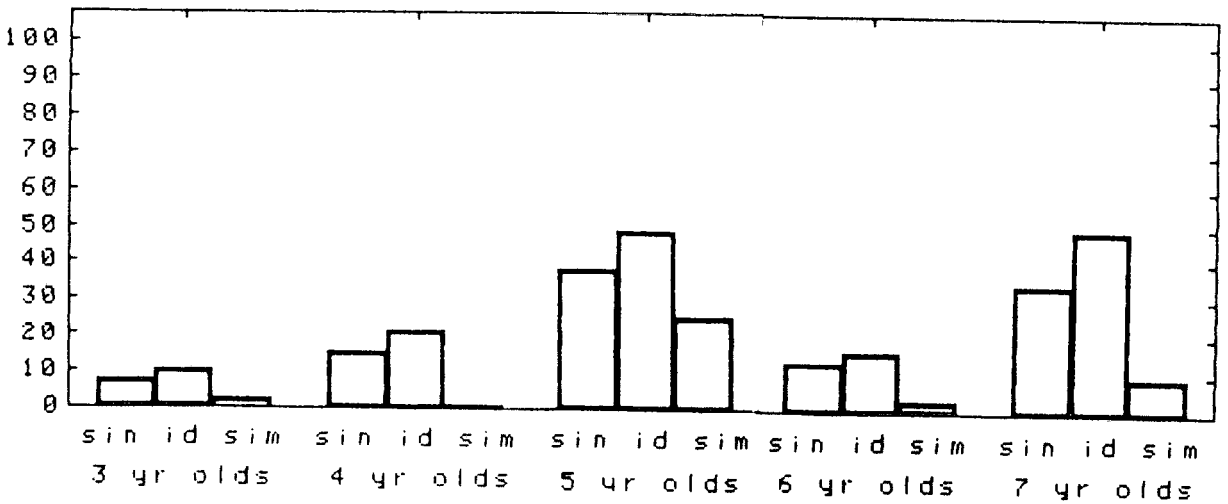


Figure 5.14 the use of indefinites was very low in the five-year old group.

Finally, considering article omission, which in Experiments 6 and 7 had been quite common for five-year olds in particular in noun only responses, it can be seen in Figure 5.15 that again there was a high percentage of noun only responses for that age group but as Figure 5.15 shows they are now joined by the seven-year old group. However, both five and seven-year olds reserve undetermined NPs mainly for singletons and identicals (5 year olds $Q = 6.8$, $p < .05$; 7 year olds $Q = 9.3$, $p < .025$; Friedman tests corrected for ties), where, of course, they are not misleading, as dog and guinea pig will achieve the same ends as one of the dogs and the guinea pig.

Between Age Groups

A Kruskal-Wallis test revealed a significant difference between groups in the use of indefinite descriptions for identical objects ($H = 17.948$, $p < .002$). The differences lay between the five-year olds and younger age groups (3 year olds versus 5 year olds $U = 6$, $p < .002$; 4 year olds versus 5 year olds $U = 9$, $p < .002$; 2 tailed Mann Whitney U tests) and between the seven-year olds and two youngest age groups (3 year olds versus 7 year olds $U = 18$, $p < .02$; 4 year olds versus 7 year olds $U = 18$, $p < .02$; 2 tailed Mann Whitney U tests). These differences reflect the preference for noun only responses in the five and seven-year old age groups.

Discussion

This experiment has shown that

the majority of three and four-year old children see the relevance of including information which will allow the listener to select one of two similar tokens in his model of a perceptual array. Approximately half of the younger subjects used colour modifiers consistently from the very first trial.

The removal of the competitive element and the experimenter's ploy of ensuring that an inadequate description led to only one of the trays going up meant that most of the remaining subjects only made one error before giving adequate descriptions, that is, they could use the feedback from a single trial to perceive the relevance of including a

colour modifier. What is more they do not generalise their perception of the usefulness of colour modifiers to all kinds of objects, they confine their use of such modifiers to objects which are similar and differ only with respect to colour : three and four-year olds are using definite descriptions with colour modifiers as determiners.

The experiment has also shown how quick six and seven-year olds are to perceive the necessity of including additional information which will enable a listener to discriminate between similar objects. Five-year olds, too, were more discriminating in their use of colour modifiers than had been same-age subjects in the previous experiment, using the + colour + N as determiners and not just descriptors.

Experiments 6, 7 and 8 have all been concerned with the effect of the composition of the array on subjects' use of referring expressions. However, in all three experiments the referents were inanimate. It remains to be shown that the same pattern of results would be obtained when animate referents were used. Experiments 1 - 5 showed that the pattern of determination that held for animates like man and girl did not always hold for inanimates like egg or book. Hickmann (1980), too, found a difference in the use of definite and indefinite descriptions for animate and inanimate referents in seven-year olds with a much higher proportion of inappropriate descriptions for the animate referents than for the inanimates.

There are two further points about Experiments 6, 7 and 8 which make them different from the experiments in Chapter Four of this thesis : the listener always knew the contents of the array before the speaker referred to an object and subjects were never asked to refer anaphorically, that is, within each trial an object was referred to only once. Before discussing the overall effect of the composition of the array on subjects' use of the definite and indefinite articles and modifiers there is one final experiment which will thoroughly test the referential ability of young children and will link together all the experiments in this thesis. This final experiment will investigate children's ability to introduce and refer to animate entities which are different, identical or similar.

5.5 Experiment Nine - Story-Telling Task III

Experiments 6 - 8 were concerned with the effect of the composition of the referential array on subject's choice of referring expressions. With the exception of responses to 'What did you/I do?' in Experiment 6, responses were of the form article (+ modifier) + noun. In all the experiments the referents were inanimate, most of the objects were not the only class members present and the objects were referred to only once in any one trial. In contrast, Experiments 1 - 5 were mainly concerned with the effects of the knowledge/ignorance of the listener. The referring expressions which were elicited were embedded in sentences. Many of the entities to which reference had to be made were animate, were the only one of their kind in the films or picture sequences, and were referred to more than once. The main contrast between the two sets of experiments concerned the listener's knowledge of the entities involved and the purpose of the speaker's utterances. In Experiments 6 - 8 the listener always had in his model the same number and kind of tokens as the speaker and the speaker's task was to choose a referring expression which would enable the listener to select the appropriate token in his model. In Experiments 1 - 5, with the exception of the listener knowledgeable condition in Experiments 2, 3 and 4, the listener had no idea how many tokens of what kind the speaker had in his model. The speaker's task was to select a description which would enable the listener to introduce the right number and kind of token into his model, and subsequent references had to enable the listener to select which of those tokens needed to be tagged with the additional information.

In the first five experiments even the youngest subjects used the indefinite article to mention an entity for the first time significantly more often than the definite article. When that entity was animate, for example, a man or a woman, subjects rarely used the definite article. On the few occasions when the definite article was used on first mention, for example the lady was dusting, the experimenter asked the listener 'Which lady was he talking about?' The listeners nearly always said 'The lady in the picture', or 'the lady in the story' : in other words listeners had taken the definite description as referring to the only lady that was going to be

mentioned. Johnson-Laird and Garnham (1980) point out that linguists and philosophers have often noted that a definite description can lead a listener to infer the existence of a unique entity if the description occurs in the absence of prior identification of the entity. In Experiments 1 - 5 the animate entities were unique : there was only one man, woman, boy or girl. In the first four experiments and in Experiment 5 Version A the inanimate entities were also unique. Even in Experiment 5 Version B where several identical inanimate referents were present only one of the entities was directly involved in the action and needed to be mentioned. One could argue that even here a definite description could be used to designate the only entity which was going to be relevant to the current context, if the presence of the other entities had not been mentioned.

The question this final experiment addresses is this : what will be the effect of having two identical or similar animate entities both of which need to be mentioned? If there were two men in a cartoon story one of whom did one thing and one of whom did something else, the speaker could not use a definite description on first mention. If the speaker began the man (did this) the listener might infer the existence of a unique entity and put into his model a token representing a unique member of the class of adult male humans. However, if the speaker continued 'and the man (did that)' referring to the second character, the listener, knowing that the initial definite description debarred the presence of another token of the same type from his model (Johnson-Laird and Garnham, 1980) would assume the speaker was still talking about the first man. Even if the speaker began his narrative by saying that there were two men, and the listener's model therefore contained two tokens, subsequent definite descriptions whether of the form 'the man (did this)' and 'the man (did that)' or of successive pronouns 'he (did this) and 'he (did that)' would not be appropriate if the speaker intended to refer to different characters since the listener would have no way of knowing to which token he must attach the new information. The speaker must find ways other than the + noun or pronoun to introduce the characters and to refer to them later.

In the current experiment there were three versions of two basic three-picture cartoon stories. There were two characters in the

stories. In Version A the characters were identical, either two boys or two girls. The speaker can help the listener set up his discourse model either by saying something like two boys were, or he can say a boy was ... and another boy was. When the speaker goes on to mention these characters again there are several ways of helping the listener to distinguish between the actions of the two characters and thus link this information to the right tokens : one boy ... the other boy, the first boy ... the second boy or definite descriptions containing relative clauses such as the boy who broke the car ... the boy who was crying In the stories with identical characters neither successive pronouns nor successive the + n, would be appropriate.

In the B Versions of the stories the characters were of the same gender but differed in size. Speakers could help the listeners set up a discourse model by saying a big boy ... and a little boy or they could start off with two boys ... and then say the big boy ... the little boy. On second mention of a referent adjectives would be the obvious means for enabling the listener to distinguish between the two tokens in his model and, again, successive definite descriptions such as the boy ... the boy, or he ... he would not be appropriate. If speakers failed to pick out the relevant dimension of size they would have to adopt the same strategies as in the A Versions to introduce and refer to the two characters.

In the C Versions of the stories the characters differed on the obvious dimension of gender : both stories involved one boy and one girl. Speakers could help listeners set up their models by saying a boy ... a girl, or they could leave the listener to infer the existence of a unique entity by saying the boy ... the girl. On second and subsequent mentions all definite descriptions would be appropriate whether using definite articles or pronouns. Version C, then, acts as a control in two ways. Firstly it is the only condition in which the use of successive the + N or pronouns to refer to different characters would be appropriate, and secondly it would show whether there was any difficulty in understanding the basic story.

Interest lies in three aspects of children's performances:

1. How the speakers will help their listener to set up their discourse model when they describe Picture 1.

2. How speakers will refer to the two characters on second and subsequent mentions.
3. How successful are their attempts at enabling the listener to distinguish between the two characters so that listeners can link the right information with the right token.

On the basis of the findings of the first five experiments it is predicted that children will use indefinite descriptions on first mention. As for second references to the characters in the stories, two findings from previous experiments suggest that younger subjects in particular may have some difficulty with the Identical and Similar versions. Firstly, many subjects needed feedback in Experiments 7 and 8 before they appreciated that it was necessary to include adjectives as modifiers and no such feedback was available in this experiment. Secondly, it was obvious from Experiments 5 - 8 that few children used partitives, and descriptions such as the first one came only from parents. If the children's linguistic abilities are not sufficiently developed for them to use partitives and modifiers and they are forced to rely on the definite article or, as seems more likely from Experiments 1 and 2 in the case of the younger subjects, pronouns, then they are likely to have difficulty in wording their descriptions so that the listener can understand the story, especially in the Identical Versions. It was therefore expected that the older the subject the more likely he would be to communicate successfully so that listeners could construct a similar model to the speakers'.

Method

Subjects One hundred and thirty-two subjects took part in the experiment. There were thirty-six subjects in each children's group, namely, four-year olds (3;9 - 4;3) five-year olds (4;9 - 5;3) and six-year olds (5;9 - 6;3) and twenty-four parents. None of these subjects had previously taken part in a story-telling task.

Materials There were three versions of two basic stories. Each story comprised three pictures of sequential events and each picture was drawn in black ink on a white card measuring 6" x 6" (see Figures 5.16 - 5.21).

The stories may be described as follows:

Story 1

Version A (Identicals)

Picture (1). Two boys are playing with a toy car.
Picture (2). One boy is stamping on the car and the other boy has his hands to his mouth and is looking on in horror. Picture (3). The car is in pieces and the boy who has broken it has his hands in the air and is smiling while the other boy is crying.

Version B (Similar)

Picture (1). A big boy and a small boy are playing with a toy car. Picture (2). The big boy is stamping on the car and the small boy has his hands to his mouth and is looking on in horror. Picture (3). The car is in pieces and the big boy has his hands in the air and is smiling while the small boy is crying.

Version C (Different Genders)

Picture (1). A boy and a girl are playing with a toy car. Picture (2). The girl is stamping on the car and the boy has his hands to his mouth and is looking on in horror. Picture (3). The car is in pieces and the girl has her hands in the air and is smiling while the boy is crying.

Story 2

Version A (Identicals)

Picture (1). Two girls are playing with a doll.
Picture (2). One girl is hiding the doll behind her back and the other girl is holding out her hands asking for the doll. Picture (3). The girl who is

hiding the doll is crying because the other girl is pulling her hair.

Version B (Similar)

Picture (1). A tall girl and a small girl are playing with a doll. Picture (2). The tall girl is hiding the doll behind her back and the small girl is holding out her hands for the doll.

Picture (3). The tall girl is still holding the doll and is crying because the small girl is pulling her hair.

Version C (Different Gender)

Picture (1). A boy and a girl are playing with a doll. Picture (2). The boy is hiding the doll behind his back and the girl is holding her hands out asking for the doll. Picture (3). The boy is still holding the doll and is crying because the girl is pulling his hair.

Design and Procedure

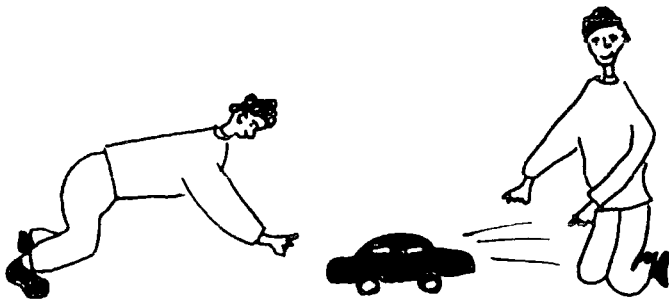
Each subject was given a three picture cartoon story to tell to a same-age listener who could not see and had no previous knowledge of the pictures. In the children's groups twelve subjects told the A Versions, twelve the B Versions and twelve the C versions. Twelve parents told Version A and twelve told Version B. Parents were not asked to tell Version C since it was obvious that they would have no problems with the Different Gender Versions of the stories.

The procedure and instructions were the same as in Experiments 1 and 5.

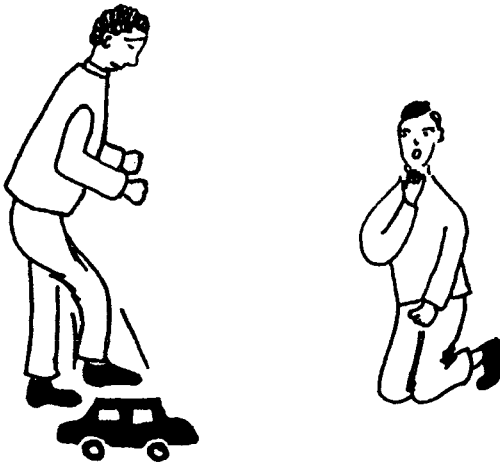
Results

First Mention

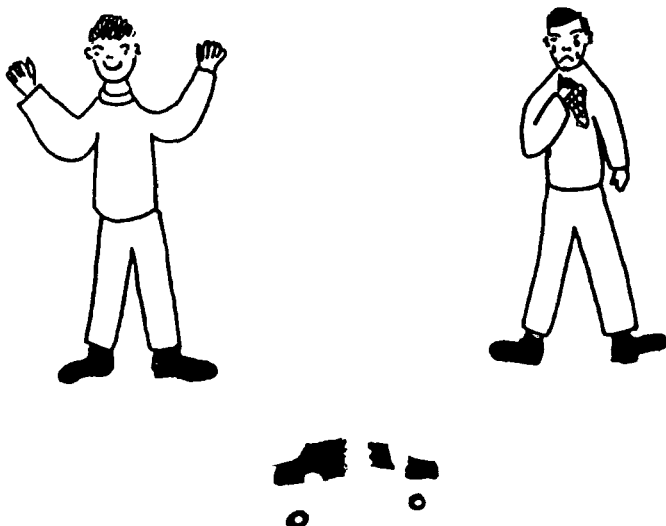
Six subjects did not mention the presence of a second character at all : five were in the Identical Version (2 4 year olds, 2 5 year olds, 1 6 year old) and one was in the Similar Version (1 4 year old).



Picture 1

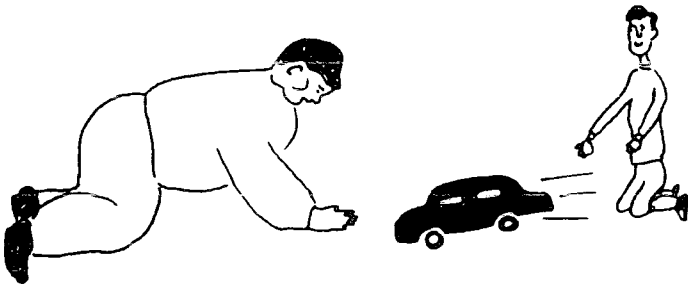


Picture 2

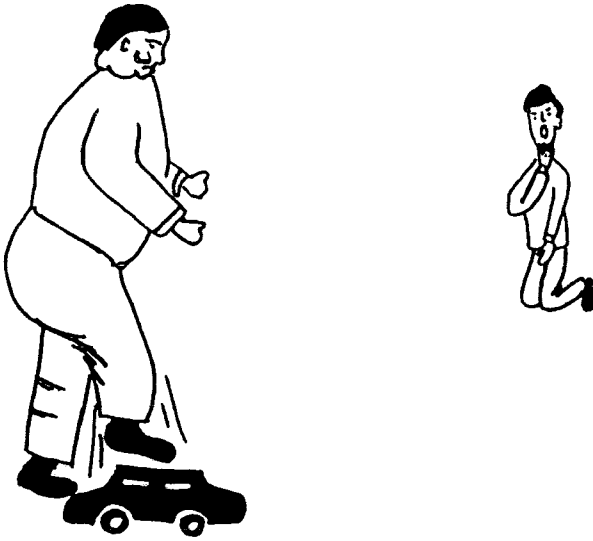


Picture 3

FIGURE 5.17 STORY 1 VERSION B (SIMILARS)



Picture 1

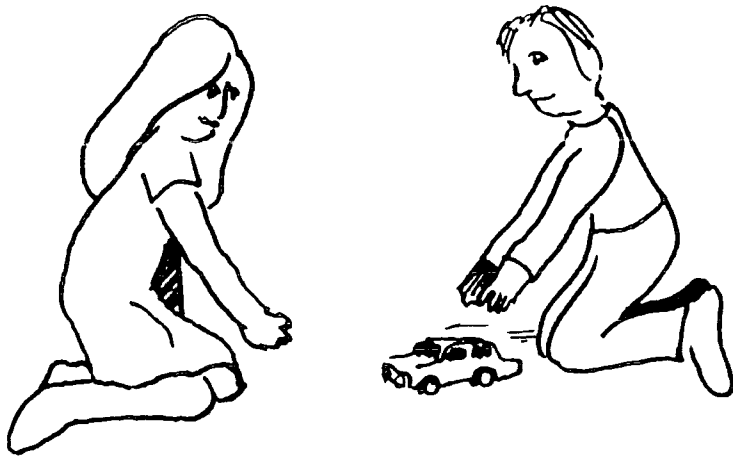


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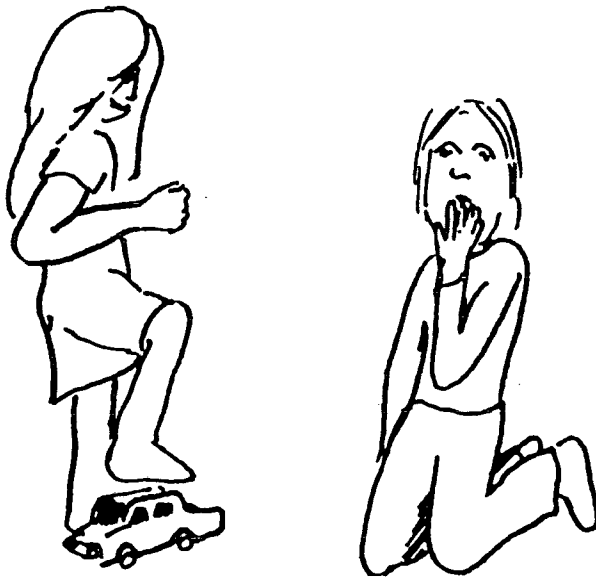


Picture 3

FIGURE 5.18 STORY 1 VERSION C (DIFFERENT GENDER)



Picture 1

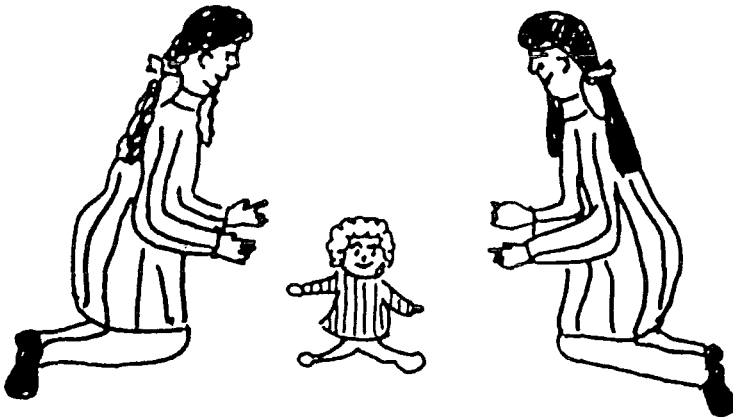


Picture 2

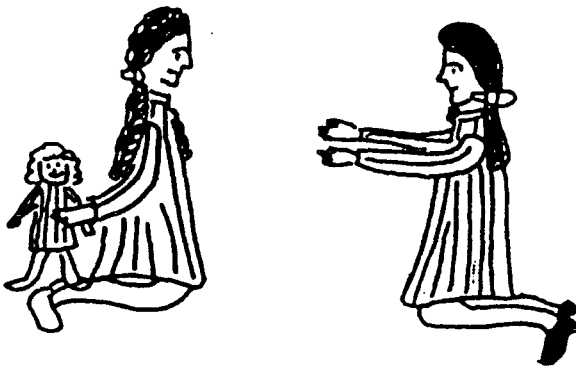


Picture 3

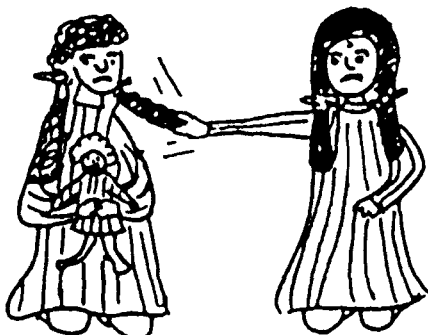
FIGURE 5.19 STORY 2 VERSION A (IDENTICALS)



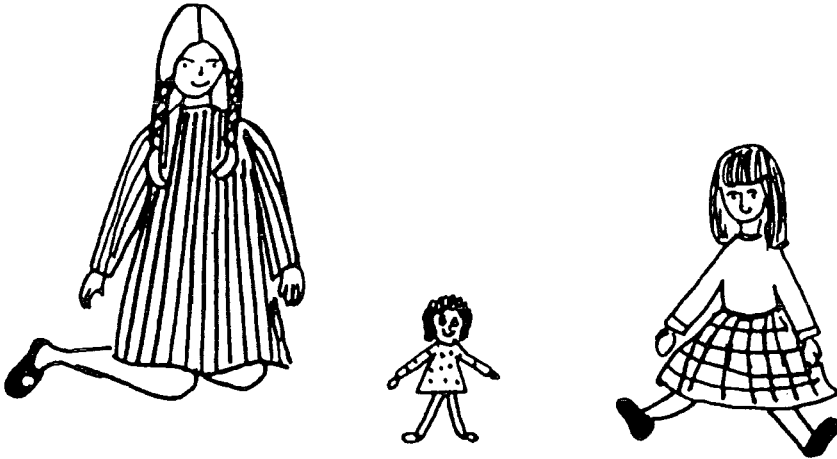
Picture 1



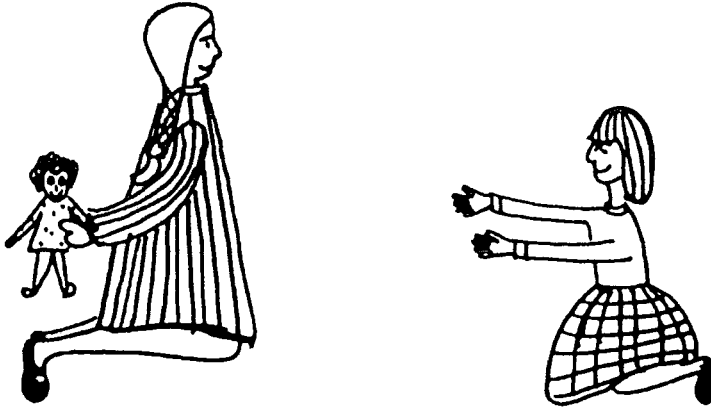
Picture 2



Picture 3



Picture 1



Picture 2

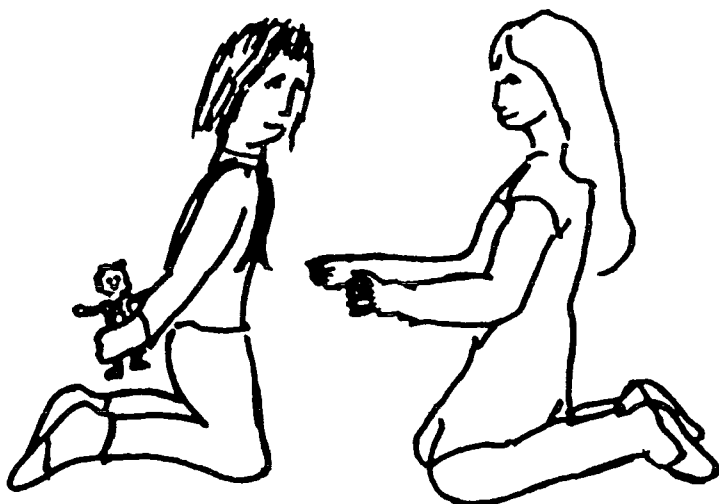


Picture 3

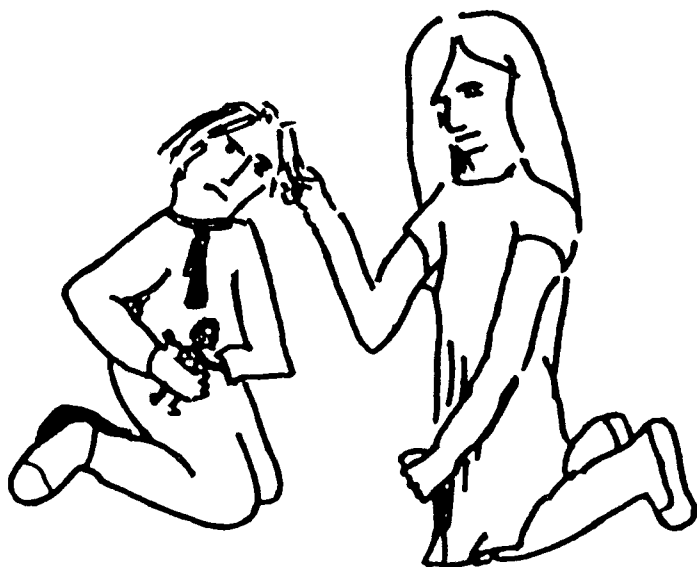
FIGURE 5.21 STORY 2 VERSION C (DIFFERENT GENDER)



Picture 1



Picture 2



Picture 3

Details of the determiners used are given in Appendix I Tables I.1 - I.3.

Responses have been divided into three categories for those subjects who mentioned both characters.

Category 1: Listeners are left in no doubt as to how many tokens, and of what type, to put into their model, e.g. two Xs, an X ... another X, a boy ... his Daddy, a girl ... her brother. Table 5.7 shows the total number of subjects in each age group whose first mentions of both characters came within this category. In the control condition with different gender characters this was the main strategy used (32 out of 36 children). In the Identical Version thirty-eight out of forty-three subjects introduced the characters in this way but in the Similar Version only thirty-five out of forty-seven subjects' responses came into this category.

Category 2: Listeners were left to infer, correctly, the existence of unique entities. Responses in this category included one, or two, definite descriptions, e.g. Different Gender : a boy ... the girl, the boy ... the girl; Identical : a X ... the other X; Similar : the boy ... the Dad. As Table 5.7 shows this strategy was used by very few subjects, by only four of the thirty-six children in the Different Gender Version, by seven subjects in the Similar Version but by no subjects in the Identical Version.

	Different Gender			Identical			Similar		
	1	2	3	1	2	3	1	2	3
4 yr olds	11	1	0	9	0	1	6	3	2
5 yr olds	10	2	0	9	0	1	8	3	1
6 yr olds	11	1	0	8	0	3	9	1	2
Parents	-	-	-	12	0	0	12	0	0
Total	32	4	0	38	0	5	35	7	5

Table 5.7. Numbers of children in each category (see text) for initial descriptions of both characters in the three versions of the stories.

Category 3: These responses are all inappropriate. Listeners would not know how many tokens to introduce and/or of what kind, e.g. the Xs, they, the X ... the X, he ... he, the X ... the other X. As can be seen in Table 5.7 inappropriate responses were never used in the control condition but were used five times in each of the other two versions.

In all three versions of the stories the majority of responses were in Category 1 where the listeners were explicitly told how many tokens and of what kind to put into their model. Combining age groups Sign Tests revealed significant preferences for Category 1 over the other two categories (Identical and Different Gender $p < .0005$; Similar $p < .005$; 1 tailed).

Within age groups Sign Tests confirmed the significant preference for Category 1 responses for all children's groups in the Different Gender Version (4 and 6 year olds $p < .01$, 5 year olds $p < .025$), for all except the six-year olds in the Identical Version (4 and 5 year olds $p < .05$, parents $p < .0005$) but only for the parents in the Similar Version ($p < .005$; 1 tailed tests). However, even though the differences in the Similar Version were not statistically significant the majority of responses came under Category 1. If we combine Categories 1 and 2, both of which are appropriate, then, with the exception of five-year olds in the Identical Versions, all age groups in all versions worded their descriptions in such a way that listeners would have the right number and kind of tokens in their models (Different Gender : $p < .0005$ for 4, 5 and 6 year olds; Identical : 4 and 5 year olds $p < .025$; parents $p < .0005$; Similar : 4 year olds $p < .05$; 5 year olds $p < .005$; 6 year olds $p < .025$; parents $p < .0005$; 1 tailed Sign Tests).

Second Mentions

Eleven of these subjects who had introduced both characters went on to mention only one of them again, or talked about both characters together, e.g. Two boys are playing with a car. They've broken it. Six of these subjects told the Identical Version (2 4 year olds, 1 5 year old, 3 6 year olds) and five told the Similar Versions (2 4 year olds, 1 5 year old, 2 6 year olds). None of the subjects who told the Different Gender Versions failed to mention the characters at least

twice (see Appendix I Tables I.4 - I.6 for details of determiners used).

Responses for those subjects who introduced both characters and mentioned both of them again are divided into three categories.

Category 1: Definite articles and pronouns. These would be the appropriate kind of references in the Different Gender conditions because there would be no doubt as to which token the new information should be linked, e.g. the boy ... the girl, he ... she. These were the only kind of responses used by the children's groups for the Different Gender Versions (see Figure 5.22). Within age groups the six-year olds ($p < .02$) and five-year olds ($p < .05$) used significantly more Category 1 responses in the Different Gender Version than in the other two versions combined. This difference was not significant for the four-year olds ($p > .2$). All two tailed Sign Tests. Considering only descriptions including the definite article even the four-year olds used significantly more in the Different Gender Version than in the other two versions combined ($p < .05$) and the difference for the five and six-year olds was highly significant ($p < .001$; 2 tailed tests) (see Figure 5.22).

Category 2: One ... the other, and explanatory modifiers such as the boy who broke the car. These would have been the obvious descriptions to use in the Identical Version, though they would also have been appropriate in the Similar Version if adjectives, e.g. big/little had not been used. No subject used Category 2 responses in the Different Gender Versions.

As Figure 5.23 shows this was the category most used by parents and six-year olds, and to a lesser extent by five-year olds in the Identical Version. However, less than half the responses for four-year olds fell into this category. Sign tests revealed that Category 2 responses were used significantly more often than Categories 1 and 3 combined in the Identical Versions by parents ($p < .001$) and six-year olds ($p < .05$) but not by five or four-year olds ($p > .2$), 2 tailed tests.

Within age groups all groups used more Category 2 responses in the Identical Version than in the Similar and Different Gender

Figure 5.22. Total number of definite articles and pronouns (Category 1) on second mention in the three versions of the stories.

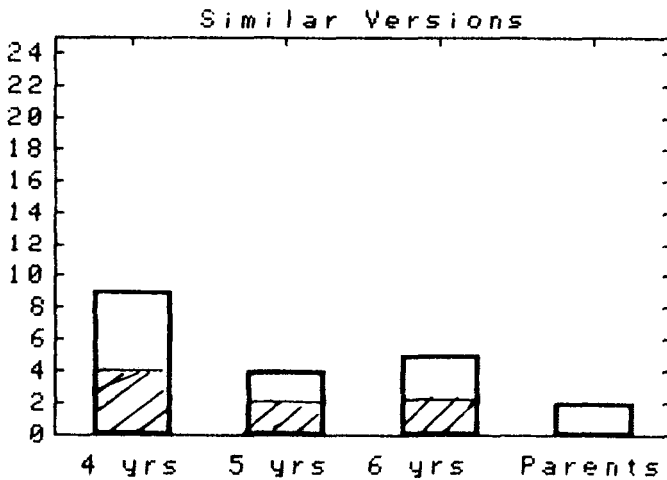
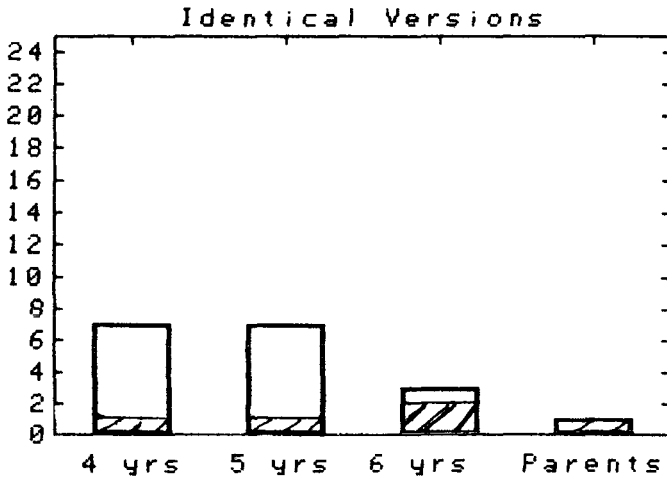
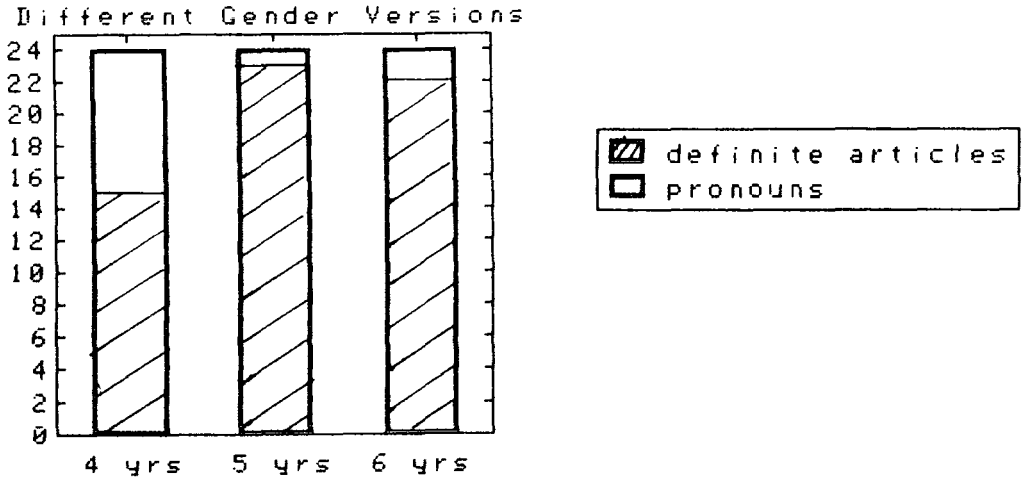


Figure 5.23. Total number of one ... the other and explanatory modifiers (Category 2) used on second mention in the Identical and Similar Versions of the stories.

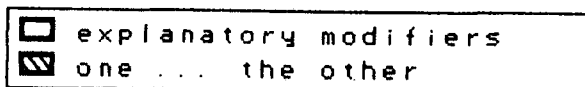
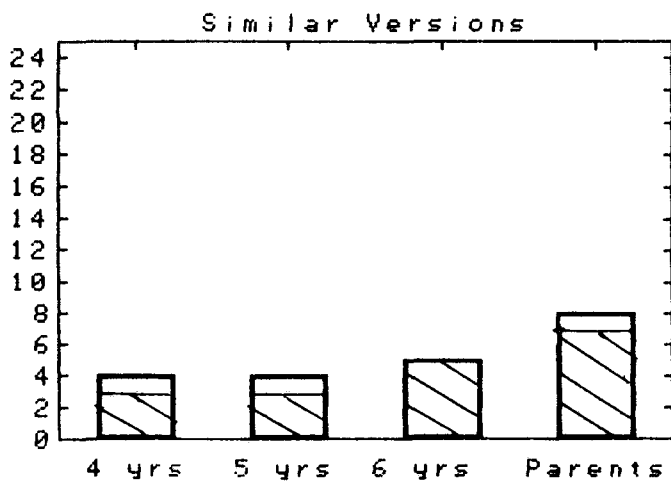
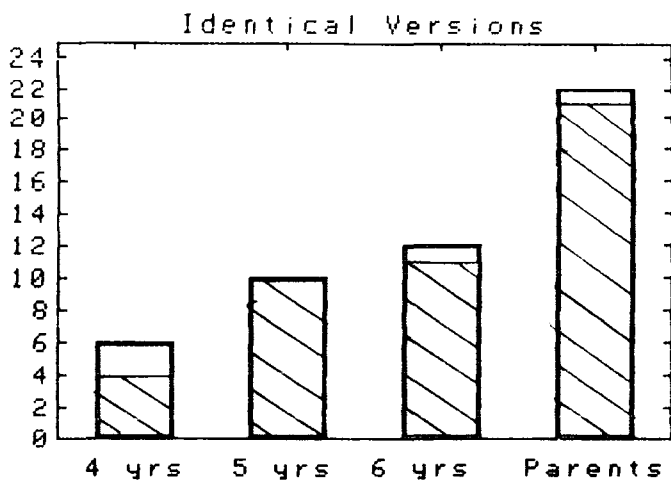
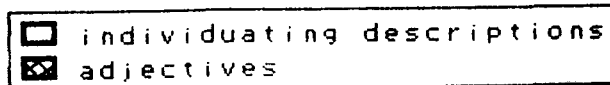
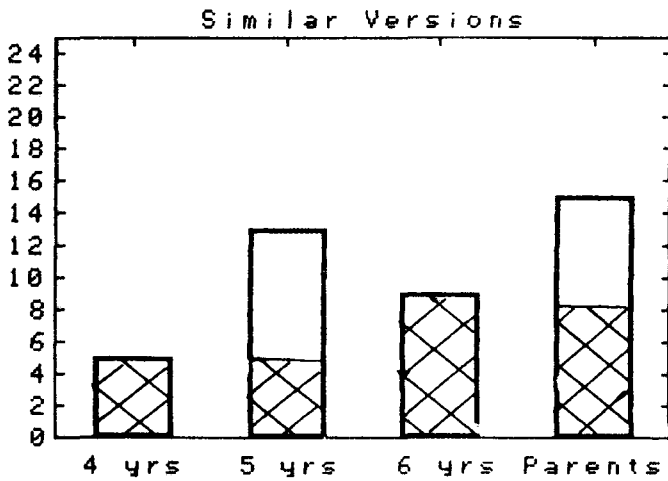
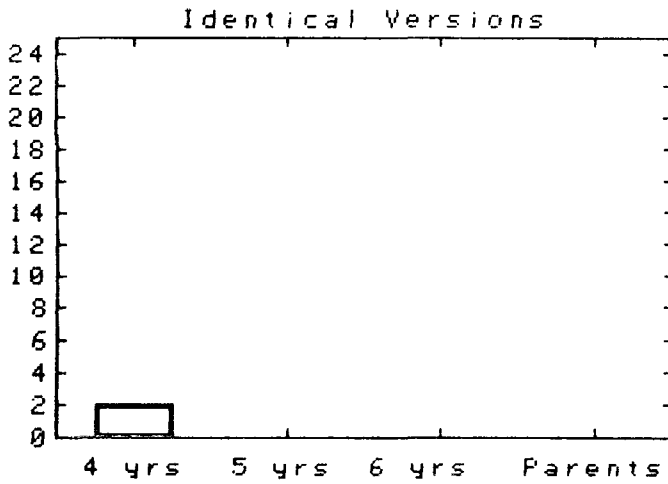


Figure 5.24. Total number of adjectives and individuating descriptions (Category 3) used on second mention in the Identical and Similar Versions of the stories.



Versions combined though this was significant only for the parents ($p < .02$, 2 tailed Sign Tests).

Category 3: Adjectives, e.g. big/small or individuating descriptions, e.g. Daddy ... Son. These would have been the most appropriate descriptions to use in the Similar Versions. In no group did all the subjects focus on the dimension of size (see Figure 5.24) and the number of responses in Category 3 was not significantly greater than in Categories 1 and 2 combined (2 tailed Sign Tests).

Combining Categories 2 and 3, both of which would have been appropriate for the Similar Versions, six-year olds ($p < .05$) and parents ($p < .001$) used these categories significantly more often than Category 1, five-year olds were marginally significant ($p < .1$) but the four-year olds did not differ ($p > .2$), 2 tailed Sign Tests.

Within age groups only the four-year olds used Category 3 in any other than the Similar Versions. However, whereas they used adjectives for the Similar Versions they used individuating descriptions in the Identical Versions, e.g. a Mam. Individuating descriptions were used only by parents and five-year olds in the Similar Versions.

Communicative Success

It was expected that the older the subject, the more likely he would be to communicate successfully, that is, to describe his model so that the listener would know which piece of new information was to be linked to which of the tokens representing a member of the class of boys or girls. This expectation was based on two findings from previous experiments. The first was that in the absence of feedback younger subjects were less likely to use adjectives to distinguish between similar objects which differed on only one dimension. Figure 5.24 showed that younger subjects did use fewer adjectives (as well as individuating descriptions) in the Similar Versions.

The second finding was that younger children were less likely than older subjects to use relative clauses or explanatory modifiers and partitives. These would be useful strategies to use in the Identical Versions and also in the Similar Versions if differences in size were not used. Figure 5.23 showed that four-year olds rarely

used such descriptions in either the Identical or Similar Versions. It was thought that younger subjects might have to rely on pronouns to mention characters for the second time, a strategy which, if used to refer to different characters, would be inappropriate in the Identical and Similar Versions of the stories. As Figure 5.22 showed, four and five-year olds used far more pronouns in the Identical Versions than the six-year olds or parents. The four-year olds also used more pronouns than the other groups in the Similar Versions.

Whether or not descriptions were successful was determined in the following way. All the protocols from each version, in turn, were transcribed and presented in random order to four independent judges. The experimenter described exactly what the experimental procedure had been so that the judges knew, as did the original listeners, that what was being described was a three-picture cartoon story. As they read each protocol the judges gave a running commentary as to who was doing what, that is, they described the discourse model they themselves were constructing as they read the protocol. The experimenter had a copy of the protocols in the four different orders in which they were presented to the judges and marked each expression that referred to one of the animate characters in one of five ways:

Score

- | | | |
|---|-----|---|
| 1 | ✓ | = correctly assign on first reading |
| 2 | ?✓ | = unable to assign at first but, after reading on, could correctly assign. |
| 3 | ? | = unable to assign |
| 4 | ? X | = unable to assign on first reading but, after reading on, assign incorrectly |
| 5 | X | = assign incorrectly. |

(See Appendix I Table B for a sample commentary)

All judges saw the Identical Versions first and the Similar Versions five to seven days later. Two judges saw all three Versions of all subjects but when it became obvious that very few referring expressions in the parents protocols or in the children's Different Gender Versions presented any difficulty whatsoever the third and fourth judges saw only the protocols from the three children's groups for the Identical and Similar Versions of the stories.

A mean rating score for each subject was obtained by dividing the total score for all referring expressions by the number of referring expressions x number of judges. The lower the score, the more successful the description : a perfect score would have been 1.0, i.e. all judges correctly assigned on first reading.

Table 5.8 shows the total number of referring expressions scored in the three versions and Table 5.9 shows the average rating score for each age group in each version. All children's groups performed better in the Different Gender Version than the other two versions. In fact only two subjects, both four-year olds, failed to obtain a 'perfect' score of 1.0 in the Different Gender Version. In this version, of course, neither the + N or pronouns would have been misleading.

	Different	Identical	Similar
4 yr olds	34	36	53
5 yr olds	56	54	51
6 yr olds	55	55	76
Parents	-	64	80
X	48.3	52.25	65

Table 5.8. Total number of referring expressions scored in the three versions.

	Different	Identical	Similar
4 yr olds	1.04	1.49	1.62
5 yr olds	1.0	1.21	1.49
6 yr olds	1.0	1.24	1.48
Parents	-	1.14	1.02
X	1.01	1.27	1.40

Table 5.9. Mean rating for each age group in the three versions.

Between Age Groups

Identical Versions: Jonckheere Tests with extensive ties revealed a significant improvement in successful communication with increasing age ($Z = 1.645$, $p < .05$; 1 tailed). However, when the parent group is excluded there was no improvement with age for the children's groups ($Z = .0919$).

Similar Versions: In this version parents differed most markedly from children (see Table 5.9). When they are included in the analysis Jonckheere Tests confirmed a significant improvement with age in communicative success ($Z = 3.3618$, $p < .0005$; 1 tailed) but again this trend was not found when the test was applied to the children's groups only ($Z = 0.1919$).

Within Age Groups

Mann-Whitney U tests revealed no significant differences between the three different conditions in any age group (4 year olds $U = 60$, 5 year olds $U = 37$, 6 year olds $U = 78$).

Discussion

The prediction that subjects would use indefinite descriptions to first mention the two characters in the story was confirmed. One hundred and fifteen of the one hundred and thirty-two descriptions would have enabled the listeners to set up discourse models with both characters in them. Only eleven subjects used the definite article to establish the existence of unique entities : seven in the Different Gender stories, e. g. the boy ... the girl and five in the Similar stories, e.g. the girl ... the Mummy. Misuse of the definite article was very low indeed, only two subjects in the Identical Version and one in the Similar Version said the boy ... the other boy and one subject in the Similar Version said the boy ... the boy.

Thus speakers of all ages demonstrated their ability to give descriptions which would enable listeners to introduce the right number and kind of tokens into their discourse models, and all age groups used indefinite descriptions significantly more often than definite descriptions in all three versions.

There were, however, some differences between the story versions

on first mentions. The younger subjects clearly found it more difficult to describe the two characters in the Identical Version than in the other two versions : two four-year olds, two five-year olds and one six-year old never mentioned the presence of a second character at all. It is unlikely that this was because they could not understand the story - all subjects who told the control version (Different Gender) mentioned both characters. Only one subject, a four-year old, failed to mention both characters in the Similar Version.

Further evidence to support the suggestion that subjects found the Identical Version more difficult comes from the fact that six subjects, two four-year olds, one five-year old and three six-year olds, having introduced two characters went on to talk only about one of them, or about both characters together, e.g. 'Two boys are playing with a car. He is standing on it and it's broken and he's happy', or 'Two boys are playing with a car. They've broken it'. Such responses were never used in the Different Gender Version which again suggests it is not difficulty in understanding the story that lies behind such descriptions. Subjects also found the Similar Versions more difficult than the control version : five subjects, two four-year olds, one five-year old and two six-year olds also avoided mentioning the two characters separately after the initial introduction.

Second and subsequent mentions also reveal different degrees of difficulty in describing the characters in the three versions of the story (see Tables I.4 - I.6 in Appendix I). Eighteen of the second and subsequent mentions in the Identical Versions were references to both characters together, e.g. 'They are fighting', but only five of the second and subsequent mentions in the Similar Version were of this kind and only one in the Different Gender Version. Again it is clear that it is not difficulty with the story itself that is responsible but subjects' difficulty in describing their models for the listeners.

One striking difference in the second and subsequent mentions was with respect to the use of the definite article. There were very few such descriptions in the Identical and Similar Versions where they may have been misleading but a high number in the Different Gender Version where they would not be misleading. It would appear that subjects in all age groups are aware of the needs of the listener when that listener is totally ignorant of the content of the pictures and aware

of the fact that the definite article should be used only when entities are uniquely identifiable.

It is noteworthy that subjects preferred definite NPs to pronouns even when, as in the Different Gender Versions, pronouns would have been completely unambiguous. It would seem that even four-year olds show a sensitivity to discourse constraints (c.f. Karmiloff-Smith, 1985). Pronouns, in fact, were very much a minority response and, as in previous experiments (e.g. Emslie 1978; current Experiments 1 and 2), were used more by younger subjects than older subjects. The four-year olds used more than the five or six-year olds in the Different Gender Versions in which pronouns would have been appropriate, but also used more in the Similar Versions where pronouns may have been misleading. Both four and five-year olds used more pronouns than six-year olds or parents in the Identical Version suggesting again, perhaps, that this was the most difficult condition for the younger subjects.

Whether or not pronouns are misleading depends on whether they are being used for the same character, e.g. the boy ... he ... he, or whether successive pronouns refer to different characters. Many of the pronouns subjects used were second mentions of the same character, but some of the younger subjects used successive pronouns to refer to different characters. 54% of descriptions which judges incorrectly assigned involved a pronoun as did 48% of those where the judges could not assign reference. Only 24% of incorrectly assigned reference and 10% of the unable to assign references involved the definite article (see Appendix I Table I.7 for details of unsuccessful references).

Overall, there was quite a low percentage of unsuccessful references. Combining the incorrect and don't know judgements there is a mean of 10.8% in the Identical Version and 13.3% in the Similar Version with parents, as well as children, contributing one or two 'errors'.

On the whole, given the difficulty of the task, the children performed remarkably well. Their main problems arose in the Identical Versions, and in the Similar Versions when they did not use size to distinguish between the two characters, and seems to have been due largely to their not using explanatory modifiers such as 'One of the Xs ... the other X', 'the first X ... the second X' which were used by

older subjects and parents. Without such modifiers children seemed to have been forced either to avoid mentioning both characters or to rely on pronouns. Some subjects in the Similar Version even used indefinite descriptions on second mention which were never used in the Identical or Different Gender Versions (see Table I.2 in Appendix I). Such descriptions violate the principle of anaphoric conservation.

1. The number of similar objects chosen varied from block to block. In Block A there were always 10 similars since the Experimenter chose the objects but subjects were free to choose their own objects in blocks B and C hence the different numbers of similar objects.

CHAPTER SIX

DISCUSSION

6.1 Summary of Results

The experiments in this thesis investigated two main contextual factors which influence children's use of the definite and indefinite articles in referring expressions. The first factor is the knowledge of the listener and the second is the composition of the referential array.

The first five experiments were mainly concerned with the knowledge/ignorance of the listener but the presence/absence of the referents was also varied in Experiment 2. With the exception of Experiment 5 B Versions, the referents were always the only one of their kind in the films or pictures. In these experiments the listener either knew nothing at all about the films and pictures (Experiments 1 and 5, Experiment 2, L_I conditions, Experiments 3 and 4, L_I condition) or knew exactly as much as the speaker (Experiment 2, two L_K conditions, Experiments 3 and 4, L_K condition). The referents were either physically present (Experiments 1, 3, 4, 5 and Experiment 2, two R_P conditions) or physically absent (Experiment 2, two R_A conditions).

The results of these experiments showed that from the age of three-years seven months the crucial factor in young children's use of the articles is their perception of the knowledge of the listener : when a listener is ignorant children of all ages will use indefinite rather than definite descriptions to mention a referent for the first time. That children use indefinite descriptions because they intend to identify referents for their listener was demonstrated in Experiments 2 - 4. Experiment 3 was particularly important because it showed that the same child will alter his pattern of article usage according to the knowledge of the listener : the child uses indefinite descriptions when the listener is ignorant and definite descriptions when the listener is knowledgeable. It was concluded that children know that their choice of referring expressions depends on the

knowledge of the listener and that they can demonstrate this awareness if the task is suited to their cognitive abilities. Experiment 1 confirmed Emslie and Stevenson's (1981) suggestion that differences in materials were responsible for the differences in results between their experiments and that of Warden (1976 Experiment III) and demonstrated that if a task becomes too difficult for children, as with the Warden's cartoon stories, and they have difficulty in either constructing or describing their own model then they will not take into account the needs of the listener and may violate both the principle of unique identifiability and of anaphoric conservation.

One further finding of Experiment 2 was that the presence or absence of the referents had little effect on children's use of the articles in an event description task : the crucial factor was the knowledge/ignorance of the listener.

Experiments 2 - 4 demonstrated that previous studies which had used story-telling tasks with pre-school children (e.g. Emslie and Stevenson, 1981; Bennett-Kastor, 1983) had not over-estimated their understanding of the use of the articles since the task of describing a 'real life' video-taped event produced results similar to those of a story-telling task. It would also seem that a story-telling task like the Emslie and Stevenson cartoon pictures in Experiment I had been a fair test of school-age children's use of the articles since, on the whole, the results were similar to those in Experiments 2 and 3.

The results of Experiments 1 - 4 lend some support to the suggestion made in 2.1.E that the 39% inappropriate descriptions from the seven-year olds and 13% from the ten-year olds in Hickmann's (1980) experiment may have been a result of task difficulty since the seven-year olds in the current investigation had no such problems with the Emslie and Stevenson story in Experiment I or with the cartoons or videos in Experiments 2 - 5 and 9. It seems possible that the inappropriate descriptions in the Hickmann experiment resulted either from a breakdown at the stage at which children need to take into account their listener's model of the events being discussed (as in Category 3 in the telling of the Warden stories in Experiment 1) or from problems children had in constructing and maintaining their own models of the events (Categories 1 and 2 in the telling of Warden's stories in Experiment 1). It is possible that children may fall back

on a fairy story telling format where the main animal characters are treated as quasi-knowns (e.g Bennett-Kastor, 1983) in order to organise the information about the non-participants in their own mental models of the events. These, of course, must remain suggestions since the only direct test would be to expose subjects both to the Hickmann cartoons and to the pictures or videos used in the current experiments. However, the explanation put forward does tie in with a recent suggestion by Johnson-Laird et al (1986) that the development of children's syllogistic reasoning depends on their ability to construct and manipulate models (Johnson-Laird, Oakhill and Bull, 1986) and that the more difficult it is for children to construct a model and the more models it is necessary to evaluate the more likely it is that children will draw invalid conclusions.

There was no evidence at all in the first five experiments of this thesis of a stage at which children over-use the definite article which Maratsos (1976) had found with some of his four-year olds and Warden (1976) had found with his under five-year olds. At no stage do children regularly violate the principle of unique identifiability when they tell a story or describe an event. It is not, however, being claimed that children never use definite descriptions to mention a referent for the first time when their listener is ignorant. Children, and parents, do sometimes use definite referring expressions but in the majority of such cases these descriptions specify the nature of the token the listener must add to his mental model and the links between this token and ones already in the listener's model, e.g. a girl ... her Mummy, a man ... his suitcase.

The extent to which subjects took their listener's general knowledge of contexts into account when choosing a definite or indefinite referring expression seemed quite limited. Few subjects in any of the conditions where the listener was ignorant used the definite article for objects which would normally be unique in a given setting (e.g. clock in Experiment 5) and few speakers used the definite article for objects or individuals who were, in fact, the only one of their kind in the context (Experiments 1 - 5 and 9). The preferred strategy both for children and parents was to use an indefinite description on first mention when the listener was ignorant.

Experiments 6 - 9 were mainly concerned with the effects on children's choice of referring expressions of the composition of the referential array but there were also variations in the presence/absence of the array, whether there was one array or two, and whether the listener knew/did not know the composition of the array.

In all four experiments the array comprised either singletons (that is, entities which were the only member of their class), identicals (that is, there were two or three identical entities present) or similars (that is, there were two or three members of the same class present but they differed from one another either with respect to colour or size) or some combination of these three groups. Experiment 6 used three kinds of groupings, singletons, singletons plus identicals, singletons plus similars, Experiments 7 and 8 used singletons plus identicals plus similars and Experiment 9 used either singletons or identicals or similars.

In Experiments 6, 7 and 8 both speaker and listener knew the composition of the array when each trial began but in Experiment 6 there was only one array, which was not visible to speaker or listener when the speaker referred to a hidden object, whereas in Experiments 7 and 8 speaker and listener had their own identical arrays which remained visible throughout each trial. In Experiment 9 the composition of the array was not known to the listener though the referents were visible to the speaker throughout his narrative.

Experiments 6 - 8 showed that there was a clear effect of the status of a referent within an array on children's use of the articles. As far as the definite article is concerned children of all ages were discriminating in their use of the + N responses and reserved them almost entirely for singletons, that is, definite descriptions were used for entities which were unique in the array. The results were clearest in Experiment 6 where there was only one array and that array was not visible when the child gave his description. When speakers and listeners had their own array, as in Experiments 7 and 8, the + N was still the dominant response for singletons but there was an increase in article omission. The fact that the definite article was omitted in no way affected the listener's ability to identify the referent in these experiments. The children were highly discriminating in their use of the definite

article. According to Karmiloff-Smith (1979) young children are unable to take into account the status of a referent in the array when using the definite article. However, it is argued in this thesis that the crucial factor underlying the use of the articles is not the status of an object in the array but the status of a token for that object in the speaker's and listener's models, and considered from this perspective children even as young as three-years of age are sensitive to the status of the referent in the listener's model. Once one takes into account the state of the listener's model then Karmiloff-Smith's results become less surprising and more attributable to the fact that the listener (the experimenter) always knew which object had been hidden.

Although Experiment 6, the Paper Bags, was not designed to follow up Garton's (1982) study (since the Paper Bags was actually completed before Garton's study became available), it does lend support to one of the criticisms of her study made in 2.2.B which was that there was no justification for her expecting young children to use the definite article for an object simply because they had named that object first. All the objects in each bag were named in the Paper Bags and yet this did not lead to the definite article being used for all objects : definite articles, as the mental model theory predicted, were reserved for singletons.

Turning now to the use of the indefinite article in Experiments 6 - 8 it was clear that children were aware of the essential partitive or 'exclusive' nature of the indefinite article because indefinite descriptions were reserved for objects which were one of several identical or similar objects. The fact that indefinites were not used for unique objects (singletons) was proof that when subjects used indefinite descriptions they were not simply naming objects. In all three experiments identical objects, as predicted by the mental model theory, elicited the most indefinite descriptions for there are other more informative means of referring to similars (e.g. the definite article + a modifier) if one wishes to single out a particular entity from a group of objects which differ from each other in at least one respect, e.g. colour or size.

It was the trials involving similar objects that produced some of the most unexpected results in this thesis. In Experiments 6 - 8

performance was affected by the composition of the referential array, the child's perception of the purpose of the task and the choice of descriptions in those trials which involved similar objects of different colour. There was a low percentage use of colour modifiers by school-age children and no use of colour terms by pre-school children in Experiment 6 where subjects had to say which objects in a known but not visible array had been hidden. It was suggested that subjects may have seen the task as one which required them to distinguish between classes of objects rather than between individual members of a class because although they took into account the fact that there was more than one class member present (that is, they did not use the definite article for similars) they did not use a description which would have enabled the listener to distinguish between two potentially distinguishable tokens (that is, they did not use a colour modifier).

Experiment 7 attempted to provide a task in which subjects would appreciate the necessity to distinguish between similar objects but there was still very little use of modifiers by pre-school children and not only did this use decrease over trials but listeners' hesitations decreased also. It was suggested that pre-schoolers interpreted the word 'same', which was used both in task instructions and in the question asked by the experimenter when the chosen animals were held up for comparison, to mean 'member of the same class' rather than 'identical' or 'same colour'. The task, therefore, had not succeeded in creating a context where pre-schoolers would appreciate the necessity to distinguish between similar objects.

School-age children, in contrast, increased their use of colour terms across blocks, therefore the task did seem to have created an appropriate context. However, there was no improvement within blocks and even though several listeners hesitated before choosing an animal no five-year old asked for clarification and even the older subjects, though hesitating, did not always ask for further information. Although subjects were reminded that they could ask the speaker if there was any animal they weren't sure about very few listeners did so. It was suggested that the lack of improvement within trial blocks may have been due to the competitive nature of the game. This would explain the speaker's use of inadequate descriptions but not the failure of the listener to ask for clarification.

There are several possible reasons for listeners' failure to ask questions. Firstly, subjects may have been so bored with the task that they did not care whether the message was adequate or the correct animal selected (e.g. Warden, 1981, b) and secondly subjects may not have detected the inadequacy or ambiguity of the message (e.g. Bearison and Levy, 1977; Ironsmith and Whitehurst, 1978). However, if either of these two factors was true not only would subjects not have asked questions they would not have hesitated either.

There were twenty-three non-hesitating non-question-asking responses to inadequate messages from five-year olds, five from six-year olds and five from seven-year olds, thus it seems possible that some subjects, especially five-year olds, were either too bored to notice or did not detect the inadequacy of the message. However, this still does not explain the four occasions when five-year olds hesitated or the six occasions when six and seven-year olds hesitated but did not ask. Possibly listeners thought their goal was to "guess" correctly and that asking for a clue was not part of "the game". However, Flavell, Speer, Green, and August, (1981) and Patterson, Cosgrove, and O'Brien, (1980) have shown that even when children do notice that a message is ambiguous (i.e. they look puzzled etc.) younger subjects are less likely than older children to ask for clarification or state that the message is ambiguous. Such results, however, are modified by the eventual outcome of the ambiguous message. Sonnenschein (1984), for example, showed that simply watching a listener select the wrong referent was enough for five-year olds to realise there had been a communication failure. Unfortunately in Experiment 7 listeners could select the correct referent by chance and in fact did so on nineteen occasions (eleven times for 5 year olds, once for 6 year olds, 7 times for 7 year olds). Thus one of the reasons for listeners failing to ask for clarification may have been due to the fact that inadequate messages quite often for the five and seven-year olds resulted in the correct referent being chosen.

Experiment 8 not only created a context in which even three and four-year olds appreciated the necessity for distinguishing between similar but different coloured objects but also ensured that no inadequate message resulted in the correct animal being chosen. Twenty-two of the fifty subjects, including four three-year olds and

five four-year olds, appreciated the obligatory nature of colour modifiers from the very first trial. A further twenty-two subjects used the feedback from inadequate messages to amend subsequent descriptions of similar objects. Only three subjects (two 3 year olds, one 4 year old) failed to reach criterion in any block of trials and only a further three subjects (two 5 year olds, one 7 year old) failed to use colour modifiers consistently by the third block of trials.

Clearly, almost half of the subjects did not need feedback to appreciate the necessity for giving unambiguous referential descriptions and of the remaining 56% most subjects needed feedback from only one inadequate description. Feedback was of two kinds : there was visual feedback, that is, the trays did not rise together and the listener held up each animal in turn so the speaker could compare the listener's choice with his own (c.f. Sonnenschein, 1984) and there was verbal feedback in that the listener repeated the speaker's description of each animal. Deutsch and Pechmann (1982) showed that simply repeating the speaker's description in question format resulted in speakers providing unequivocal descriptions in almost all cases (even 3 year olds increase their adequate messages from 13 to 89%). In the current Experiment 8 even without the question format nearly all speakers gave unambiguous descriptions on the next trial which indicates that they did appreciate that their initial descriptions had been inadequate.

The results are similar to those of Garton (1983) who, in the blindfolded condition, repeated the question 'Who is the farmer talking to?' and found that none of her three-year olds simply repeated what they had already said but greatly improved the quality of their message.

The few subjects who did not reach criterion (two 3 year olds, one 4 year old) apparently did not realise their descriptions were ambiguous and it seems possible that if they were given the Robinson (e.g. 1978) 'Whose fault was it?' kind of task these subjects would fall into what Robinson has termed listener blamers.

The final experiment was in many respects the most difficult for the subjects since, unlike Experiments 6 - 8, the listeners did not know the composition of the referential array and yet speakers of all

ages demonstrated their ability to give descriptions which enabled the listener to introduce the right number and kind of tokens into his discourse model. Moreover, a high percentage of all second and subsequent mentions would have enabled listeners to distinguish between identical and similar tokens in their models. This final experiment confirmed the findings of previous experiments that children can take into account the status of a referent within an array, can create discourse referents and can maintain discourse cohesion, that is, they can maintain reference intralinguistically.

6.2 Children's Use of the Articles

The results of the experiments suggest that although children can, and do, take into account the status of an object within a referential array the over-riding factor in their choice of referring expression is their perception of the knowledge of the listener.

As far as the definite article is concerned all age groups used definite descriptions for objects which were the only one of their kind in the experimental context but this was only when the speakers knew that the listener already knew that the object was unique. Children used the definite article for singletons in Experiments 6 - 8 but did not use the definite article for singletons in Experiment 9 until the objects had been identified for the listener, that is, until the referents were mentioned for the second time. A similar pattern of results was found in other experiments too, for all the video films in Experiments 2 - 4 involved unique entities, for example, a boy and a girl or a man and a woman, and yet only in the listener knowledgeable conditions did subjects use definite descriptions on first mention. It was argued in Chapter One that it is uniqueness in a model, not in the world, that governs the use of definite descriptions and this is how young children appear to use the definite article. In Experiments 6 - 8, and in the listener knowledgeable conditions in Experiments 2 - 4, listeners and speakers had the same perceptual information available and thus speakers could assume that listeners had the same number and kind of tokens in their models as they themselves had, thus an object which was unique in the array

(i.e. a singleton) would have a corresponding unique token in both speaker and listener's model and could be referred to with a definite description. In Experiments 1, 5 and 9 and in the listener ignorant conditions in Experiments 2 - 4 only the speaker had the perceptual information necessary for his mental model construction and although he had unique tokens in his model of the events the listener had no such tokens. Whereas the speaker could use a definite description to describe unique objects in his model he could not use such descriptions appropriately to refer to corresponding tokens in his listener's model until he had first given the listener the linguistic information which would enable him to construct a similar model. Children seem very aware of this for when the listener was ignorant they identified singletons for the listener, that is, they used indefinite descriptions to instruct the listener to put a token representing the particular object in his model and then used definite descriptions to refer to that object.

As for the use of the indefinite article, again the knowledge of the contents of the listener's model seems to be the most crucial factor for children used the indefinite article to mention a referent for the first time when the listener was ignorant regardless of the status of that referent in the array. Thus when the referents were singletons in Experiments 1, 5 and 9 and in the listener ignorant conditions in Experiments 2 - 4, children used the indefinite article but children did not use the indefinite article for singletons when a listener was knowledgeable in Experiments 2 - 4 and in Experiments 6 - 8. Children seem, therefore, to be well aware that the indefinite article is used to instruct the listener to add one token to his model. When the listener is knowledgeable the use of the indefinite article depends on the status of the referent : indefinite descriptions were not used for singletons but were used to first mention a referent which was one of two or more identical or similar objects in Experiments 6 - 8, and indefinite descriptions were used on second mention of a referent in Experiments 5 and 9 when the speaker's first mention had instructed the listener to add two or more identical tokens to his model. It would seem, therefore, that children are also aware that a second use of the indefinite article is to single out one of two or more identical tokens in the listener's model.

Although there is a great deal of evidence for the suggestion that even in children as young as four-years of age perception of the status of a referent in their listener's model exerts a greater influence on their choice of referring expression than the status of that object in the world, the suggestion is based mainly on the contrast between Experiments 6 - 8 and 9 with additional evidence being drawn from Experiments 1 - 5. Unfortunately the only direct test of the influence of the knowledge of the listener was in Experiments 2 - 4 where almost all the referents were singletons. Nevertheless, these were strong tests of the influence of the knowledge of the listener since the same task and materials were used when the listeners were knowledgeable as well as ignorant. However, when the composition of the array was varied (Experiments 6 - 9) there were also differences in task between the listener being ignorant (Experiment 9) and knowledgeable (Experiments 6 - 8). In the former task subjects told a story where the singletons, identicals and similars were humans whereas in the latter they described a static array of toys in determiner (+ modifier) + noun or single sentence responses. One needs to be sure the difference in article usage are not simply the result of either the kind of task used or the kind of objects used.¹ One could test for this by having an experiment in which there were two listener conditions, ignorant and knowledgeable, two kinds of arrays in each listener condition - static and animate, and two types of task - selecting items where the responses would be of the form a/the + N, and describing scenes when children would produce narratives. Such an experiment would be a very strong test of the suggestions made above.

In sum, children between the ages of three and a half and seven and a half years use the indefinite article to instruct the listener to add one token to his model (Experiments 1 - 5 and 9) and also use it to single out one of two or more identical tokens in the listener's model (Experiments 5 - 9). The definite article is used to refer to

1. There was, of course, one narrative experiment, Experiment 5, where the number of inanimate objects was varied but these objects had been chosen because, as singletons, they had produced an unusual pattern of determination. This would, therefore, not seem as fair a task with inanimates as Experiment 9 was with animates.

an object which the speaker knows is unique in the listener's model either because the listener is currently looking at the object with the speaker (Experiment 2 Listener Knowledgeable Referents present), the listener has had available the same perceptual information as the speaker (Experiments 2 - 4, L_K conditions, Experiments 6 - 8) or the speaker has previously identified a referent for the listener and now uses the definite article anaphorically (Experiments 1 - 5 and 9). Very rarely is the definite article used to establish the existence of a unique referent (Experiments 1 - 5 and 9). From about the age of four children also seem to be aware of the principles of anaphoric conservation and unique identifiability : they do not use the indefinite article to refer to previously mentioned unique referents (Experiments 2 - 5 and 9) nor do they use the definite article when there is more than one token of the same type in their listener's model (Experiments 6 - 9). However, there are factors which can interfere with children's application of the knowledge of the rules or principles for article usage and, although in the experiments reported here instances of inappropriate usage were rare, when they did occur these factors seem to affect children of different ages in different ways.

6.3 Age Differences

Age differences in this study were minimal. The differences that did emerge concerned article omission, the use of modifiers and the effect of task difficulty.

Article omission was very rare in the three and four-year old age groups. It seems that once children are aware that common nouns have determiners they consistently use determiners with such nouns. Article omission was more common in the school-age children though it should be stressed that this was always a minority response and was confined almost entirely to noun phrase only descriptions in Experiments 7 and 8. When children did omit determiners the highest incidence was always in trials involving identical objects, then singletons and least of all similar objects. Article omission, of course, is not misleading in identical and singleton trials as it

does not result in the listener selecting either the wrong object in the world or identifying the wrong token in his mental model for if there is only one dog in the array then dog will identify it as well as the dog and if there are three pigs then pig will identify the right kind of creature just as well as one of the pigs or a pig. Generally speaking article omission was highest in the five-year old groups in Experiments 7 and 8 with the seven-year olds not far behind though only in response to identical objects : the age differences that were found in the percentage use of indefinite descriptions for identicals in Experiment 8 between the five and seven-year olds and the three and four-year olds were due to the older subjects omitting articles in 49% of responses. The only occasion on which five-year olds differed significantly from other subjects was in their article omission in similar trials in Block C in Experiment 7 and in Experiment 8. However, again it must be pointed out that article omission was a minority response for five-year olds accounting for only 25% of descriptions of similar objects in Experiment 8 and 41% in Block C Experiment 7.

Turning now to age differences in the use of modifiers, younger subjects always used less than older subjects though the differences were significant only in Experiment 6 and Blocks B and C in Experiment 7. Given that pre-schoolers did use colour modifiers in Experiment 8 one needs to consider why the age differences occurred in Experiments 6 and 7. There were no adjectives at all from pre-schoolers in Experiment 6 where similars were treated like identicals but since only three five-year olds, seven six-year olds and ten seven-year olds out of twenty in each age group used modifiers it seems likely that those subjects who did not use them did not see the task as one requiring a distinction to be made between two objects of different colour. Age differences, then, seem likely to be due to differences in task perception.

The age differences that occurred in the use of modifiers in Experiment 7 were again almost certainly due to age differences in task perception rather than differences in appreciation of the determinor function of the definite article + modifier, and the differences in task perception were due to differences in understanding of the word 'same' which was used both in task

instructions and object comparison : three and four-year olds interpreted same to mean same kind, five six and seven-years olds to mean same class and same colour.

The pattern of results with colour modifiers in Experiments 6 - 8 and size modifiers in Experiment 9 suggest that when children between the ages of about four and seven appreciate the need to distinguish between similar entities they will attempt to do so. However, as Experiment 9 showed, not all children do so in the most economical way possible, that is, by focussing on the feature which distinguishes one similar object from another. In the similar version of the cartoon story in Experiment 9 the characters were different sizes but only five of the nine four-year olds, nine of the eleven five-year olds and six of the ten six-year olds who attempted to refer to both characters focussed on that dimension. Moreover, only four four-year olds, four five-year olds and five six-year olds relied on modifiers, i.e. adjectives, to make the distinction, all the others used descriptions like Daddy/son or boy, Mummy/daughter or girl.

Finally, we come to age differences which resulted from task difficulty. The experiment in which this was most clearly seen was Experiment 1 but there were also some interesting age differences in Experiment 9.

When a task is so difficult that children cannot construct their own model of the character or incidents to be described they fall back on naming statements (Experiment 1). This is most common in pre-school children and decreases with increasing age. When children have constructed their mental model but have difficulty in describing it then there are at least three things they may do. Firstly, they make take the easiest way out and simply avoid mentioning the referents altogether (Experiment 9). Secondly, they may avoid describing what happened, that is, avoid specifying the links between tokens and fall back on existential statements like 'There's a cat and a dog', or 'the cat's there', or they may use naming statements (Experiments 1 and 9). Thirdly, they may, in their struggle to describe their own model, fail to take the listener's needs into account and over-use the definite article on first mention. Since older subjects are more likely than pre-schoolers to attempt to describe their models it is the younger subjects who are most likely

to provide responses which fall into the first two categories and older subjects whose response are most likely to fall into the third of the above categories.

The difficulties children have in describing their models seem to stem from problems in understanding the materials (e.g. Experiment 1) or because of a restricted range of mainly definite descriptions : relative clauses were rare and many children seemed not to know - or at least did not use - useful pairs of descriptive terms like one X ... the other X, the first X ... the second X, and tended to pair the descriptions they did have as a/one boy ... another (one) boy, the boy ... the other boy. The younger the child, the less likely he was to use the descriptive pairs which would have been most useful for the identical and similar characters in Experiment 9. Relying mainly on pronouns and the definite article for second mentions, then, pre-schoolers sometimes have difficulty in providing descriptions which enable the listener to distinguish between two identical or similar tokens in his model (Experiment 9). In fact younger subjects always used more pronouns in the narrative tasks than older subjects both on first mention of a referent in the listener knowledgeable conditions in Experiments 2, 3 and 4 and on second mention of a referent in Experiment 9 and the Emslie and Stevenson stories in Experiment 1. It is possible that the greater use of pronouns by pre-schoolers (as opposed to the greater use of the + modifier + noun by school-age children) is a result of task difficulty rather than a lack of awareness of the greater possibility of ambiguity of pronouns since pre-school subjects used far fewer pronouns when there was possible ambiguity (e.g. second mention of the animals in the Warden stories, Experiment 1 and second mention of the two boys or two girls in the identical and similar versions of Experiment 9) than they did when the referents were singletons and there was no possibility of ambiguity (e.g. second mentions in the Emslie and Stevenson stories in Experiment 1, different gender version in Experiment 9).

There was, in this investigation, no sign of the three stages of article acquisition suggested by Karmiloff-Smith (1979, 1985) or of the discontinuity in development noted by psycholinguists in recent years (e.g. Bever, 1982; Bowerman, 1982). Karmiloff-Smith suggests that the acquisition of the article system may fall into the following three stages :

Stage 1 (approximately 3-5 years)

Procedural Success. Children seem to be using the articles where adults would but they are not necessarily basing their language on adult-like linguistic competence. The child stores representations of many forms and functions which are unconnected to one another thus there are no connections between the articles, each aspect of the article system is stored independently.

Stage 2 (approximately 5-8 years)

The child begins to combine these distinct forms and functions into a complete system which contains contrastive sets (e.g. a/the for identical/singleton). The article system is in a state of flux, therefore, and the child over-marks the distinctions conveyed by the articles and uses grammatically incorrect forms.

Stage 3 (approximately 8+ years)

Almost all redundant marking and ungrammatical forms disappear and the child now endows morphemes with plurifunctional status. The child has now acquired the complete adult system of determination.

It is true that the five-year olds in the current study sometimes performed slightly less 'accurately' than three and four-year olds or six and seven-year olds, but the differences were not statistically significant except as far as article omission was concerned and in other cases, for example, in the use of modifiers, and in the use of the definite article on second mention, there was a linear increase with three and four-year olds using less than five-year olds who in turn used less than six and seven-year olds. Moreover, inspection of all responses in all experiments fails to reveal either incorrect agrammatical forms or over-marking which Karmiloff-Smith states is characteristic of Stage 2 children. The failure to find the kind of evidence which Karmiloff-Smith found may be due to the state of flux

manifesting itself in different ways in French and English (the articles in French conveying many more distinctions than their equivalents in English) or, as seems more likely from the experiments in this thesis, there is no real regression and the over-marking and agrammatical forms are not a result of any problems children are having with language per se at least as far as the article system is concerned. It seems possible that over-marking and agrammatical forms are a result of age differences in children's reaction to the tasks and experimenter's questions. Karmiloff-Smith and Garton, it will be remembered, were asking children questions about objects the identity of which they already knew : exact verbal description of those objects was not necessary, the definite article or a pronoun would have been adequate. When Garton (1983) refused to accept such an answer, replaced her blindfold and made the children try again, she found instances of over-marking even in three-year olds (e.g. the black cow sitting down when the other cow was black and standing up). These children in Garton's experiment seem to have realised that the experimenter wanted more than an adequate referring expression : their perception of the purpose of the task changed.

It is being suggested, then, that the Stage 2 which Karmiloff-Smith describes may be a result of changes in task perception and it seems possible that this change may result from the effects of the child beginning formal education. For pre-schoolers (up to 4+ in England) a game with a 'teacher' can be taken at face value until the teacher indicates otherwise. But games at infant school are what happens in the 'play area' (e.g. Wendy house, sweet shop) of the classroom or in the playground. If a teacher sits beside a child at his desk and puts down a set of toys she is not giving the child something to play with, she is testing him or teaching him. 'How many have you got?' etc. in Maths, 'What colour are these?', 'Do you know what these shapes are called?' etc. It is possible that the agrammaticalities and over-marking noted by Karmiloff-Smith are a result of children covering all eventualities as they try to work out what the purpose of the experimenter's questions are, for it can't be object identification because she already knows the object to which they are being asked to make reference.

There is some evidence from the current investigation that five

to six-year olds may see the tasks differently from younger and older subjects. For example, in Experiment 5, no pre-schooler counted the number of cups, chairs, etc. in the multiple versions, or tried to tell the time on the clock/clocks but almost half the five to six-year olds did. Again, in Experiment 7, the five-year olds were the only group to increase their use of colour terms across blocks of trials for all objects as if they saw the task as a test of their knowledge of colour names. Six and seven-year olds did not perceive the task this way, possibly because they knew that teachers know that children know their colours by the time they are six. And pre-schoolers, of course, because of the use of the word 'same' did not even realise colours were necessary so they, too, saw the task differently from the five-year olds.

The only real test of Karmiloff-Smith's three-stage theory is a longitudinal study following a group of children from the ages of about four to six or seven. The writer's experience of children of this age suggests that the same tasks could be used in the annual tests, for the children in the current investigation failed completely to recognise the author, or her equipment or the fact they had been taken out individually or in pairs, to play games on a previous occasion. And if children were not being used in more than one experiment one could always adopt the Genevan method of Karmiloff-Smith and ask the children why they had used particular descriptions or what they thought the purpose of the game was, though one should not expect all subjects to be capable of explaining why they did what they did (e.g. Karmiloff-Smith, 1986).

6.4 Theoretical Implications of the Research : Evaluation of Mental Models

This thesis began with the suggestion that the theoretical framework of previous research into young children's use of the articles failed in some important ways to capture normal adult usage of the articles because the concepts of uniqueness and familiarity had been applied to entities in the world rather than to representations of those entities in the speaker and listener's mental models. This

had led to incorrect predictions about when the definite and indefinite articles would be used, for even adults did not conform to the predicted pattern, and had led to misleading conclusions about young children's understanding and use of the articles. It is time, now, to evaluate the theory proposed in Chapter One in the light of the experimental results.

The idea of mental models which was adopted for this research has been shown to have clear advantages over previous theories in a number of ways. First of all it has explanatory value. Because the theory suggests that the starting point for analysis of article usage is the content and structure of the speaker and listener's models it enabled one to explain why definite descriptions can be appropriate on first mention and what kind of tokens and pattern of links between tokens enable such descriptions to be successful. For example, the model explained why 92% of the adults in Zehler and Brewer's (1982) study used the definite article for what those researchers termed 'context intermediates' when tokens for a few like items are available, for example, car - doors, the definite article can be used either because the speaker wishes to indicate the only item which is going to be relevant or the possible referents are restricted to one by the specified action, e.g. opening the door, or by identifying the actor, hence driver - driver's door, passenger - passenger's door.

The model also provided a framework in which to explain the processes underlying narrative discourse (e.g. Experiments 1 - 5 and 9) and enabled one to pin-point the stages at which breakdowns might occur in the communication processes. It was suggested that speakers have first to construct their own model of events which involves recognising referents and understanding the action involved and constantly up-dating their own models, tagging old tokens with new information and adding new tokens for new entities. Having constructed their own models speakers then need to take into account the knowledge of the listener and decide whether a referent is new for the listener in which case an indefinite description or an individuating description would be appropriate, or whether the speaker already had an identifiable token in his model in which case a definite description with or without a modifier would be appropriate. If speakers fail to construct their own models because, for example,

they cannot understand the events, they may simply name the entities for which they have tokens in their models. If speakers have difficulty describing their model they may fail to mention referents altogether or may fail to take the needs of the listener into account thus descriptions may include inappropriate definites on first mention. If speakers fail to recognise referents they may use indefinite descriptions on second mention. With the above theoretical framework it was possible to explain, for example, why some subjects in Warden's Experiment III (1976) and in the current Experiment 1, used naming statements, inappropriate definite descriptions on first mention and inappropriate indefinite descriptions on second mention. The model also explained why in some of Karmiloff-Smith's (1979) and Garton's (1982) experiments subjects tended to use the definite article when the researcher expected the indefinite article and the indefinite article when the researcher expected the definite article. For example, in Garton's (1982) replication of Karmiloff-Smith's Hide and Seek Experiment the mental model theory could explain why the children did not refer to the different kinds of objects in different ways : the non-hidden objects remained in full view on the table so the listener could certainly identify the missing item for herself. For this reason noun only or definite article + noun responses would have been totally appropriate, and this is what the children tended to use. As the mental model theory explains, it is the knowledge of the listener that is important, not the status of the object in the world.

It is this last crucial point which explains the pattern of results found in some of Karmiloff-Smith's experiments. For example, in her Experiment 5 (1979) which was discussed in 2.2.A she expected speakers to identify referents when both she and the child speaker could see which object was being referred to : she classified as 'adequate' a Y or one of the Y when the doll she was manipulating pushed one of three identical objects and classified as 'inadequate' referring expressions which involved the definite article or a demonstrative. She thus counts as inadequate 83% of responses from four-year olds, 60% from five-year olds and 61% from six-year olds. Similarly, when the doll pushed one of three similar objects (differing in colour) she classifies as inadequate the 37% of four-year old, 55% of five-year old and 37% of six-year old referring

expressions which included a demonstrative, a pronoun or a definite article. However, she herself states that 'context and shared knowledge between speaker and addressee makes the pronoun quite unambiguous' and 'the definite article for first action is clear from context (Karmiloff-Smith, 1979, p. 126)'. Since non-ambiguity is surely what reference is all about in 'real life' one can only take this as further support for the argument that the mental model approach is preferable to that adopted by the functionalists.

Finally, the mental model approach has predictive value : it predicted fairly accurately when children, and parents, would use the definite and indefinite articles depending on the knowledge of the listener and the status of the referent in the referential array : the scoring system explained in Chapter Three seemed to capture both children and parents' use of definite and indefinite descriptions.

However, it became apparent in the first five experiments that some referents were resistant to the listener ignorant/knowledgeable manipulation and manipulation of the composition of the referential array, thus the mental model did not correctly predict article usage with a few particular referents. The choice of article here seemed to depend on the class to which an entity belonged and the role it played in the event described.

Some entities seem always to elicit the indefinite article even when the listener is knowledgeable and the referent is the only one of its kind present in the array (e.g. flower, egg, book, cup). Two main factors emerged about these objects. Typically they are small, inanimate, normally one of several identical entities in a given setting (c.f. Karmiloff-Smith, 1971, p. 121) and normally the direct or indirect object of the verb, that is, they have things done to them, and secondly it is the role of the object in the story rather than the exact identity of that object that is important. Du Bois (1980, p. 272) says that indefinite descriptions 'are frequently employed because the speaker decides that an object is not important in its own right, but serves only as a prop to specify an individual or subcategorize a general activity'. All the entities which elicited only, or mainly, indefinite descriptions were of this type. Thus, for example, the boy gave the girl a flower rather than a hug (Experiment 3) and the man was reading a book rather than a newspaper (Experiment

2). The mental model theory as presented in this thesis will have to be amended to take account of the fact that even when an entity is known to be unique in a listener's model the speaker may choose to use an indefinite description because it is the class membership rather than the exact identity of that entity that is important (e.g. Givon, 1978), that is, the indefinite article is being used in a non-specific, non-identifying sense, thus its status in the listener's model - unique or not, known or not, is irrelevant (c.f. Johnson-Laird and Garnham, 1980, p. 390).

Conversely there were some entities which seem always to elicit the definite article even when the listener is ignorant and/or the referent is not the only member of its class available in the given context. In these cases the definite article seemed to be used not in referring expressions where the specificity or identifiability of a particular referent is important but in locative phrases, e.g. on the table, on the chair (Experiment 5), in the tree(s) (Experiment 1) where all that matters is the uniqueness of the location (c.f. discussion of the attributive use of the in Johnson-Laird and Garnham, 1980, p. 390). Du Bois (1980) found more than 70% of adult subjects talking to an 'ignorant' listener used a definite article for a location. Why locatives should so often be definite seems not to be too well explained in the literature. Clark (1978) suggests it may be because a specific location is being indicated and whereas the indefinite article can be used either specifically or non-specifically the definite article is normally specific. This would tie in with the suggestion made above that it is the uniqueness of the location that is important, that no other locations are going to be involved. One possible test of the suggestion that locatives are definite and thus the definite articles on first mention in Experiment 1 in phrases like 'in the tree(s)', and in Experiment 5 on the table, on the chair should be counted as 'appropriate', would be to create contexts in which the same objects played different roles. For example, one could have a woman making a table or putting a basket on a table, or one could have a man planting a tree or hanging his jacket in a tree. However, the choice of article in locative phrases may depend on the 'exclusive' nature of the indefinite article or the uniqueness condition of the definite article being the important

factors. For example, during the 1983-84 crisis in Lebanon the announcer on B.B.C. television news said one Thursday that 'British troops had been airlifted from a beach'. Two days later he announced 'British families have been airlifted from the beach'. This was not the same beach that had been used for airlifting British troops but in the first bulletin the implicit message seems to have been that the location was one of several possible ones and the specific beach was being kept a secret. The second bulletin carried the implicit message that the actual location was common knowledge, and hence could be inferred by the listeners. It would seem, therefore, a matter of whether or not a speaker intended to stress the exclusive nature of indefinite descriptions or the unique nature of definite descriptions as to which article will be used in a locative phrase. Thus in predicting whether a definite or indefinite description will be used it seems that one must take account of the role of that entity in the speaker's model, especially when the description will be preceded by a locative, as well as the speaker's intention.

APPENDIX A

EXPERIMENT 1 - STORY TELLING TASK I

Tables A.1 - A.5 Determiners used on first and second mention in
the Emslie and Stevenson and Warden stories.

Key: the* = associative anaphoric use (after fishing)
 a' = naming statement
 ano = another
 dem = demonstrative, this

Table A.6 First mention of each referent in each story

Key: () = associative anaphora

TABLE A.1. DETERMINERS USED BY 4 YEAR OLDS

Subj	EMSLIE & STEVENSON STORIES			WARDEN STORIES																	
	FIRST MENTION			SECOND MENTION																	
	Girl	Teddy	Dog	Girl	Teddy	Dog	Girl	Boy	River	Dog	Hen	Cow	Egg	Cat	Tree	Bird	Dog				
1	a	a	a	the	it	her					dem	a	dem	a			the	the	the		
2				a	a	the*		the	he		a'	a'	∅				∅	∅			
3	a	a	a					the	the		the	the	the	the			the	the			
4				a	∅	the*		the	the		∅	the		the			the				
5	a'	a'	a'					the	the		a'	a'					a'	∅	a		
6				a	a			the	the		a'	a'	the	the			a	-	the		
7				a	a			the	the		a'	a'					the	a'			
8	a'	a'	a'					the	the		a'	a'	a				the	the			
9	a	her	her					it	the		a'	a'		a'			a'	a'			
10				a	a	the*		the	the		a'	a'	∅				a'	a'			
11	a'	a'	a'				the	it	a		a'	a'	a'	a'			a'	a'			
12				a	a	the*		the	he		a'	a'					a'	a'			
13				a	a	the*		a	the	the	a'	a'	a'				a'	a'			
14	a	a	a		∅	the	the							a'	a'	a'			∅	∅	
15	a	her	a		she	it					the	a	a	a'			a	a			
16				a	a	the*		she	he		a'	a'	a'	a					the	the	the
17				a	a	the*		the	the		a'	a'	a'	a'					the	the	the
18	a'	a'	a'		the	the	the				a'	a'					the	the			
19				a	a			she	he		the	the	the	the					the	the	
20	a	a	a		she	the	he				a	a					he	the			

TABLE A.2 DETERMINERS USED BY 5 YEAR OLDS

Subj	EMSLIE & STEVENSON STORIES						WARDEN STORIES																						
	FIRST MENTION			SECOND MENTION			FIRST MENTION			SECOND MENTION																			
	Girl	Teddy	Dog	Girl	Boy	River	Girl	Teddy	Dog	Girl	Boy	River	Dog	Hen	Cow	Egg	Cat	Tree	Bird	Dog	Dog	Hen	Cow	Egg	Cat	Tree	Bird	Dog	
1	a	her	a				she	the	the								a	a	a	a						a	the	the	
2				one	one	the*				the	the		the	the	the	a					the	the	the						
3	a'	a	a'					the	the					∅		∅									∅		∅		
4				a	a					the	the		a'	a'	a'						a'	ano'							
5				a	a	the*				the	the		∅	∅	∅	a'					a'	a'							
6	a'	∅	a'				the	the	the					∅		a'	a'										∅		
7				a	a	the*				the	the		a	a	a	a					a	a							
8	a	a	a					the	the								a		a	a						a		a	
9	a'	a'	a'				she	the	the								the	the	the	a						the		the	
10				a	a	the*				she	the	the	a	a	a'						a'	a'							
11	a	a	a					∅	∅					∅	the	the	the	the							the		the		
12				a	a	the*				the	the		the	the	the	a					a	a	the						
13				they						the	the		a	the	a'	a						the							
14	a	a	the					the	he					the	the	a										the	the		
15				a	a					the	the		a	a	a	an					the	the							
16	a	a	a				the	the	the					the	the	a	a								the		the		
17	a	a	a				the	it	he					the	the	the	the								the		the	it	
18				they	the*					the	the		a'	a'	the	an					the	the							
19				a	a	the*				her	the						a	the	the	the					it		the		
20	the	the	the				she	it	him				∅	a	a						the								

TABLE A.3 DETERMINERS USED BY 6 YEAR OLDS

Subj	EMSLIE & STEVENSON STORIES						WARDEN STORIES																						
	FIRST MENTION			SECOND MENTION			FIRST MENTION			SECOND MENTION																			
	Girl	Teddy	Dog	Girl	Boy	River	Girl	Teddy	Dog	Girl	Boy	River	Dog	Hen	Cow	Egg	Cat	Tree	Bird	Dog	Dog	Hen	Cow	Egg	Cat	Tree	Bird	Dog	
1	a	a	a	she	her	the							a'	a'	a'	a'										a	the	a	
2					a	a	the*			the	the		a	a'	the	an						a	a						
3	a	her	a			the	the						a	the	a'											a		the	
4					a	a	the*			the	the		the	the	the	an					the	the	the						
5					a	a	the*			the	the	the	a	a	a	an					the	the	the						
6	a	her	a	the	the	it							a	the	a	a										the	the	the	
7				the	the	the*			the	the			the	the	the	an						a							
8	a	a	a	the	the	the							a	the	a	a										the	the	a	
9	the	the	the	the	the	the							a	a	a	a										the	the		
10				a	a				the	the			the	the	the	an						the							
11	a	her	a	the	the	the							a	the	a	the										ano	the	the	
12				a	a	the*			the	the	the		a	the	a							a	a						
13				a	a	the*			the	the			the	the	a	an						the	the						
14	a	a	a	the	the	the							a	the	a	the										the	the	this	
15				one	one				the	the			a'	a'	a	an						the	the						
16	a	a	the	she	the	it							the	the	a	the										the	the	the	
17	a	a	a	the	the	the							the	the	the	the										the	the	the	
18				a	a	the		dem	a	the			a	a	a							a	a						
19				a'	a'	the		the	the	the			a	a	a	an						a	a						
20	the	a	a	the	it	the							the	dem	a	a										it	the	the	the

TABLE A.4 DETERMINERS USED BY 7 YEAR OLDS

Subj	EMSLIE & STEVENSON STORIES								WARDEN STORIES																				
	FIRST MENTION				SECOND MENTION				FIRST MENTION				SECOND MENTION																
	Girl	Teddy	Dog	Girl	Boy	River	Girl	Teddy	Dog	Girl	Boy	River	Dog	Hen	Cow	Egg	Cat	Tree	Bird	Dog	Dog	Hen	Cow	Egg	Cat	Tree	Bird	Dog	
1	the	a	a				the	the	the								the	the	the	a						the	the	the	
2				a	a					the	the		a	a	a	an					a	a							
3	dem	the	a				she	it	the				a	a	the	dem										the	the	the	
4				the	the					she	the		a	a	the	an					the	a	the						
5				a	a	the*				the	the		the	a	the	an					the	the	the						
6	a	a	a				the	the	the								a	the		a					the	the	the		
7				a	a	the*				the	the		the	a	a						the	a							
8	the	a	a				the	the	the								the	the	the						the	the	the		
9	the	a	the				the	the	the								a	a	a'	a					a	a	∅		
10				a	a					the	the		the	a	a	an					the	the	the						
11	a	a	a				the	the	the								the	the	a	the					the	the	the		
12				a	∅	the*				the	the		the	the	a	an					the	the							
13				a	a	the*				the	the		a	the	the	an					it	it							
14	a	her	a				she	the	the								a	the	the	the					the				
15				a	a	the*				the	the		a	a	a	an					the	a							
16	a	a	a				the	the	the								a'	a'	the	the					the	the			
17	a	a	the				her	the	the								a	the		the					the	the			
18				a	a	the*				the	the		a	a	a	an					the	a							
19				a	a	the*				the	the	the	a	the	a	an					the	a							
20	the	her	the				the	it	the								the	the	the	the					the	the	the		

TABLE A.5 DETERMINERS USED BY PARENTS

Subj	EMSLIE & STEVENSON STORIES								WARDEN STORIES																				
	FIRST MENTION				SECOND MENTION				FIRST MENTION				SECOND MENTION																
	Girl	Teddy	Dog	Girl	Boy	River	Girl	Teddy	Dog	Girl	Boy	River	Dog	Hen	Cow	Egg	Cat	Tree	Bird	Dog	Dog	Hen	Cow	Egg	Cat	Tree	Bird	Dog	
1				a	a	the*			the	the							a	a	a	the							the	the	
2	a	her	a				the	the	the				a	a	the						a	a							
3	the	the	the					the	the								the	the	the	the						the		the	the
4				a	a				the	the			the	the	the	an					the	the							
5	a	a	the				she	the	the								a	a	a	a						she	the	the	the
6				a	a	the*							a	a	a	a					it'	the	the						
7				a	a	the*			the	her							a	a	a	a						the	the	the	the
8	a	a	a				the	the	the				a	a	the	a'					the	the							
9	a	her	her				she	the	the								a	a'	a	a						the	the	the	
10				a	a	the*			the	the	the		the	the	∅	a					the	∅							

TABLE A.6 FIRST MENTIONS FOR EACH STORY

	EMSLIE A						EMSLIE B					
	girl		teddy		dog		girl		boy		river	
	a	the	a	the	a	the	a	the	a	the	a	the
4 yrs.	10	-	8	-	9	-	10	-	9	-	-	(7)
5 yrs.	9	1	7	1	8	2	8	-	8	-	-	(7)
6 yrs.	8	2	5	2	8	2	9	1	9	1	-	2(6)
7 yrs.	5	4	7	1	7	3	9	1	8	1	-	(7)
ALL	32	7	27	4	32	7	36	2	34	2	0	2(27)

	WARDEN A								WARDEN B							
	dog		hen		cow		egg		cat		tree		bird		dog	
	a	the	a	the	a	the	a	the	a	the	a	the	a	the	a	the
4 yrs.	8	2	9	1	2	1	1	1	6	1	8	2	5	2	6	3
5 yrs.	6	2	6	3	6	3	7	-	3	4	-	6	5	4	4	3
6 yrs.	6	4	5	5	6	4	8	-	7	3	2	7	9	1	5	4
7 yrs.	6	4	7	3	7	3	9	-	6	4	3	7	2	6	3	5
ALL	26	12	27	12	21	11	25	1	22	12	13	22	21	13	18	15

APPENDIX B

EXPERIMENT 2 - VIDEO TASK I

Tables B.1 - B.4 Determiners used on first mention

Key: L_I R_P = Listener Ignorant/Referents Present
 L_I R_A = Listener Ignorant/Referents Absent
 L_K R_P = Listener Knowledgeable/Referents Present
 L_K R_A = Listener Knowledgeable/Referents Absent
 the' = associative anaphoric use
 the² = with relative clause

Table B.5 Total Number of responses for each category

TABLE B.1 DETERMINERS USED BY 4 YEAR OLDS

CONDITION	STORY A						STORY B					
	WOMAN	DUSTER	PICTURE	MAN	CHAIR	HANDKERCHIEF	MAN	CHAIR	BOOK	WOMAN	TEAPOT	CUP
L _I R _P	1	a		a	a	a						
	2						Dad	a	his	Mum		
	3	a	a	a		a						
	4						the					
	5	a		a	a	the						
	6							a	a	a	the	
L _I R _A	1	a		them								
	2						a		a			a cup of
	3	a		a		the						
	4						a			a		
	5	a	the'	the	the	a						
	6							a		a		a cup of

TABLE B.1 (CONTINUED) 4 YEAR OLDS

CONDITION	STORY A						STORY B					
	WOMAN	DUSTER	PICTURE	MAN	CHAIR	HANDKERCHIEF	MAN	CHAIR	BOOK	WOMAN	TEAPOT	CUP
L _K R _P	1	the		a	the							
	2						he	a	a	Mum		
	3	she		a	Dad							
	4								a			
	5	they		the	they							
	6							the	the	a	his Mum	
L _K R _A	1	the		the	the	a						
	2						he			she		a cup of
	3	the			the							
	4						the					
	5	she		it	he	a						
	6							he			she	

TABLE B.2 DETERMINERS USED BY 5 YEAR OLDS

CONDITION	STORY A						STORY B					
	WOMAN	DUSTER	PICTURE	MAN	CHAIR	HANDKERCHIEF	MAN	CHAIR	BOOK	WOMAN	TEAPOT	CUP
L _I R _P	1	a		a		the						
	2						a			a		
	3	a		∅		a						
	4						∅			a (Mum)		a
	5	a		a	somebody- -the man		a					
	6							a	a	a	a	
L _I R _A	1	the		the		the						
	2						the	the		the		
	3	a (Mum)		the ²		a (Dad)						
	4						a			a		a cup of
	5	the Mum		a		somebody						
	6									a		

TABLE B.2 (CONTINUED) 5 YEAR OLDS

CONDITION	STORY A						STORY B					
	WOMAN	DUSTER	PICTURE	MAN	CHAIR	HANDKERCHIEF	MAN	CHAIR	BOOK	WOMAN	TEAPOT	CUP
L _K R _P	1	a		a	the	a						
	2						Dad		a	Mum		
	3			the		the						
	4						∅		a	∅		
	5	∅		the	∅	the						
	6							the	a			a cup of
L _K R _A	1	she		the	he							
	2						he	the		a		a cup of
	3	a			the	a						
	4						he		the			
	5	the	a	it	the	that						
	6						this		a	this		

ABLE B.3 DETERMINERS USED BY 6 YEAR OLDS

CONDITION	STORY A						STORY B					
	WOMAN	DUSTER	PICTURE	MAN	CHAIR	HANDKERCHIEF	MAN	CHAIR	BOOK	WOMAN	TEAPOT	CUP
L _I R _P	1	a (Mum)		a	a	a						
	2						a	a	a	a		
	3	a		a	her husband	a						
	4						a	a	a	a		a cup of
	5	someone -she		a	someone -the man	a						
	6						a	a	a	a (Mum)		a cup of
L _I R _A	1	a		a	her husband	a						
	2						a	a	a	a	a	a
	3	a	the'	a	her husband	a						
	4						a	a	a	a		a cup of
	5	a	the'	a	a	a	his					
	6							a	a	a	a	a

TABLE B.3 (CONTINUED) 6 YEAR OLDS

CONDITION	STORY A						STORY B					
	WOMAN	DUSTER	PICTURE	MAN	CHAIR	HANDKERCHIEF	MAN	CHAIR	BOOK	WOMAN	TEAPOT	CUP
L _K R _P	1	she		the	the	a						
	2						the		a	the		
	3	the	it	the	a	a						
	4						he		a			a cup of
	5	a		the	he	the	a					
	6							a	a	a		a cup of
L _K R _A	1	she		the	her husband	a						
	2						the		the	the		a cup of
	3	the		the	the	a						
	4						the			the		a cup of
	5	the		a	the							
	6						he		a	his wife		a cup of

TABLE B.4 DETERMINERS USED BY PARENTS

CONDITION	STORY A						STORY B					
	WOMAN	DUSTER	PICTURE	MAN	CHAIR	HANDKERCHIEF	MAN	CHAIR	BOOK	WOMAN	TEAPOT	CUP
L _I Rp	1	somebody -a woman	the'	a	somebody -he	a						
	2						a	a	a	a	a	a
	3	a	the'	her	her husband	a						
	4						a		a	his wife		a cup of
	5	a	the'	a	a	a	a					
	6							a	a	a	his wife	
L _I RA	1	a	the'	a	a	a						
	2						a	a	a	a	a	a
	3	a	the	a	somebody -the fellow	a						
	4						a	a	a	the	the	a
	5	a	a	a	her husband	a						
	6							a	the	a	his wife	a

TABLE B.4 (CONTINUED) PARENTS

CONDITION	STORY A						STORY B					
	WOMAN	DUSTER	PICTURE	MAN	CHAIR	HANDKERCHIEF	MAN	CHAIR	BOOK	WOMAN	TEAPOT	CUP
L _K R _P	1	she		the	someone	a						
	2						a	a	a	the		a cup of
	3	a		a	Dad	a						
	4						the	a	a	his wife		a cup of
	5	a		a	her husband	a						
	6						the	a	a	his wife		a cup of
L _K R _A	1	the	a	the	the	a						
	2						a	a	a	a		a cup of
	3	this	the'	a	her husband	a						
	4						a	a	a	his wife		a cup of
	5	the	the'	a	her husband	a						
	6						a	a	a	his wife		a cup of

TABLE B.5 TOTAL NUMBER OF RESPONSES FOR EACH CATEGORY

	CONDITION	INDEFINITES		APPROPRIATE DEFINITES		DEFINITES	
		Identifying	Classifiers	Indiv.	Possessive	Pronoun	The/That
4 yrs.	L _I	27	3	3	1	1	6
	L _K	8	3	2	1	11	11
5 yrs.	L _I	24	1	2	-	-	8
	L _K	11	2	2	-	5	15
6 yrs.	L _I	47	3	3	4	-	-
	L _K	14	5	-	2	6	19
Parents	L _I	48	2	4	6	-	4
	L _K	30	6	3	8	1	9

APPENDIX C

EXPERIMENT 3 - VIDEO TASK II

Tables C.1.A - C.4.B Determiners used on first mention in the
Listener Ignorant (LI) and Listener
Knowledgeable (LK) conditions

Key: pl = plural
 dem = demonstrative, this
 pos = the girl's
 smt = something

Table C.5 First mention for the four age groups in the
Listener Ignorant (LI) and Listener
Knowledgeable (LK) conditions

Table C.6 Total number of first mentions for each film

TABLE C.1.A DETERMINERS USED BY 4 YEAR OLDS IN THE LISTENER IGNORANT CONDITION

FIRST MENTION		FILM A	FILM B	FILM C	FILM D
SUBJ		GIRL BOY SWING TEDDY TREE	GIRL BOY FEATHER HAT GUN	GIRL BOY BIKE ROPE FLOWER	GIRL BOY TRAIN TUNNEL STICK
<u>4 YRS.</u>	1			a a a a	
	2				a a a a
	3			the the the the a	
	4				the a it a
	5			a a his a	
	6				the a a the the
	7	a the the			
	8		a a Ø pl		
	9	a a a her the			
	10		a a his		
	11	a the the the the			
	12		the the		

ABLE C.1.A (CONTINUED) 4 YEAR OLDS LISTENER IGNORANT

	FILM A					FILM B				FILM C					FILM D					
SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK
13	a	a	the	a	the															
14						a	a	a												
15	a	a	a	a																
16						two	pl	a		a										
17	a	a	a	a	the															
18						the	a	the	his											
19											the	a	the	the*						
20																a	the	a	a	a
21											a	a	his	some						
22																a	a	a	the	a
23											a	a	a	a	a					
24																a	a	a		

TABLE C.1.B DETERMINERS USED BY 4 YEAR OLDS IN THE LISTENER KNOWLEDGEABLE CONDITION

FIRST MENTION	FILM A					FILM B				FILM C				FILM D								
	SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK	
<u>4 YRS.</u>	1	a	a	the	her	the																
	2						the	the														
	3	the	the	the	the	the																
	4						the	a	a	his												
	5	a	the	the	her																	
	6						her	the	the													
	7											the	the									
	8																the	the	it	the	the	
	9											the	the	his	her	a						
	10																he			a	the	
	11											the	the	a								
	12																she	him	a	the		

TABLE C.1.B (CONTINUED) 4 YEAR OLDS LISTENER KNOWLEDGEABLE

	FILM A				FILM B				FILM C				FILM D							
SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK
13											his	him	a		a					
14																the	a	it		a
15											the	a	a	the	a					
16																they		a	the	
17											the	the	the	the	a					
18																the	the	his		a
19	the	the	the	her																
20						they		the	his											
21	a	a		the	the															
22						her	the	the												
23	a	a	a	a	the															
24						the	the													

TABLE C.2.A DETERMINERS USED BY 5 YEAR OLDS IN THE LISTENER IGNORANT CONDITION

FIRST MENTION	FILM A					FILM B				FILM C				FILM D						
SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK
<u>5 YRS.</u>	1										a	a	a	the						
	2															they	a	a	a	
	3										the	the	a	the*	a					
	4															the	the	the	the	a
	5										a	a	a	her	a					
	6															a	a	pl		a
	7	the	the	the	her	the														
	8						the	the												
	9	the	the	a	her	the														
	10						a	a		his										
	11	a	the	the	the	the														
	12						a	the	the	a										

TABLE C.2.A (CONTINUED) 5 YEAR OLDS LISTENER IGNORANT

	FILM A					FILM B				FILM C					FILM D					
SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK
13	a	a	the	a	the															
14						a	dem	the	his											
15	the	a	a	a	the															
16						a	a	the	a	a										
17	the	the	the	her	the															
18						a	a	her	his											
19											the	he	a		a					
20																a	a	a		a
21											a	a	a							
22																a	a	ø pl		a
23											the	a	a	her	a					
24																a	a	a		a

TABLE C.2.B DETERMINERS USED BY 5 YEAR OLDS IN THE LISTENER KNOWLEDGEABLE CONDITION

FIRST MENTION	FILM A					FILM B			FILM C				FILM D								
	SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK
<u>5 YRS.</u>	1	she	the	the	pos	the															
	2						they		the	his											
	3	the	the	the	her	the															
	4						the	the	the												
	5	a	a	the	a	the															
	6						a	a													
	7											the	the	the		a					
	8																the	him	a		the
	9											∅	a	a		a					
	10																the	a	the		the
	11											the	the			a					
	12																the	the			a

TABLE C.2.B (CONTINUED) 5 YEAR OLDS LISTENER KNOWLEDGEABLE

	FILM A					FILM B				FILM C					FILM D						
SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK	
13											a	a	his	the*	a						
14																a	a	a	the	a	
15											a	a	his	the*	a						
16																the	a	a	the	a	
17											a	a	a	her	a						
18																a	a	a		the	
19	she	a	the	her	the																
20						the	the														
21	a	a	a	a	the																
22						a	the	her	his												
23	the	the	the	her	the																
24						the	the	a													

TABLE C.3.A DETERMINERS USED BY 6 YEAR OLDS IN THE LISTENER IGNORANT CONDITION

FIRST MENTION		FILM A				FILM B				FILM C					FILM D							
	SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK	
<u>6 YRS.</u>	1											the	the	a	the	a						
	2																the	the	some	the	a	
	3											a	dem	his	a	a						
	4																a	the	the			
	5											the	the	his	her	one						
	6																a	the	a	the		
	7	a	a	her	her	the																
	8						a	a	a	his												
	9	a	a	a	a	the																
	10						one	one	the	his												
	11	they	the	it	the																	
	12						a	a	the	his												

TABLE C.3.A. (CONTINUED) 6 YEAR OLDS LISTENER IGNORANT

	FILM A					FILM B				FILM C					FILM D						
SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK	
13	a	the	the	a	the																
14						a	a	a	his												
15	the	a	her	her	the																
16						a	a	a	a												
17	a	a	a	a	the																
18						a	a	the	his												
19											dem	a	a	a							
20																	a	a	a		a
21											the	the	a	a	a						
22																	his	the	the	the	a
23											a	a	his	the*	smt						
24																	a	a	a		the

TABLE C.3.B DETERMINERS USED BY 6 YEAR OLDS IN THE LISTENER KNOWLEDGEABLE CONDITION

FIRST MENTION	FILM A					FILM B					FILM C					FILM D					
SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK	
<u>6 YRS.</u>	1	the	the	the	her	the															
	2						they	the	his												
	3	dem	the	the	her	the															
	4						they	the	his												
	5	the	the	the	the	the															
	6						the	the	her												
	7										the	the	a	her							
	8															a	a	a			
	9										the	a	a		a						
	10															the	the	the	the	a	
	11										the	the	a	it	a						
	12															a	a	a	the	a	

TABLE C.3.B (CONTINUED) 6 YEAR OLDS LISTENER KNOWLEDGEABLE

	FILM A					FILM B				FILM C					FILM D						
SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK	
13											a	a	a	some	a						
14																a	a	a	the	a	
15											the	dem	his	the	a						
16																a	a	a			a
17											the	a	his	the*	smt						
18																a	a	the			a
19	a	dem	the	the	the																
20						a	a	the	his												
21	the	the	the	her	the																
22						the	the	her	his	his											
23	the	the	the	the	the																
24						he		the													

APPENDIX D

EXPERIMENT 4 - VIDEO TASK III

Tables D.1.A - D.1.B Determiners used on first mention in the
Listener Ignorant (LI) and Listener
Knowledgeable (LK) conditions

Key:

P = parent

C = child

the* = after skipping

dem = demonstrative, this

the-s = plural

TABLE C.4.A DETERMINERS USED BY 7 YEAR OLDS IN THE LISTENER IGNORANT CONDITION

FIRST MENTION	FILM A					FILM B				FILM C					FILM D							
	SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK	
<u>7 YRS.</u>	1											a	a	a	the*	a						
	2																a	a		the		
	3											a	a	his	her	a						
	4																dem	a	a			dem
	5											a	a	a		a						
	6																the	the	the	the	the	
	7	the	the	a	her	the																
	8						the	the	her	his												
	9	a	a	a	the	the																
	10						a	a	the	his												
	11	a	a	the	a	the																
	12						a	a	the	his	a											

TABLE C.4.A (CONTINUED) 7 YEAR OLDS LISTENER IGNORANT

	FILM A					FILM B				FILM C					FILM D						
SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK	
13	a	a		her	the																
14						the	the	a													
15	a	a	a	her	the																
16						a	dem	the	his												
17	dem	dem	dem	the	the																
18						dem	dem														
19											the	a	a	the*	smt						
20																a	a	a		the	
21											a	a	a	a	a						
22																a	a	a	the	a	
23											a	a	a	her	a						
24																a	a	a	a	a	

TABLE C.4.B DETERMINERS USED BY 7 YEAR OLDS IN THE LISTENER KNOWLEDGEABLE CONDITION

<u>FIRST MENTION</u>	FILM A					FILM B				FILM C				FILM D							
SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK	
<u>7 YRS.</u>	1	the	the	the	her	the															
	2						the	the													
	3	the	the	the	her	the															
	4						dem	the		his	a										
	5	the	the	the	a	the															
	6						they		the	his											
	7											the	the	the		the					
	8															the	the	the			a
	9											the	the	his	her						
	10															the	the	the			the
	11											a	a	a		a					
	12															the	a	a			a

ABLE C.4.B (CONTINUED) 7 YEAR OLDS LISTENER KNOWLEDGEABLE

FILM A					FILM B					FILM C					FILM D						
SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK	
13											the	the	his		a						
14																the	the	the		a	
15											a	a	a	the*	the						
16																dem	dem	the	the	the	
17											dem	dem	a	a	dem						
18																dem	dem	a	the	a	
19	a	the	the	her	the																
20						a	a	the	a	a											
21	a	a	the	a	the																
22						they		the	his												
23	a	a	the	a	the																
24						the	the	the	his	a											

TABLE C.5

FIRST MENTIONS FOR THE FOUR AGE GROUPS IN THE LISTENER IGNORANT (L_I) AND LISTENER KNOWLEDGEABLE (L_K) CONDITIONS

	Indefinite		This		Indiv. Descr.		Possessive Pronoun		Associative Anaphora		Definite Article		Pronoun	
	L _K	L _I	L _K	L _I	L _K	L _I	L _K	L _I	L _K	L _I	L _K	L _I	L _K	L _I
4 yrs.	25	62	-	-	1	-	9	4	-	1	47	23	9	2
5 yrs.	49	55	-	1	-	-	6	9	2	1	35	34	4	2
6 yrs.	35	57	3	2	-	1	13	13	1	1	47	31	4	3
7 yrs.	28	59	8	8	-	-	10	11	1	2	52	27	3	-

TABLE C.6

TOTAL NUMBER OF FIRST MENTIONS FOR EACH FILM

Film	L _K					L _I				
	A	B	C	D	Mean No.	A	B	C	D	Mean No.
4 yrs.	27	17	24	23	3.8	27	18	26	26	4.0
5 yrs.	30	17	25	25	4.0	30	22	26	24	4.25
6 yrs.	30	20	28	26	4.3	29	24	29	25	4.5
7 yrs.	30	22	26	27	4.4	29	22	29	27	4.5

TABLE D.1A DETERMINERS USED BY PARENTS AND CHILDREN IN THE LISTENER IGNORANT CONDITION

SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK
P 1											a	the	his	her	a					
C 1																a	a	a		the
P 2											a	a	his	her	a					
C 2																a	a	some		his
P 3											a	a	his	the*	a					
C 3																a	a	his		the
P 4	a	her brother	the	her	the -s															
C 4						a	a			a										
P 5	a	her cousin	the	a	the															
C 5						a	a	a	a	a										
P 6	a	her brother	a	her	the -s															
C 6						a	a													
P 7	a	her brother	the	her	the -s															
C 7						a	a			a										

TABLE D.1A (CONTINUED) PARENTS AND CHILDREN. LISTENER IGNORANT

SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK	
P 8 C 8	a	her cousin	the	a	the	she	the		her												
P 9 C 9	a	the	a	her	the -s	a	a	a	a	a											
P 10 C 10	a	her brother	the	her	the	a	a														
P 11 C 11																					
P 12 C 12											his friend	the	his	her	a	a	a	some		her	
P 13 C 13											a	a	his	her	a			the	a	a	a

TABLE D.1B DETERMINERS USED BY PARENTS AND CHILDREN IN THE LISTENER KNOWLEDGEABLE CONDITION

SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK	
P 1	the	her brother	the	the																	
C 1						she	the	her													
P 2	a	a	the	her	the																
C 2						the	the	a													
P 3	the	her brother	the	a	the -s																
C 3						they		a													
P 4											his sister	a	his	her	a						
C 4																a	a	a	the	a	
P 5											this	this	a	the	a						
C 5																the	the	a	the	his	
P 6											this	a	his	a	a						
C 6																they	a	the	a		
P 7																					
C 7																a	a	a		the	

TABLE D.1B (CONTINUED) PARENTS AND CHILDREN. LISTENER KNOWLEDGEABLE

SUBJ	GIRL	BOY	SWING	TEDDY	TREE	GIRL	BOY	FEATHER	HAT	GUN	GIRL	BOY	BIKE	ROPE	FLOWER	GIRL	BOY	TRAIN	TUNNEL	STICK	
P 8																					
C 8																	she	the	the	the	a
P 9																					
C 9																					
P 10																					
C 10																					
P 11											the	the	his	the*	a						
C 11																she	the	a	the	a	
P 12																					
C 12																					
P 13																					
C 13																					

APPENDIX E

EXPERIMENT 5 - STORY TELLING TASK II

Tables E.1 - E.4 Determiners used on first mention in the A (singleton) and B (multiple) versions of both stories

Key: one* = one of the

TABLE E.1 DETERMINERS USED BY 4 YEAR OLDS ON FIRST MENTION

VERSION A (Singletons)

STORY 1					STORY 2			
SUBJ	MAN	LADDER	CLOCK	CHAIR	MAN	SUITCASE	CUP	TABLE
1	a	a	the	the				
2					a	a	a	the
3	a	some	a	a				
4					a	a	a	the
5	a	a	a	a				
6					a	a	a	
7	a	his	the	the				
8					a	a	a	
9	a	some	a	a				
10					a	a	his	the
11	a	a	the					
12					a	a	a	the

VERSION B (Multiple)

STORY 1				STORY 2			
MAN	LADDER	CLOCK	CHAIR	MAN	SUITCASE	CUP	TABLE
a	a	a	one*				
				a	a	a	
a	a	a					
				a	a	a	∅
a	some	a	the				
				the		the	the
a	his	the clocks	a				
				a	a	a	a
a	a	a	a				
				a	his	a	
a	a	a					
				a	a	a	a

TABLE E.2 DETERMINERS USED BY 5 YEAR OLDS ON FIRST MENTION

VERSION A (singletons)

SUBJ	STORY 1				STORY 2			
	MAN	LADDER	CLOCK	CHAIR	MAN	SUITCASE	CUP	TABLE
1	∅	∅	∅	the				
2					a	a	a	a
3	he	some	the	the				
4					∅	his		
5	he	a	a					
6					a	a	the	the
7	a		it	the				
8					a	a	a	the
9	a	the	the	the				
10					∅	∅	∅	∅
11	a	a	the	a				
12					a	a	a	the

VERSION B (Multiple)

SUBJ	STORY 1				STORY 2			
	MAN	LADDER	CLOCK	CHAIR	MAN	SUITCASE	CUP	TABLE
1	a	the	the	the				
2					the	his	a	
3	a	some	the	the				
4					he	a	his	the
5	a	some	a	the				
6					a		a	the
7	the	a	the					
8					a		a	the
9	a	some	the	a				
10					a	his	a	the
11	a	some	one					
12					a	his	a	

TABLE E.3 DETERMINERS USED BY 6 YEAR OLDS ON FIRST MENTION

VERSION A (Singletons)

SUBJ	STORY 1				STORY 2			
	MAN	LADDER	CLOCK	CHAIR	MAN	SUITCASE	CUP	TABLE
1	a	some	the					
2					a	a	a	a
3	a	some	the	the				
4					a	a	a	a
5	a	some	a	a				
6					a	her	a	
7	he - a man	some	the	the				
8					a	a	a	a
9	a	some	a	a				
10					he	a	a	the
11	a		the	the				
12					a		a	

VERSION B (Multiple)

SUBJ	STORY 1				STORY 2			
	MAN	LADDER	CLOCK	CHAIR	MAN	SUITCASE	CUP	TABLE
1	a	a	one	the				
2					a	a	a	the
3	the	some	one	one*				
4					a	a	one	one*
5	a	one	the	a				
6					a	a	a	the
7	a	a	a	the				
8					a	a	a	the
9	the	a	the	the				
10					a	his	∅ cups	the picnic tables
11	a	a	a	the				
12					a	a	a	the

TABLE E.4 DETERMINERS USED BY PARENTS ON FIRST MENTION

VERSION A (Singletons)

SUBJ	STORY 1				STORY 2			
	MAN	LADDER	CLOCK	CHAIR	MAN	SUITCASE	CUP	TABLE
1	a	a	the	the				
2					a	a	a	a
3	a	a	a	a				
4					a	his	a	a
5	a	a	the	the				
6					a	a	a	a
7	a	a	the	a				
8					a	a	a	a
9	a	his	the	the				
10					a	a	a	a
11	a	a	a	a				
12					a	a	a	a

VERSION B (Multiple)

SUBJ	STORY 1				STORY 2			
	MAN	LADDER	CLOCK	CHAIR	MAN	SUITCASE	CUP	TABLE
1	a	a	the	the				
2					a	a	the second	the foremost
3	a	a	the fourth	the second				
4					a	a	the second	the bottom
5	a	a	the fourth	one*				
6					a	a	the second	the table at the front
7	a	some	the	the				
8					a	a	a	the
9	a	his	the	the				
10					a	a	the	the
11	a	a	a	the				
12					a		a	the

APPENDIX F

EXPERIMENT 6 - THE PAPER BAGS

Tables F.1 - F.5	Determiners used for singletons (sin.), identical (id.) and similars (sim.) in each trial.
Table F.6	Determiners used for trials 1 - 4 (singletons).
Table F.7	Determiners used for trials 5 & 6 (identicals).
Table F.8	Determiners used for trials 7 & 8 (similars).
Table F.9	List of contents of the paper bags.

TABLE F.1 DETERMINERS USED BY 3 YEAR OLDS

	TRIAL 1	TRIAL 2	TRIAL 3	TRIAL 4	TRIAL 5	TRIAL 6	TRIAL 7	TRIAL 8
SUBJECT	Sin.	Sin.	Sim.	Sim.	Id.	Id.	Sin.	Sin.
1	the	the	the other	a	the other	the	the	the
2	the	the	one of the	the	the other	the	the	the
3	the	the	a	a	a	a	the	the
4	the	the	the	another	another	another	the	the
5	the	the	the	the	the	the	the	the
6	the	the	one	one	one	one	the	the
7	the	the	the	a	a	a	the	the
8	the	the	∅	a	the	a	the	the
9	the	the	one of the	one of the	one of the	one of the	the	the
10	the	the	a	one of the	one of the	one of the	the	the

TABLE F.2 DETERMINERS USED BY 4 YEAR OLDS

	TRIAL 1	TRIAL 2	TRIAL 3	TRIAL 4	TRIAL 5	TRIAL 6	TRIAL 7	TRIAL 8
SUBJECT	Sin.	Sin.	Sim.	Sim.	Id.	Id.	Sin.	Sin.
1	the	the	the	the	one of the	one	the	the
2	the	the	the	the	the other	the other	the	the
3	the	the	a	the other	the other	a	the	a
4	a	the	the	a	the	a	the	a
5	the	a	a	a	a	a	the	the
6	the	the	the other	a other	the other	the other	the	the
7	the	the	a	the other	the other	the other	the	the
8	the	the	a	an	one of the	a	the	a
9	a	the	a	the	a	a	the	the
10	the	the	a	another	another	a	the	the

TABLE F.3 DETERMINERS USED BY 5 YEAR OLDS

	TRIAL 1	TRIAL 2	TRIAL 3	TRIAL 4	TRIAL 5	TRIAL 6	TRIAL 7	TRIAL 8
SUBJECT	Sin.	Sin.	Sim.	Sim.	Id.	Id.	Sin.	Sin.
1	∅	the	a	an	one	a	the	the
2	the	the	the	the	one of the	the	the	the
3	the	the	the	the	one	a	the	the
4	the	the	∅	the	the	the	the	∅
5	the	the	the red	one	the green	a	the	the
6	∅	the	the other	the other	the other	the other	the	the
7	the	the	a	the green	the	the	the	the
8	the	the	a	∅	∅	a	∅	a
9	the	the	the	the grey	the	the	the	the
10	the	the	∅	∅	one of the	one	the	the

TABLE F.4 DETERMINERS USED BY 6 YEAR OLDS

	TRIAL 1	TRIAL 2	TRIAL 3	TRIAL 4	TRIAL 5	TRIAL 6	TRIAL 7	TRIAL 8
SUBJECT	Sin.	Sin.	Sim.	Sim.	Id.	Id.	Sin.	Sin.
1	the	the	the red	the other	the	a	the	the
2	the	the	the green	the green	the other	the blue	the	the
3	the	the	the green	a	a	a	the	the
4	the	∅	the red	rel. cl.	the	the	the	the
5	the	∅	the	the other	the other	a	∅	the
6	∅	∅	a	the green	a	∅	∅	∅
7	the	the	a	one	one of the	a	the	∅
8	the	∅	the blue	the	one	a	the	the
9	∅	the	the	the	the	the	the	the
10	the	the	one of the	one of the	one of the	one of the	the	the

TABLE F.5 DETERMINERS USED BY 7 YEAR OLDS

	TRIAL 1	TRIAL 2	TRIAL 3	TRIAL 4	TRIAL 5	TRIAL 6	TRIAL 7	TRIAL 8
SUBJECT	Sin.	Sin.	Sim.	Sim.	Id.	Id.	Sin.	Sin.
1	the	the	a- the red	the green	a	a	the	the
2	the	the	a	the	the	a	the	the
3	the	the	the	an	the	a	the	the
4	the	the	the blue	the green	the other	a blue	the	the
5	the	the	the red	the blue	one of the	one blue	the	the
6	the	the	a	the grey	the	a	the	the
7	the	the	the red	the grey	one of the	the blue	the	the
8	the	the	the other	the other	one of the	a	the	the
9	the	the	the blue	an	a	a	the	the
10	the	the	the red	an	a	the blue	the	the

TABLE F.6 DETERMINERS USED FOR TRIALS 1 - 4

Age Group	SINGLETONS					
	Experimenter Hides			Subject Hides		
	a	the	∅	a	the	∅
3 year olds	20			20		
4 year olds	3	17		3	17	
5 year olds	18		2	1	17	2
6 year olds	14		6	16		4
7 year olds	20			20		

TABLE F.7 DETERMINERS USED FOR TRIALS 5 & 6

<u>Age Group</u>	IDENTICAL											
	<u>Experimenter Hides</u>						<u>Subject Hides</u>					
	<u>a</u>	<u>one/one of the</u>	<u>the</u>	<u>the other</u>	<u>the + colour</u>	<u>∅</u>	<u>a</u>	<u>one/one of the</u>	<u>the</u>	<u>the other</u>	<u>the + colour</u>	<u>∅</u>
3 year olds	3	3	2	2	0	0	4	3	3	0	0	0
4 year olds	3	2	1	4	0	0	6	1	0	3	0	0
5 year olds	0	5	3	1	0	1	4	1	4	1	0	0
6 year olds	2	3	3	2	0	0	4	1	3	0	1	1
7 year olds	3	3	3	1	0	0	6	2	0	0	2	0

TABLE F.8 DETERMINERS USED FOR TRIALS 7 & 8

Age Group	SIMILAR											
	Experimenter Hides						Subject Hides					
	a	one/one of the	the	the other	the + colour	∅	a	one/one of the	the	the other	the + colour	∅
3 year olds	5	3	2	0	0	0	2	3	3	1	0	1
4 year olds	4	0	4	2	0	0	1	0	8	1	0	0
5 year olds	1	1	4	1	2	1	3	0	4	1	1	1
6 year olds	0	2	2	2	4	0	3	1	2	1	3	0
7 year olds	3	0	1	1	5	0	3	0	1	1	5	0

TABLE F.9 LIST OF CONTENTS OF PAPER BAGS

1. Dress, boot, pen, screwdriver
2. Watch, iron, duck, button
3. Pot, blue boat, red boat, block
4. Bottle, green elephant, grey elephant, eraser
5. Pan, 2 motor bikes, elastic band
6. Funnel, 2 cars, paper clip
7. Trumpet, brush, pencil, dice
8. Doll, sweeper, cow, beads

Reserve Bags

- 3(b) Yellow ball, red ball, dustpan, triangle
- 3(c) Red pan, green pan, baking tray, cube
- 5(b) 2 pigs, lamb, pencil
- 5(c) 2 buttons, comb, hat
- 5(a) 2 boots, plastic spoon, pin

APPENDIX G

EXPERIMENT 7 - THE FARMYARDS

Tables G.1.A - G.5.C Determiners used and time (in seconds)
taken to select the singleton, identical
and similar objects in the three blocks
of trials.

Key: the + C = the + Colour
 one* = one of the
 a* = another

TABLE G.1.A DETERMINERS USED BY 3 YEAR OLDS IN BLOCK A

B L O C K A			
Subject	Singleton	Identical	Similar
1	a, the 2.8, 2,8	the 5.0	the 4.0
2	∅ ∅ 2.4, 3.5	∅ 3.4	∅ 14
3	∅ the 4.0, 3.5	the 3.5	∅ 7.0
4	the, the 1.7, 1.8	the 3.6	the 5.5
5	the, the 4.4, 4.5	a 7.5	a 6.9
6	the, the 4.8, 8.0	the 4.0	a 4.8
7	a, a 2.8, 2.1	a 3.0	a 4.1
8	the, the 1.9, 2.0	a 4.0	a 3.7
9	the + C x 2 2.0, 3.0	a 2.9	the + C 3.0
10	the, the + C 2.5, 3.0	the 2.5	the + C 5.0

TABLE G.1.B DETERMINERS USED BY 3 YEAR OLDS IN BLOCK B

B L O C K B			
Subject	Singleton	Identical	Similar
1	a, the 3.6, 1.0	the 1.0	the 5.0
2	∅ ∅ 1.8, 1.5	a 4.2	∅ 5.5
3	the, the 19, 3.8	the 3.0	the 4.0
4	the, a 3.8, 2.8	a 2.0	a 2.6
5	the, the 3.5, 4.0	a, another 9.0, 9.0	- -
6	the, the 3.9, 2.0	a, another 3.2, 4.0	- -
7	a, a 2.1, 1.8	∅ 3.0	∅ 3.5
8	a, a, the 2.4, 2.8, 3.0	a 3.0	- -
9	the + C x 2, the 2.0, 2.1, 2.5	a 2.9	- -
10	the, the 1.6, 2.5	a 2.0	the + C 4.0

TABLE G.1.C DETERMINERS USED BY 3 YEAR OLDS IN BLOCK C

B L O C K C			
Subject	Singleton	Identical	Similar
1	the, the 2.0, 2.0	a 2.3	a 2.6
2	the, Ø 1.4, 1.9	a 3.5	the 4.2
3	the, the 1.5, 2.5	the 2.7	the 3.0
4	the, the 1.4, 1.5	a 1.2	the 1.5
5	the, the 3.0, 3.2	a 8.1	a 7.0
6	the, the 2.0, 3.1	- -	a, another 4.1, 3.7
7	a, a 2.0, 1.9	a 2.6	a 2.7
8	the, the 2.0, 2.1	a 3.1	a 3.5
9	the + C, the 3.0, 2.0	a 2.7	the + C 4.0
10	the, the 1.8, 2.0	a 2.1	the + C 3.0

TABLE G.2.A DETERMINERS USED BY 4 YEAR OLDS IN BLOCK A

B L O C K A			
Subject	Singleton	Identical	Similar
1	the, the 2.5, 3.4	a 3.0	the + C 2.0
2	the, the 2.3, 3.0	a 2.3	the 3.0
3	the, the 2.0, 1.8	the 2.0	the 2.4
4	the, the 3.0, 4.0	the 4.0	the 6.0
5	a, a 3.0, 3.0	a 4.0	a 6.0
6	∅ ∅ 2.0, 3.8	∅ 4.0	∅ 6.1
7	∅ ∅ 3.0, 3.0	∅ 1.1	∅ 8.0
8	the, the 2.4, 4.0	a 2.8	a 5.8
9	a + C, a 1.8, 2.0	a 2.4	a + C 4.0
10	the + C, the 3.5, 2.0	the 4.0	a 6.0

TABLE G.2.B DETERMINERS USED BY 4 YEAR OLDS IN BLOCK B

B L O C K B			
Subject	Singleton	Identical	Similar
1	the, a 1.1, 1.9	a 2.6	a 3.1
2	the, the 2.2, 3.0	the 2.7	a 2.9
3	the, the 2.0, 2.0	a, a 1.9, 2.1	- -
4	the, the, the 2.9, 3.0, 2.1	the 3.7	- -
5	a, a 3.6, 2.9	a 3.9	a 4.2
6	the, the 2.9, 2.4	a 4.0	a 3.7
7	∅ ∅ 3.0, 4.0	∅ 3.5	∅ 3.5
8	the, the 3.0, 3.9	a 3.0	a 4.0
9	the + C, a 2.5, 2.0	a 3.0	a + C 3.0
10	the + C, the 2.5, 2.1	the 3.8	the 3.2

TABLE G.2.C DETERMINERS USED BY 4 YEAR OLDS IN BLOCK C

B L O C K C			
Subject	Singleton	Identical	Similar
1	the, the 5.0, 6.3	a 6.1	a 8.2
2	the, the 1.0, 1.8	the 3.0	a 2.7
3	the, the 1.8, 1.8	a, another 2.1, 1.7	- -
4	the, the 1.8, 2.1	a 2.7	the 4.1
5	∅, a 1.0, 3.0	-	a, ∅ 2.1, 2.9
6	the, the 2.1, 2.4	a 3.5	a 3.4
7	a, a, a 4.0, 4.2, 2.8	a 2.0	- -
8	the, the 2.0, 2.5	a 3.0	∅ 3.8
9	a + C, a 1.9, 2.0	a 2.7	a + C 3.0
10	the + C, the 2.0, 2.2	a 3.0	the 2.9

TABLE G.3.A DETERMINERS USED BY 5 YEAR OLDS IN BLOCK A

B L O C K A			
Subject	Singleton	Identical	Similar
1	the, the 4.8, 1.0	the 2.2	the 1.9
2	∅ ∅ 1.2, 1.6	∅ 1.1	∅ 3.2
3	∅ ∅ 4.0, 1.5	∅ 3.8	∅ 1.6
4	∅ ∅ 1.1, 2.0	∅ 2.0	∅ 1.8
5	the, the + C 1.1, 1.6	the 1.5	the + C 1.8
6	the + C x 2 1.2, 1.2	the + C 2.5	the + C 1.9
7	the, the 1.5, 1.8	the 1.2	the 1.8
8	the, the 0.5, 1.3	the 1.5	the 0.9
9	the, ∅ 2.5, 4.2	∅ 2.8	∅ 2.8
10	∅ ∅ 1.0, 2.8	∅ 1.1	∅ 13.5

TABLE G.3.B DETERMINERS USED BY 5 YEAR OLDS IN BLOCK B

B L O C K B			
Subject	Singleton	Identical	Similar
1	the, ∅ 1.5, 1.5	the 2.0	∅ 0.8
2	∅ ∅ 1.2, 1.4	∅ 2.4	∅ 1.0
3	∅ ∅ 2.8, 1.6	∅ 2.0	∅ 7.8
4	∅ ∅ 1.6, 1.6	∅ 1.0	∅ 1.6
5	the + C x 2 1.2, 2.5	the + C 3.6	the + C 1.7
6	the + C x 3 1.5, 1.5, 1.2	the + C 1.4	- -
7	the + C 0.8	the + C 1.0	the + C x 2 1.1, 4.0
8	the, the 0.7, 1.3	the 0.8	the + C 1.0
9	∅ ∅ ∅ 2.0, 1.2, 1.8	∅ 1.2	-
10	∅ ∅ 0.8, 3.1	∅ 5.0	the + C 6.2

TABLE G.3.C DETERMINERS USED BY 5 YEAR OLDS IN BLOCK C

B L O C K C			
Subject	Singleton	Identical	Similar
1	the, the the 2.0, 1.4, 1.4	the, the, one 1.5, 2.5, 2.6	the, one 4.2, 2.6
2	∅ ∅ ∅ 1.5, 2.2, 1.5	∅ ∅ 1.7, 2.2	∅ ∅ ∅ 4.2, 1.2, 1.2
3	∅ ∅ ∅ 1.2, 1.5, 1.6	∅, a 1.6, 1.1	∅, a, ∅ 1.6, 2.6, 2.2
4	∅ ∅ ∅ 2.7, 1.0, 1.0	∅ ∅ 0.5, 1.5	C x 2, ∅ .9, 3.0, 1.0
5	the, the + C x 2 1.2, 1.0, 1.0	the + C x 2 3.0, 0.8	the + C x 3 2.6, 1.5, 2.2
6	the + C x 3 1.0, 1.0, 1.3	the + C x 2 0.6, 0.6	the + C x 3 1.0, 1.4, 0.8
7	the + C x 3 1.6, 1.2, 1.8	the + C x 2 1.5, 0.9	the + c x 3 1.4, 1.2, 2.0
8	the, the + C x 2 0.8, 1.8, 1.2	the + C x 2 1.2, 0.7	the + C x 3 1.0, 0.8, 0.7
9	∅ ∅ ∅ 2.1, 1.2, 1.1	∅ ∅ 0.6, 1.5	∅ ∅ ∅ 2.2, 3.5, 2.2
10	∅ ∅ ∅ 1.0, 2.8, 1.4	∅ ∅ 1.2, 2.0	∅ ∅ ∅ 1.6, 3.0, 3.0

TABLE G.4.A DETERMINERS USED BY 6 YEAR OLDS IN BLOCK A

B L O C K A			
Subject	Singleton	Identical	Similar
1	∅ ∅ 1.0, 0.8	∅ 1.5	∅ 1.7
2	∅ ∅ 1.0, 1.1	∅ 1.8	∅ 3.0
3	the, ∅ 1.0, 0.8	∅ 1.5	∅ 3.5
4	∅ ∅ 1.0, 1.8	∅ 2.8	∅ 3.2
5	the, ∅ 1.0, 1.2	the 2.2	the 2.8
6	the, the 1.0, 1.2	the 1.8	the 1.2
7	∅ ∅ .8, 1.9	∅ 1.2	∅ 2.1
8	∅ ∅ 3.0, 5.0	∅ 3.0	∅ 2.0
9	the + C x 2 4.2, 1.0	the + C 1.8	the + C 1.7
10	the, the + C 1.0, 1.5	the + C 1.0	the + C 2.5

TABLE G. 4.B DETERMINERS USED BY 6 YEAR OLDS IN BLOCK B

B L O C K B			
Subject	Singleton	Identical	Similar
1	the, the 0.8, 1.0	∅ 1.3	the + c 1.4
2	∅ ∅ 1.6, 1.0	∅ 0.8	the + C 1.4
3	the + C x 2 1.0, 1.2	- -	the + C x 2 1.2, 1.3
4	the, the 1.4, 1.8	the .8	the + C 1.2
5	the 4.0	the 1.4	the, the + C 5.4, 1.0
6	∅ ∅ 0.8, 0.8	∅ 1.0	the + C 1.2
7	∅ ∅ 1.0, 1.2	∅ 1.0	∅ 4.5
8	∅ ∅ 2.2, 1.5	∅ 1.2	∅ 8.0
9	the, the 1.2, 1.2	the + C 1.4	the + C 1.2
10	the, the 1.0, 2.2	the 1.2	the + C 1.1

TABLE G.4.C DETERMINERS USED BY 6 YEAR OLDS IN BLOCK C

B L O C K C			
Subject	Singleton	Identical	Similar
1	∅ ∅ ∅ 1.0, 1.2, 1.0	∅ ∅ 1.0, 1.0	the + C x 3 1.4, 1.0, 1.2
2	the, the, the 1.1, 0.8, 0.8	∅ ∅ 1.0, 1.0	the + C x 3 0.8, 0.8, 0.8
3	the, the, the 1.0, 1.0, 0.8	the, the, the 1.0, 1.0, 1.0	the + C x 2 1.2, 1.1
4	the, the, the .8, 1.0, 0.8	the, the .9, 1.0	the + C x 3 1.1, 1.1, 1.2
5	the, the, the 1.0, 2.0, 1.2	∅, the 1.0, 1.2	the + C x 3 2.8, .8, 1.2
6	the, the, ∅ .8, 1.2, 1.0	∅, the 1.0, 1.1	the + C x 3 1.1, 1.0, 1.1
7	∅ ∅ ∅ 1.0, 1.0, 1.2	∅ ∅ 2.0, 1.0	the + C x 3 1.8, 2.2, 1.2
8	∅ ∅ ∅ 1.0, 1.0, 1.0	one, a, ∅ 1.5, 1.2, 1.0	∅, C 3.9, 2.0
9	the, the + C 1.1, 0.8	a, a + C, a* 1.0, 1.0, 1.0	the + C x 3 1.1, 1.0, 1.0
10	the, the, the 0.9, 2.2, 1.0	a, the + C 0.8, 1.6	the + C x 3 1.1, 2.2, 0.5

TABLE G.5.A DETERMINERS USED BY 7 YEAR OLDS IN BLOCK A

B L O C K A			
Subject	Singleton	Identical	Similar
1	∅ ∅ 0.5, 0.8	∅ 1.6	∅ 1.0
2	∅ ∅ 1.0, 1.2	∅ 1.0	∅ 4.5
3	the, the + C 1.2, 1.0	a 1.2	the + C 2.2
4	the + C x 2 1.2, 2.0	the + C 0.4	the + C 1.2
5	the, ∅ 1.0, 1.0	∅ 2.0	∅ 1.8
6	the, the 2.0, 3.0	the 1.5	the 7.0
7	the + C x 2 1.2, 2.0	the 2.1	the + C 2.0
8	the + C x 2 1.2, 1.0	the 1.2	the + C 1.2
9	the, the 0.8, 1.8	the 1.4	the 1.2
10	the, the 1.0, 1.1	the 1.5	the 1.8

TABLE G.5.B DETERMINERS USED BY 7 YEAR OLDS IN BLOCK B

B L O C K B			
Subject	Singleton	Identical	Similar
1	∅ ∅ 0.4, 1.0	∅ 0.8	C 1.2
2	the + C 1.2	∅, another 0.5, 0.2	the + C 1.0
3	the, the + C 1.2, 1.2	one* 1.0	the + C 1.0
4	the 0.8	one*, C 1.0, 1.0	the + C 0.8
5	the, the 0.8, 0.8	the 1.2	a 1.5
6	the, ∅ .8, 1.0	the 1.0	the + C 1.0
7	the, the + C x 2 1.0, 1.1, 1.0	-	the + C 1.1
8	the + C 1.0	the 1.0	the + C x 2 1.0, 1.0
9	the, the 1.2, 1.2	the 1.2	the 2.0
10	the, the 1.0, 1.0	the 1.0	the 4.8

TABLE G.5.C DETERMINERS USED BY 7 YEAR OLDS IN BLOCK C

B L O C K C			
Subject	Singleton	Identical	Similar
1	∅ ∅, the 0.9, 0.4, 0.7	∅ ∅ 1.1, 1.0	C x 3 1.3, 1.2, 0.8
2	the, the, the 0.8, 2.0, 0.8	∅, a 0.2, 0.2	the + C x 3 1.4, 0.4, 0.8
3	the, the + C x 2 0.8, 1.0, 1.2	one* x 2 0.8, 1.1	the + C x 3 1.2, 0.4, 1.1
4	the, the, the + C 1.0, 0.4, 1.0	one* x 2 1.1, 0.5	the + C x 3 0.8, 0.8, 1.1
5	the, the, the .8, 0.8, 2.5	∅ ∅ 1.0, 0.5	the + C x 3 1.0, 1.8, 0.8
6	the, the, the 1.0, 0.8, 0.8	the, another 1.0, 1.0	the + C x 3 0.8, 1.0, 1.0
7	the, the, the + C 0.8, 1.1, 1.7	the, another 1.1, 1.0	the + C x 3 1.8, 1.0, 1.0
8	the, the, the + C 0.8, 1.0, 1.1	the, the 1.0, 1.0	the + C x 3 0.8, 1.0, 0.8
9	the, the, the 1.2, 1.0, 1.1	the, the 1.0, 1.1	the, the, the 3.0, 2.0, 1.0
10	the, the, the 1.0, 1.4, 1.0	the, the 1.2, 0.5	the, the, the 3.2, 1.2, 1.2

APPENDIX H

EXPERIMENT 8 - THE BALANCES

Table H.1 Number of trials to criterion for each subject
in the three blocks of trials.

TABLE H.1 NUMBER OF TRIALS TO CRITERION FOR EACH SUBJECT IN THE THREE BLOCKS OF TRIALS

3 YEAR OLDS				4 YEAR OLDS				5 YEAR OLDS			
Subject	Block 1	Block 2	Block 3	Subject	Block 1	Block 2	Block 3	Subject	Block 1	Block 2	Block 3
1	3	2	1	1	2	2	1	1	4	2	1
2	0	0	0	2	2	2	1	2	2	3	1
3	0	0	2	3	3	3	1	3	5	2	0
4	2	3	1	4	5	3	1	4	0	5	1
5	2	3	0	5	0	0	0	5	4	2	1
6	4	2	1	6	3	3	1	6	2	2	1
7	2	2	1	7	2	2	1	7	4	2	0
8	2	2	1	8	3	3	1	8	4	3	1
9	3	3	1	9	2	2	2	9	2	2	1
10	0	0	1	10	2	2	1	10	5	3	1
6 YEAR OLDS				7 YEAR OLDS							
1	3	2	1	1	2	2	1				
2	3	3	2	2	2	3	1				
3	3	3	1	3	2	2	1				
4	4	2	1	4	3	2	1				
5	2	2	1	5	4	2	1				
6	2	2	1	6	2	2	1				
7	3	2	1	7	2	2	1				
8	2	2	1	8	3	2	1				
9	2	2	1	9	3	3	0				
10	2	2	1	10	3	2	1				

APPENDIX I

EXPERIMENT 9 - STORY TELLING TASK III

Tables I.1 - I.3 Determiners used on first mention in the Identical, Similar and Different Gender Versions of the stories.

Tables I.4 - I.6 Determiners used on second and subsequent mentions in the Identical, Similar and Different Gender Versions of the stories.

Table I.7 Details of references which judges assigned incorrectly or were unable to assign.

Key: Numbers without brackets = judges assigned incorrectly
 Numbers in brackets = judges were unable to assign
 * Subject referred to one, then both characters together

TABLE I.1 DETERMINERS USED ON FIRST MENTION, IDENTICAL VERSION

SUBJECT	4 YEAR OLDS	5 YEAR OLDS	6 YEAR OLDS	PARENTS
1	two boys	the man	the boy, the other boy	two little girls
2	he	two boys	he	one boy, another boy
3	a boy, <u>he</u>	two lads	two boys	two boys
4	a man, a <u>man</u>	a man, another man	two boys	two girls
5	two boys	he	two boys	two girls
6	a man, another man	a man, the other man	the man, the other man	two boys
7	two girls	two girls	two girls	two boys
8	one, one	two girls	a girl, the other girl	two girls
9	two girls	two girls	two girls	two children
10	a mam	two girls	they	two boys
11	a girl, a mam	the little girls	two girls	two children
12	two girls	two girls	two girls	two boys

TABLE I.2 DETERMINERS USED ON FIRST MENTION, SIMILAR VERSION

SUBJECT	4 YEAR OLDS	5 YEAR OLDS	6 YEAR OLDS	PARENTS
1	some boys	a man, a boy	the boy, the boy	two little girls
2	a man, other man	a boy, a Daddy	a big boy, a little boy	two boys
3	a little man, a strong man	a little man, the other man	the boy, his Dad	a little boy, his Dad
4	a man	a man, a boy	two boys	a big girl, a little girl
5	a Daddy, a big boy	a little man, a big man	two men	two children
6	a little girl, another little girl	the Daddy, the little boy	two boys	a little boy, a big boy
7	the little girl, she - that girl	a little girl, the <u>other</u> girl	a big girl, a little girl	two little girls
8	the girl, the mammy	a big girl, a little girl	a little girl, another little girl	a little lad, a big lad
9	big girl, little girl	the girl, the other girl	a girl, another girl	two little girls
10	a doll, the little girl	Mam and a girl	two girls	a father, a son
11	a girl, the other girl	big doll, little doll	a little girl - <u>one</u>	a father, his son
12	the girls	two girls	the little girls	two girls

TABLE I.3 DETERMINERS USED ON FIRST MENTION, DIFFERENT GENDER VERSION

SUBJECT	4 YEAR OLDS	5 YEAR OLDS	6 YEAR OLDS
1	a man, a lady	a boy, a girl	a man, a girl
2	a man, a little girl	a boy, a girl	a boy, a girl
3	a boy, a girl	a boy, a girl	a girl, a boy
4	a girl, a boy	a boy, a girl	a boy, a girl
5	a boy and girl	a girl, a boy	a girl, her brother
6	a girl, a boy	the girl, the boy	a girl, a boy
7	a girl and boy	a boy, the girl	a boy, a girl
8	a boy, a girl	a woman, a man	a girl, a boy
9	a girl, a man	girl, a boy	a girl, a boy
10	the little boy, the girl	the little girl, a boy	a lady, a man
11	a man, a lady	a boy, a girl	a boy, a girl
12	a girl, a boy	a man, a woman	a mammy, a daddy

TABLE 1.4 DETERMINERS USED ON SECOND AND SUBSEQUENT MENTIONS IN THE IDENTICAL VERSIONS

<u>4 yrs.</u>	1	2	a	he/she	him/her	the	one	the other	the adj.	mother sister etc.	rel. clause	the first/ second	another	Referring to both
1		1		1										
2	1			2										
3				3(1)		1(1)								
4				3	2									
5		1												2 boys
6					1	1		1						
7				3	2									
8							2							
9								1			2			
10	1					1								
11					1	1								they
12					1		1p							they
<hr/>														
<u>5 yrs.</u>														
1	1			6										
2					1	2		4(1)						
3				2(1)			3	2(2)						
4		1												2 mans
5	1			4										
6				2		(1)		2						
						2(1 that)								
7				2	1									two of them
8				2(1)										they
9				1			1							they, two
10				2	1			1						
11								1			1			they
12				1(1)				1						they, both

TABLE I.4 (CONTINUED) IDENTICAL VERSIONS

6 yrs.	1	2	a	he/she	him/her	the	one	the other	the adj.	mother sister etc.	rel. clause	the first/ second	another	Referring to both
1		1		1		1								
2	1			1										
3		1					lp							
4		1		1(1)										
5				1				3						
6				3		3		1						
7							3	2						they x 3
8				3				1						they
9				2(1)	1		1	3						
10					2		1							
11							2				2			
12		1		2	2			2		her sister				2 girls x 2
<u>Parents</u>														
1				2	1		1	1						they x 2
2				2		1						2		
3							lp	1			1			
4					2		1	2			1			
5							1				2			
6					1		1	1				1		
19				1			2	1			2			
20				2	2		1	1			1			they x 2
21				1	2		2	2						they
22				1			1	3						
23						1	2	2						
25							2	1						

TABLE I.5 DETERMINERS USED ON SECOND AND SUBSEQUENT MENTIONS IN THE SIMILAR VERSIONS

<u>4 yrs.</u>	1	2	a	he/she	him/her	the	one	the other	the adj.	mother sister etc. man/boy	rel. clause	the first/ second	another	Referring to both
1		1	1											some boys x 2
2				1		1		1						
3				1					1					they
4	1					1								
5		1								2				
6				2	2			1			1			
7			somebody x 2	4		4(1 that)	1			1(1)				
8							3(1)		1	4				
9				2					3					
10				4(3)	1									
11					1			1(1)						
12				1		1			1					
<u>5 yrs.</u>														
1										4				
2										3				they
3				2			1	1(1)						
4				2						1				
5				1					4					
6	1			1										they
7						2(1)		1(1)	3		1			
8				1	2					4(1)				
9					1	1		1						
10					1					2				
11				1	1			1(1)	2					
12				1	1				2(1)					

TABLE I.5 (CONTINUED) SIMILAR VERSIONS

<u>6 yrs.</u>	1	2	a	he/she	him/her	the	one	the other	the adj.	mother sister etc. man/boy	rel. clause	the first/ second	another	Referring to both
1						4		1						
2					1				4					
3										3				
4		1				1								two mans
5		1		2				1						
6				1	1		1	2			1			
7						1	1	2	5					
8				3	3				2					
9				5(2)	2	1		1	1					
10		1		2	3		1p							
11				3(1)	2		2	3(1)			1			
12				3	2				1					
<u>Parents</u>														
7				3			1	2						
8									5					
9				1						3				
10				2	3				3					they
11					2		1p	2						
12				2					4					
13				3	4				6					
14				6	1	1								
15			another		1			2			1			
16				2						3				
17										3				they x 2
18				2	1		1	1	4					

TABLE I.6 DETERMINERS USED ON SECOND AND SUBSEQUENT MENTIONS IN THE DIFFERENT GENDER VERSIONS

<u>4 year olds</u>	a	he/she	his/her him/her	the	one	the other	the adj.	Mother Dad/Son	rel. clause	the first/ second	another	Referring to both
1		1 1	1	3								
2				2								
3			1	2								
4			2	2								
5		1	1	1								
6		1		2								
7		1 1										
8			1	1								
9		1 1										
10				2								
11		1 1										
12				3								
<u>5 year olds</u>												
1		4		2								
2		2	2	2								they
3		1	3	2								
4		1	2	1								
5			1	3								
6			1	3								
7			1	2								
8			1	4								
9			2	4								
10				3								
11				3								
12			1 2	2								

TABLE I.6 (CONTINUED) DIFFERENT GENDER VERSIONS

<u>6 year olds</u>	a	he/she	his/her him/her	the	one	the other	the adj.	Mother Dad/Son	rel. clause	the first/ second	another	Referring to both
1		1	2	2								
2		1	3	3								
3		1	1	4								
4		1	1	5								
5		3	2	1				1				
6				2								
7				2								
8			1	4								
9				4								
10				4								
11		1		3								
12			1	2								

TABLE I.7 REFERENCES WHICH JUDGES ASSIGNED INCORRECTLY OR WERE UNABLE TO ASSIGN

	a (indef.)	he/she	him/her his/her	the	one	the other	adj.	F/Son	rel. clause	the first	refer to both
<u>Identical Version</u>											
4 year olds		3		1							1
5 year olds		2		1							
6 year olds		4(1)		3	1(1)	1					
Parents					(2)	(2)					
		9(1)		5	1(3)	1					1
<u>Similar Version</u>											
4 year olds	2*(2)	2(4)	1(1)	(2)	(1)						
5 year olds		4(2)	1(1)	1	(1)	1					
6 year olds	1 (1)	1	1	3							
Parents	1										
	4 (3)	7(6)	3(2)	4(2)	(2)	1					
<u>Different Gender Version</u>											
4 year olds		1									
5 year olds											
6 year olds											
		1									

Table I.8. Example of a judge's running commentary

Protocol¹: There were two lads playing with a car. One was rolling it to the other one and one was rolling it to the other one. One went and stood on it and he went 'Oh! No!' And he stood on it and broke the car.

Commentary²: [There were two lads playing with a car] That's easy - two boys playing with a toy car, I presume. [One] one of them [was rolling it to the other one] the other boy [and one] I'm not sure who that is [was rolling it to the other one] Not sure about that either. Must mean that the first boy was rolling it to the second boy who rolled it back to the first boy. [One] one of the boys [went and stood on it] the car [and he] that's the boy who stood on it [went 'Oh! No!' And he] that's the same boy [stood on it and broke the car].

Scoring: There were two lads playing with a car. One was rolling it to the other one and one was rolling it to the other one. One went and stood on it and he went 'Oh! No!' And he stood on it and broke the car.

-
1. Underlining = emphasis
 2. Brackets are around each part of the protocol which the judge was reading aloud

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