

THE DEVELOPMENT OF NON-NOMINAL
EXPRESSIONS IN 12-24 MONTH OLD CHILDREN

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THE DEVELOPMENT OF NON-NOMINAL EXPRESSIONS IN 12-24 MONTH
OLD CHILDREN

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ABSTRACT

The meaning of expressions other than names in the language of 9 12-24-month olds was studied. The children were audio-taped or videotaped regularly from about 15 months to about 24 months. The meaning of each early word was discovered by looking at the contexts in which the children used that word. Changes in the meaning of each word were recorded. "That", "there", "no", "more", "oh dear", "gone", "down", "up", "in", "out", "on" and "off" were studied particularly closely.

"That" and/or "there" encodes the fact that the child perceives an object, that he successfully completes a plan, or that an object changes its location. "No" encodes the fact that the child does not successfully implement a plan, "more" that he intends to repeat a plan, and "oh dear" that his plan fails. "Gone" encodes the fact that the child does not perceive an object, "down" and "up" encode downward and upward movement, "in" and "out" encode movement in to or out of a container, and "on" and "off" encode attachment and detachment. Children initially used these expressions in egocentric, action-oriented ways and later used them in more objective ways.

The cognitive literature provides the basis for an account of the development of the concepts encoded by these expressions, particularly, the concepts of abstract aspects of plans, of disappearance, balance, containment and attachment. These concepts appear to be developed at around 18 months, that is, at about the same time that the words that encode them first appear. This suggests that early non-nominal expressions encode new, problematic, concepts, rather than well-established concepts. It is argued that the development of early non-nominal expressions could facilitate the development of the abstract concepts they encode. This argument may also be applied to early names.

LONG ABSTRACT

This thesis is primarily concerned with the development of expressions other than names in the 12-24 month period. Nine children were visited in their homes and their speech and behaviour were recorded. Three children were audiotaped for one hour every fortnight from the time they began to talk until they reached the two-word stage. Three children were video-taped for 1/2 hour every month from the age of 15 months to the age of 21 months, three children were video-taped every month from the age of 18 months to the age of 24 months.

The meaning of each expression was discovered by looking at the contexts in which it was used. It was assumed that if there was some common factor in these contexts, the expression encoded that common factor. Some of the most important non-nominal expressions, "that", "there", "no", "more", "oh dear", "gone" and "down", "up", "in", "out", "on" and "off" were examined particularly closely. A hypothesis about the meaning of each of these expressions was formulated, changes in the use of each expression were noted, and other reports of the use of each expression were examined.

Children used "that" and/or "there" to indicate objects and to mark success and location. They used "that/there" when they pointed to objects or showed them to others, when they picked up, touched or examined objects, and occasionally when they acted on objects in other ways. They applied "that/there" to any object that interested them. They used "that/

there" when they successfully completed a plan, that is, when they acted to bring about an event and that event ensued. They used "that/there" when they tried to change the location of an object, when they pointed to the intended destination of an object they were about to move, when they indicated the location of a stationary object and when they answered "where" questions.

Children tended to use "that/there" in indicative contexts before they used it in locative contexts. They also tended to use "that/there" when they intended to move an object before they used it to indicate the location of a stationary object. If children used "that/there" to mark success they tended to do so after they used it indicatively but before they used it locatively. The relationship between the development of the meaning and form of "that/there" was complex, but some children ended up using "that" to indicate objects and using "there" to mark success or location.

Children used "no" in six types of contexts. They used "no" when they refused to comply with a proposal suggested by someone else, when they protested at the actions of another, when they failed to complete a plan, and when they started to act in one way but then changed their minds. They also used "no" as a conversational device, a stock and often inappropriate way of responding to adult utterances, and they used "no" to negate propositions. They only used "no" to negate propositions after they used it in the other contexts. They also tended to use "no" in refusal and protest contexts before they used it in failure and change of mind contexts. It is argued that there is a common

factor in the first four contexts. In all of them a plan is not successfully implemented. That is, an event does not take place either because the child decides not to act to bring about that event, or because other people or objects interfere.

Children used "more" in four types of contexts. They used "more" when they acted on an object and then intended to repeat that action on a similar object, when they acted on an object and then intended to repeat that action on the same object, when they requested that someone else repeat an action, and when they commented on the similarity of two objects. They only used "more" to comment on the similarity of objects after they used in the other contexts. It is argued that there is a common factor in the first three contexts. In all of them the child intends to repeat a plan, that is, he intends to repeat an action that is intended to bring about a particular event.

Children used a number of expressions such as "oh dear" and "oh no" in three different contexts involving failure. They used the expressions when they were unable to bring about an event, when they brought about an event but something went wrong immediately afterwards, and when an undesirable event took place. Some children also used expressions such as "right" when they succeeded in bringing about an event. It is argued that expressions such as "oh dear" encode the failure of a short-term or long-term plan.

Children used "gone" in four types of contexts. They used "gone" when they searched for objects, when objects disappeared, when they emptied containers or commented on

empty containers, and when objects were suddenly and unexpectedly transformed. They tended to use "gone" to refer to object transformations in the early sessions, and then to stop using it in this way later on. They also tended to use "gone" first when they brought about the disappearance of an object, and only later when objects simply disappeared. It is argued that the first two types of contexts have a common factor, the child believes that an object exists but that he cannot perceive it. The last two contexts may also be interpreted in this way if, as their non-linguistic behaviour suggests, these children have a concept of the object that is not like the adult concept.

Children used direction expressions in four general types of contexts. They used these expressions when they intended to change the location of an object, when other people changed the location of an object, when an object simply changed its location, and when they pointed out the location of a stationary object. Each expression referred to a different type of movement or location. "Down" and "up" were used when objects moved towards or away from the ground, or when they were above or below other objects. "In" and "out" were used when objects moved in to or out of containers, or were inside or outside of containers. "On" and "off" were used when objects became or ceased to be contiguous or attached to other objects, or were contiguous or attached to other objects. "On" and "off" were frequently applied to articles of clothing. Children tended to use all these expressions first when they intended to change the location of objects, then when other people moved objects or objects

simply moved, and finally when they pointed out the location of stationary objects.

These six types of non-nominal expressions were similar in many ways. The expressions did not encode properties of objects or, for the most part, relationships between objects. They also did not encode actions or types of action, nor were they social or expressive devices. The expressions were frequently used in contexts that involved plans. In these contexts the child intended to perform an action on an object in order to bring about a particular event. The expressions had an egocentric quality. Children were concerned with their own plans rather than the plans of others, or with the relationships between themselves and objects, rather than those between other people and objects. Finally the expressions encoded highly abstract concepts, these concepts could not be defined in simple perceptual or behavioural terms.

Specifically, "no", "more", failure expressions and success expressions, including "there", encoded abstract aspects of plans. They encoded the fact that the child's plan succeeded or failed, that he intended to repeat a plan or that his plan was not successfully implemented. The indicative and locative "that/there", "gone" and the direction expressions were more concerned with abstract aspects of objects. They encoded abstract relationships between the child and objects, specifically that the child did or did not perceive an object, or encoded abstract spatial characteristics of objects. However, these expres-

sions were particularly likely to be used when the child acted on objects, when, for example, he planned to make an object disappear or to change the location of an object.

The meanings of these non-nominal expressions also changed in similar ways. Expressions like "no" and "more" which originally encoded abstract aspects of plans came to encode abstract aspects of objects. Expressions like locative "there" and the direction expressions which originally encoded changes in the location of objects came to encode the location of stationary objects. Expressions like "gone" and the direction expressions, which were originally used when children intended to bring about events, were eventually used when these events simply took place.

A number of other non-nominal expressions were recorded though these expressions appeared later than the first six types of non-nominals, and were used less frequently and less commonly. The children also used names, but while they used more different names than non-nominal expressions, names were used less frequently, less commonly and less consistently.

An account of the development of the concepts encoded by the first six types of non-nominal expressions was developed. This account was based on the accounts of cognitive development in infancy of writers like Piaget, Bower and Bruner.

Infants begin with a repertoire of actions that are innately coordinated with events. Later, they learn that specific actions lead to specific events, and that an event may be reproduced by reproducing the action that preceded

it. Then, they learn how to hierarchically order action-event sequences and how to generate new action-event sequences, and they learn that only certain action-event sequences are possible. These three developments allow them to develop plans when they are about 12 months old. They can produce a new action that is designed to bring about a new event. Finally, at about 18 months, they construct a model of their own behaviour and the behaviour of objects which allows them to use insight to solve problems. This also allows them to generalise about their plans and to develop the concepts encoded by "no", "more" and success and failure expressions.

Infants also gradually develop a more sophisticated understanding of objects. They develop more and more predictions about whether an object that has disappeared will reappear, and where it will reappear. Eventually, at about 18 months, they generalise across these predictions and construct a general model of objects, observers and space. This model allows them to develop the idea that any object may exist without being perceived. This idea is related to the concept encoded by "gone".

Sometime after they are a year old children begin to investigate the way objects fall and the way they support each other. Eventually, they come to understand that objects have a natural tendency to move towards the floor unless they are supported by other objects. This discovery is related to the development of the concepts encoded by "down" and "up".

Until they are around 18 months old children have a

set of perceptually based object-identity rules. An object is defined as a bounded volume of space with certain features whose contours move together. According to these rules containment and attachment should be viewed as the replacement of two objects by a single object, rather than as a change in the spatial relationship of two objects. Children only override these rules, and so come to understand the concepts of containment and attachment encoded by "in", "out", "on" and "off", at about 18 months. Also, children only develop general concepts of movement which include the perceived movements of objects, hypothetical movements of objects and their own movements, at about 18 months. Such general concepts are encoded by the direction expressions and locative "there".

It seems that the concepts encoded by non-nominal expressions are only developed at about the same time that these expressions first appear, at around 18 months. These expressions seem to encode problematic concepts, concepts the child is in the middle of developing, rather than simple and well-established concepts. How can this pattern of development be explained?

The child could be particularly likely to pay attention to problematic contexts and to the language produced in such contexts rather than to contexts that are easy to understand, or are totally incomprehensible. The fact that adults use the same expression in a variety of contexts, for example, the fact that they use "there" whenever a plan succeeds, could help the child to generalise about those contexts, particularly if the dynamics of his cognitive system were

pushing him to make such generalisations. In turn, the fact that an expression encoded a significant new generalisation and allowed the child to make cognitive progress could lead the child to store that expression and to use it in his speech. At the same time, the child will not be able to hypothesise that an expression encodes a concept that is way beyond his cognitive competence. As the child grows older concepts that were once problematic will become familiar and concepts that were once incomprehensible will become problematic, and he will acquire new expressions and change his use of old expressions accordingly.

This model can be applied to names as well as to non-nominal expressions. According to the prevailing feature theories of names, names encode rather simple concepts. However, an alternative view of names, based on the Kripke-Putham account of names in the adult language, can explain many puzzling aspects of early naming. According to this account, names refer to objects that are conceived of as independent sources of experience, rather than to particular types of experiences. The cognitive literature suggests that this realist concept of the object is developed some time in the second year. Thus, early names may also encode problematic concepts.

This model of the interaction of linguistic and cognitive development may also help to explain why children begin to use language at about 18 months. This model emphasises the close relationship between the child's language and his theories of the world, and also emphasises the fact that both his language and his theories are constantly changing.

Such a model may have implications for theories of the meaning of the adult language.

In this chapter I will present a kind of reconstruction of the progress of this thesis. I hope this will give the reader an outline of what is to come and also a sense of the motivation behind what is to come; a sense of what I was, and was not, trying to do.

The original motivation for this study was rather abstract and philosophical. Most philosophers, psychologists and parents believe that children's first words are names; but it seems clear that naming only plays a small part in the semantic system of the adult language. I wondered when and how children began to go beyond these apparently simple names to develop more complex and abstract semantic structures.

When I began to look at some of the reports of early language, particularly Bloom's important book "One Word at a Time" (Bloom 1973), I discovered that the assumption that the first words are names was mistaken. Allison Bloom at least used another set of words which Bloom called function words and which included "no", "gone", "uh-oh", "up" and "there". When I looked at other accounts of early language, the same words cropped up again and again. However, in the literature on early child language, which I have reviewed in Chapter 2, there was no general account of the meaning of these expressions. In fact, it was not even clear whether these expressions were meaningful at all; but it seemed possible that the child already encoded complex and abstract concepts when he first began to speak.

My original philosophical question was replaced by a set of specific empirical questions. Did children use expressions

other than names in their early language ? What expressions did they use ? What, if anything, did these expressions mean ? I set out to answer these questions in what is by now the time-honoured psychological fashion. I dragged a boxful of toys and recording equipment to the homes of nine 12 - 24 months old children. This kind of naturalistic observation can be very frustrating, but it is also very fruitful and the frustration and the fruitfulness come from the same source. The children's behaviour could not be controlled or structured or even predicted and this inevitably introduced an element of uncertainty. However, it was precisely the most uncontrolled and unpredictable behaviour that was also most interesting and important. The most illuminating kinds of behaviour were ones I would never have dreamed of eliciting in an experimental situation.

In order to discover the meaning of non-nominal expressions, I looked at the contexts in which these expressions were uttered. Following Bloom (1973) and Halliday (1975) I assumed that if there was some common factor in all the contexts in which an expression was uttered, the expression encoded that common factor. In Chapter 3 I have described exactly how I observed, recorded and analysed the children's language.

I discovered that many of the children's early words were not names. Moreover, the same non-nominal expressions occurred again and again and these expressions were used in remarkably similar ways. Six expressions or types of expressions were particularly common and appeared particularly early. These were "that/there", "no", "more", a group of failure and success expressions, including "oh dear", "right" and "gone", and a

group of direction expressions, "down", "up", "in", "out" "on" and "off". I decided to look at these expressions particularly closely.

Chapters 4 - 9 present the results of this investigation. In each chapter I have begun by trying to give a detailed picture of the kinds of contexts in which the children used a particular type of expression. Usually I have divided up these contexts into a number of different categories and given a detailed description of each category with examples from the corpus.

Sometimes utterances of an expression were ambiguous. It was difficult to tell to which aspect of the context the utterance referred. These ambiguities posed special problems when I wanted to determine the meaning of "that/there" and "no". In these chapters I have included a special section on dealing with ambiguity.

Children changed the way they used non-nominal expressions in the 12 - 24 month period. Usually they initially used an expression in certain limited types of contexts and later they also used it in other contexts. Sometimes children would initially use an expression in one type of context and then stop using it in that context later on. The forms of expressions also changed. In each chapter I have charted these developments.

During most of the 12 - 24 month period, children only used one word at a time. However, by the end of that period some children also used non-nominal expressions in multi-word strings. In each chapter I have briefly described how each type of expression was combined with other expressions and how these multi-word strings were used.

Finally, in each chapter I have compared the results of this study with other reports of early language. I have particularly relied on the case studies of Bloom (1973), Halliday (1975) and Carter (1974).

In short, in the first part of each of chapters 4 - 9 I have tried to present a detailed picture of the use and development of a particular type of non-nominal expression.

In the second part of each of these chapters I have tried to use this information to construct a hypothesis about the meaning of each type of expression. I have tried to determine what concept each expression encoded. Sometimes I was forced to conclude that an expression had more than one meaning. I have also tried to construct hypotheses about the changes in the meaning of each expression.

Finally, in each chapter I have compared the meaning of a particular type of expression and the meanings of other non-nominal expressions. It turned out that all six types of non-nominal expressions encoded similar types of concepts. However, the meanings of "no", "more", "there" (in one meaning) and 'success' and 'failure' expressions were particularly closely related, as were the meanings of "that", "gone" "there" (in another meaning) and direction expressions.

This detailed investigation of the most important non-nominal expressions led to some rather surprising and intriguing results. These expressions were meaningful, they were not just social or conversational or expressive devices. However, they did not encode properties of objects, relationships between objects, actions, types of action, or social relationships. None of the obvious hypotheses about the meaning of

early words fitted these expressions.

"No", "more" 'failure' expressions (primarily "oh dear") and 'success' expressions and "there" (in one of its meanings) encoded abstract aspects of the child's plans, particularly relationships between plans and planners and plans and reality. A plan involved an action that was performed on an object in order to achieve a goal. "No" encoded the fact that a plan was not successfully implemented either because the child simply decided not to act, or because of the interference of other people or objects. "More" encoded the fact that the child intended to repeat a plan. "Oh dear" and similar expressions encoded the fact that the child's plan failed. 'Success' expressions and "there" encoded the fact that the child's plan succeeded.

"That", "gone", "there" (in another meaning) and the 'direction' expressions "down", "up", "in", "out", "on" and "off" primarily encoded abstract aspects of objects, particularly relationships between objects and observers and spatial characteristics of objects. "That" encoded the fact that the child perceived or attended to an object. "Gone" encoded the fact that he did not perceive an object. "There" encoded the fact that an object changed its location. The 'direction' expressions encoded changes in the spatial relationships of objects. "Down" and "up" encoded the fact that an object moved towards or away from the ground. "In" and "out" encoded the fact that an object moved into or out of a container. "On" and "off" encoded the fact that an object became or ceased to be contiguous or attached to another object.

Although these expressions encoded abstract aspects of

objects, they were used in contexts that involved plans. Children were particularly likely to use "gone" when they made an object disappear, "there" when they moved an object and 'direction' expressions when they acted to change the spatial relationships of objects.

I also discovered that the meanings of expressions changed in similar ways. There were three important types of change. Expressions that initially encoded abstract aspects of plans came to encode abstract aspects of objects. "No" was eventually used to negate propositions. "More" was eventually used to note the similarity of objects. Expressions that initially encoded changes in the spatial relationships of objects eventually encoded static spatial relationships. "There" eventually encoded the fact that an object was in a location. "In" eventually encoded the fact that an object was inside a container. Finally, expressions that were initially used when children brought about an event were eventually used when the event simply happened. Eventually children used "gone" whenever an object disappeared, whether or not they made it disappear, and they used 'direction' expressions whenever the spatial relationships between objects changed, whether or not they brought about that change.

While I examined these six main types of non-nominal expressions in some detail, I also looked at other non-nominal expressions. Many of these expressions turned out to be like the six main types of non-nominals. In Chapter 10 I have discussed the other early non-nominal expressions.

I also wanted to compare some of the characteristics of non-nominals and names. I concluded that non-nominal expressions were at least as important as names in early period. I

have discussed the relationship between names and non-nominal expressions in Chapter 11.

The answers to my first empirical set of questions raised a new set of questions. How could these results be explained ? Why did children choose these types of expressions ? Why did they use them to encode these type of concepts ? Why did the meanings of these expressions change ? It seemed that I would be most likely to find an answer to these questions if I looked at the cognitive development of 12 - 24 month olds, in particular at the development of the concepts non-nominal expressions encoded.

I am not implying that cognitive development is the only or most important factor in linguistic development. Obviously social factors, formal considerations and purely linguistic factors all play a role. However, non-nominal expressions did not seem to play an important role in the child's social world, nor did they seem to be particularly significant from the point of view of the syntax or semantics of the adult language, but the concepts encoded by these expressions did seem to play an important role in the child's understanding of actions and objects. Accordingly I decided to see what developmental psychologists had to say about the concepts encoded by non-nominal expressions.

Unfortunately, I discovered that there is no clear, generally accepted account of the development of these concepts, or any other concepts, in infancy. Since Piaget's account (Piaget 1953, 1954, 1962) is most detailed and comprehensive, it is not surprising that psycholinguists like Bloom (1973), Brown (1973), Slobin (1973) and Bates (1976, 1977) have automatically turned

to Piaget when they wanted to know about cognitive development.

However, in the past fifteen years there has been an explosion of research into cognitive development in infancy and this research challenged many of Piaget's assumptions and interpretations. Piaget's observations are usually not wrong, in fact they have been confirmed to a remarkable extent; but they are incomplete. Further observations and experiments suggest that the Piagetian account of cognitive development in infancy cannot simply be accepted without question. However, there is as yet no alternative account that is as comprehensive or detailed.

In Chapters 12, 13 and 14 I have tried to construct an account of the development of the concepts that are encoded by non-nominal expressions. Inevitably this account is largely based on Piaget's observations and theories, but I have also tried to integrate them with the observations, experiments and theories of writers like Bower, Bruner and Papousek. I have also had to rely on a certain amount of logical reconstruction when no direct evidence was available. For example, I have argued that certain concepts logically depend on other concepts and therefore could not be developed before those concepts.

In fact, the concepts encoded by non-nominal expressions turned out to involve some of the most important areas of cognitive development in infancy, the development of intelligent goal-directed action and the development of a model of objects, observers and space. Inevitably my account of cognitive development has concentrated on these two areas

and has ignored other important areas of development, such as the development of the social world and the development of perception.

In addition, I have not attempted to present a critical review of the literature on cognitive development. In particular, I have not been concerned with the methodological controversies that are provoked by experiments with infants. Given the aims of this thesis and given the scarcity of evidence, it seemed more sensible to cast about for every scrap of evidence that could shed light on the development of the concepts encoded by non-nominal expressions, rather than to restrict myself to methodologically pristine studies.

In short, the account of cognitive development I have presented in Chapters 12, 13 and 14 is not intended to be definitive or final. Instead, I simply wanted to present a hypothesis about the development of the concepts encoded by non-nominal expressions that was consistent and plausible and was also consistent with the available evidence. In Chapter 12 I have considered the development of plans and the concepts concerning plans that are encoded by "no", "more" and 'success' and 'failure' expressions. In Chapter 13 I have considered the development of the concept of the object, particularly the concept of the disappearance of an object. This concept is related to the concepts encoded by "gone". In Chapter 14 I have considered the development of spatial concepts, particularly the concepts of falling, support, containment, contiguity and attachment that are related to the concepts encoded by 'direction' expressions and the more general spatial concepts that are encoded by "there".

The cognitive literature suggested that the concepts encoded by non-nominal expressions were important to 12 - 24 month olds; but the literature also suggested, rather surprisingly, that these concepts were not developed until a relatively late stage. In fact, it seemed that many of these concepts could not appear until about 18 months. Yet the children I studied used words to encode these concepts between about 15 and 21 months.

In particular, the cognitive literature suggested that children could only make certain types of generalizations after about 18 months. Only then would they be able to see that a plan had succeeded, both when they put a jigsaw puzzle in the correct space and when they hit a tower of blocks and it fell down. Only then would they be able to see that an object existed, but was not in a position where they could see it when they turned away from an object, when a block moved inside a cup, when an object was invisibly displaced and when they deduced that an object must be in a location. Only then could they see that the same spatial relationship was involved when a toy animal moved inside a fence and when a block moved inside a closed posting box. Yet between about 15 and 21 months children would use the same expression in all these different types of situations which suggests that they had made some generalization about these contexts. In the second part of Chapters 12, 13 and 14 I have argued in detail that children begin to use non-nominal expressions to encode certain concepts at about the same time that they are developing those concepts.

The children could have chosen to use other expressions, or they could have used non-nominal expressions to encode

simpler concepts, concepts that were developed at 6 months or 9 months. In fact, they consistently used non-nominal expressions to encode new concepts, concepts they had just developed or were on the verge of developing, rather than well established concepts.

How can we explain this surprising result ? I have tried to outline one possible explanation in some detail in Chapter 12. According to this account, the child's cognitive problems largely determine which expressions he uses and his hypotheses about the meanings of those expressions. His developing cognitive system pushes him to pay attention to problematic situations and to develop new concepts. It also pushes him to pay attention to expressions that occur in problematic situations and to hypothesize that these expressions encode new concepts.

This explanation largely depends on the idea that language acquisition can facilitate cognitive development. I have suggested that the child uses linguistic clues to help him to develop the new concepts that appear after 18 months. When he has a cognitive problem, he actively searches for appropriate linguistic clues and he is particularly likely to store expressions that help him to solve cognitive problems and to use those expressions in his productive speech. This Vygotskian view contrasts with the more common Piagetian view that the child develops concepts first and later maps these concepts onto language.

In Chapter 12 I have also tried to show specifically how this account could explain the relationship between the development of plans and the development of "no", "more" and

'success' and 'failure' expressions. In Chapter 13 I have tried to show how it could explain the relationship between the development of the object concept and the development of "gone". In Chapter 14 I have tried to show how it could explain the relationship between the development of spatial concepts and the development of "there" and 'direction' expressions.

Finally, in Chapters 12, 13 and 14 I have tried to show how this account could explain the changes in the meaning of the various non-nominal expressions. I have argued that these changes reflect the fact that the child is faced with new cognitive problems as he makes cognitive and linguistic progress.

I have argued then that there is a consistent relationship between the development of non-nominal expressions and the development of the concepts those expressions encode. Non-nominal expressions seem to encode concepts the child is in the middle of developing; but names and, to a certain extent, "that" do not seem to fit this pattern. The standard account of the meaning of names claims that names encode features or properties of objects, such as redness or roundness. Similarly, "that" seems to encode the fact that the child pays attention to an interesting perceptual phenomena. These concepts, particularly the first set of concepts, should be developed at a very early age. In fact, Clark (1974) has suggested that names encode innate concepts.

However, the meaning of names and of "that" may not be so simple. In particular, Putnam (1975) and Kripke (1971) have recently suggested that the meaning of names in the adult

language is considerably more complex and abstract than feature theories suggest. In Chapter 15 I have outlined Putnam's and Kripke's arguments and I have tried to show how they can be applied to early language. I have argued that the Putnam/Kripke theory makes better predictions about early language than the feature theory. The Putnam/Kripke theory also suggests that the meaning of "that" may be as abstract as the meaning of names. I have argued that the cognitive literature suggests that the concepts encoded by names and by "that", according to Putnam and Kripke, are not developed until between 15 and 21 months. "That" and names, like non-nominal expressions, encode concepts the child is in the course of developing. In the final part of Chapter 15 I have applied my Vygotskian account of linguistic and cognitive development to the development of names and "that".

In Chapter 16 I have summarized the central ideas of the thesis and I have indulged in some speculation about other applications of these ideas. In particular, I have briefly discussed why language emerges at about 18 months and I have briefly considered what child language can tell us about the meaning of the adult language.

This thesis is organized rather like a wedding cake with successive tiers of argument, each successive tier is slightly further removed from a solid empirical foundation. I have begun by describing in detail the way children use non-nominal expressions in the 12 - 24 month period. Then I have used this information to develop hypotheses about the meaning of early non-nominal expressions. I have suggested that these expressions encode certain concepts. Then I have

used the cognitive literature to develop hypotheses about the development of those concepts. I have argued that in the 12 - 24 month period non-nominal expressions encode concepts the child is in the middle of developing. I have offered a rather Vygotskian explanation for this relationship between linguistic and cognitive development. Then I have tried to apply my account of the development of early non-nominal expressions to early names. Finally, I have tried to apply some of these ideas to the problem of the emergence of language and to the problem of meaning in the adult language.

In short, in Chapters 4 - 11 I have presented what I hope is a reasonably accurate account of the meaning and development of non-nominal expressions in the language of 12 - 24 month olds. In Chapters 12 - 16 I have presented a theoretical account of the underlying interaction between linguistic and cognitive development in this period. I have argued that this account can explain the meaning and development of non-nominal expressions and can also explain the meaning and development of names.

This theoretical account is not the only possible explanation of early language. Still, I think it is an explanation that is interesting enough in its own right to be worth spelling out in some detail. In order to confirm this account, it would be necessary to investigate linguistic and cognitive development in the 12 - 24 month period much more thoroughly. I hope that this thesis at least suggests that it would be worth dragging more toys and recording equipment about in order to observe the amazing feats of one and a half year olds.

QUESTIONS AND ANSWERS ABOUT THE DEVELOPMENT OF LANGUAGE.
A REVIEW OF THE LITERATURE.

There are three kinds of questions we can ask about a child's language. What is its structure? How is it used? How and why does it change? Each of these questions has three possible answers which we may broadly call formal, cognitive and social. In the past fifteen years there has been much debate about which of these answers is correct. None of these answers are sufficient to answer all these questions for all the different areas of language. Nevertheless, when we consider specific linguistic problems, some answers may be more appropriate than others. In the following chapter I will try to explain in more detail what these questions entail and what answers have been proposed. Moreover, I will argue that some accounts have confused different questions. I will concentrate on accounts of the one-word period.

(1) What is the structure of language?

We might think of an account of the structure of a language as a complete account of the purely linguistic behaviour of a native speaker of the language. This purely linguistic behaviour would consist of the strings of sounds the speaker produces and his judgments about which strings of sounds are words and sentences of his language. This linguistic behaviour is generative, that is we can always produce new linguistic strings or judge whether new strings belong to our language. The description of the behaviour must capture this generative quality.

Perhaps the best way of providing an accurate account of purely linguistic behaviour is to think in terms of a

set of elements and a set of rules that govern the arrangement and combination of those elements. Ultimately, this set of elements should predict whether any given string of sounds is a morpheme or sentence of the language. These elements and rules would constitute a theory of the phonology and syntax of the language. The most important recent theories of this kind have been inspired by Chomsky's transformational syntactic theory (Chomsky 1965).

Much linguistic structure seems to be intrinsically determined, it has no relation to anything outside language itself. For example, the fact that in English we consistently vary the form of the plural affix depending on the form of the stem does not seem to be related to any facts about our beliefs or our social relationships. Similarly, the fact that certain verbs can only be combined with certain prepositions often appears to have little to do with the concepts those verbs and prepositions encode.

However, much linguistic structure is related to the native speaker's concepts or beliefs. Certain lexical items and certain syntactic categories and structures are consistently related to certain concepts. For example, the syntactic category "noun" which we would need simply in order to explain the possible sequences of morphemes in English is related in a general way to the concept of an object or entity, while the syntactic category "verb" is related in a general way to the concept of action or relationship. Many of the regularities captured by our phonological and syntactic theories will turn out to be consistently related to regularities in our understanding of the world. This is hardly surprising since the principal

function of language is precisely to encode concepts. Specifying the relationship between linguistic structures and the concepts, beliefs, or propositions those structures encode is the job of a semantic theory.

There are two ways of approaching this task. One technique is to take certain semantic notions as primitives (such as truth or synonymy or paraphrase) and then explain linguistic regularities in terms of these notions without actually specifying the nature of the speaker's beliefs. For example, we can predict that if "John is tall" is true and "John is thin" is true, then "John is tall and thin" will be true, or we can predict that if "The elephants were dancing in the kitchen" means X, then "In the kitchen the elephants were dancing" also means X. We can do this even if we cannot explain what makes "John is tall" true, or what exactly the meaning of "The elephants were dancing in the kitchen" is. Davidson's truth-conditional semantics (Davidson 1967) is an example of this sort of approach.

Other, more ambitious semantic theories try to specify the nature of the beliefs, concepts and propositions that are related to linguistic structures. A common strategy is to derive complex linguistic structures from simpler or more primitive structures that are supposed to correspond to the structure of cognition. Some semantic feature theories, such as Clark's theory (Clark H.H. 1973) theories of generative semantics and most recently Miller and Johnson-Laird's procedural semantics (Miller and Johnson-Laird 1976) have tried to relate particular linguistic structures to particular perceptual or conceptual structures. These theories would

try to relate the sentence "The elephants were dancing in the kitchen" to the speaker's understanding of animals, movement and location.

Some aspects of linguistic structure are not related to our beliefs about the world, instead they are related to the social relationships between language users. Again this is not surprising since an important function of language is to regulate social interaction. An expression like "thank you" or a syntactic structure like the imperative are related to the fact that the speaker and interlocutor have been involved in an exchange, or that the speaker assumes power over the interlocutor. Austin (1962) demonstrated the significance of this aspect of linguistic structure. Even a sentence that apparently encodes a proposition like "I promise to go to the store" may actually establish a social obligation.

Searle (1969) has argued that all sentences both encode a set of beliefs about the world, they have a propositional content or locutionary force and establish a set of relationships between the speaker and others, they have an illocutionary force. A particular syntactic structure, such as that of a question, an imperative, or even a simple declarative, will always be related to a particular social relationship.

Under the Chomskyan influence, the earliest of the recent studies of child language concentrated on its intrinsically linguistic structure, particularly its syntax. The great discovery of that period was that the child's language had its own syntax, which was not like the syntax of the

adult language. For example, Brown and Bellugi (1964) described the different formal properties of negation at various stages of the child's language and Berko (1958) described the child's morphological rules. The language of the one-word period was largely ignored because its structure is so simple; but while this structure is simple, it is still a structure. Only a small sub-set of the possible strings of sounds are produced in the one-word stage and these strings can be divided into classes which correspond to words. When we say that the child produces a word, we really mean that he produces an utterance that belongs to a class of phonologically similar utterances. If we want to predict which strings of sounds are acceptable in a child's one-word language, we need a lexicon which lists all the expressions the child uses. An acceptable string is simply a string that is an utterance of one of words on that list. This list of words is an account of the linguistic structure of the child's language in the one-word stage.

It rapidly became clear that in child language, as in adult language, linguistic structure is related to belief. Just as the child's syntax is different from the adult's, his semantics, the way in which his linguistic and cognitive structures are related, is also different. Bloom (1970) argued that we could understand the child's semantics by looking at the contexts in which he used a particular structure. If a particular kind of structure always appeared in a particular kind of context, we could assume that the structure encoded some feature of the context. Brown (1973) has called this method "rich interpretation".

A good example of the difference between syntactic and semantic approaches to child language is the analysis of two-word strings. The structural fact is that words appear in first or second position. Braine (1963) tried to explain this fact by proposing two syntactically determined classes of words and a combinatorial rule. By looking at contexts, Bloom (1970) discovered that the position of words reflected the relationship between the concepts they encoded. For example, certain nouns would appear in the first position if their referent possessed the noun that appeared in the second position, so "baby doll" would be produced when the baby had the doll, but "doll dress" would be produced when the dress belonged to the doll. The structural fact that "baby" preceded "doll" was related to the conceptual relationship between the object encoded by "baby" and the object encoded by "doll".

In the one-word stage, each expression is used in contexts of a particular kind. Using Bloom's method of rich interpretation, we can describe the semantics of the one-word stage. That is, we can relate the structure of the child's language in the one-word stage, which we have seen consists of a list of the expressions the child uses, to the child's concepts. By looking at the contexts in which expression occurs, we can discover what concepts that expression encodes.

In "One Word at a Time" Bloom (1973) argued that at least one child's early words could be divided into two groups. Substantive words, which were essentially names, referred to objects or properties of objects. 'Function'

words, which included "there", "uh-oh", "up", "more", "away", "gone" and "stop", were more mysterious. Bloom provided descriptions of the way one child used these expressions and speculated that they might encode aspects of the child's organization of the world.

Most of the attention since then has been focused on the substantive words, rather than the function words. Clark (1973, 1974), Nelson (1974) and Bowerman (1978) have all tried to explain how children apply names to objects in the one-word stage. Clark has argued that names refer to perceptual attributes of objects, such as size, shape and colour. A particular name will be applied to all objects that share a particular attribute. Nelson, on the other hand, has argued that names refer to 'functional features' of objects. These functional features include dynamic attributes of objects, like the bounciness of a ball, and also includes the roles the objects play in the child's action schemes. Bowerman has supported Clark's claim that the names are applied to perceptually determined classes of objects, but following Rosch (1975), has argued that these classes include objects that have different properties in common with a prototype object. On the other hand, Piaget (1962) and more recently Bates et al (1979) seem to support Nelson's view that names are applied to objects that are acted on in the same way. In fact, it is likely that names are applied to objects in all these ways.

Bates et al (1979) suggest that early words which are not names, such as some of Bloom's function words, also encode particular action schemes. Bowerman (1978) suggests

that some of these words encode subjective, internal states of the child. Farwell (1977) argues that one class of such words, locatives, encode the goals of the child's actions.

After semantics became respectable, pragmatic analyses of child language also began to appear. If some of the child's linguistic structures were related to his beliefs, others might be related to his interactions with other speakers. Dore(1975b), Bates (1976) and Bruner (1975) have explored this possibility.

Some writers have claimed that the child's first words establish social relationships between the child and his interlocutors. The first words are more like "please" or "I promise" than like "red" or "ball". Greenfield and Smith (1976) claim that the very first words are 'pure performatives'. A similar claim has been made by Bruner (1975, 1976). Some earlier writers, such as Lewis (1951) and De Laguna (1927), also felt that the first words were essentially social devices.

On the other hand, Dore (1975a), Nelson (1975a) and Halliday (1975) suggest that only some aspects of early language are systematically related to the relationships between the child and others. Dore claims that the illocutionary force of a one word utterance is carried by intonation, while its locutionary force, its propositional content, is carried by the phonological form of the utterance. Nelson describes a class of early expressions she calls 'social or expressive' which includes expressions like "thank you" and "no". These expressions are supposed to be particularly frequent in the speech of children with an 'expressive' style. Halliday's argument is complex, but essentially he claims that

some 'pragmatic' expressions establish social relationships. while other 'mathetic' expressions are related to the child's internal states or his attempts to understand the world.

In summary, while some of the child's linguistic structures are purely linguistic, others are related to his beliefs, or to his relationship with other people. In the one-word period it seems clear that one set of expressions, names, refer in some way to objects, but the significance of other expressions is less clear. All the accounts of this period agree that such expressions exist and there is some agreement about the particular non-nominal expressions that appear in English. "That", "there", "no", "more", "gone", and "up" and "down" are often mentioned. It has been suggested that these expressions encode the child's organizing activity, his particular action schemes, his internal states, or the goals of his actions. It has also been suggested that these expressions establish social relationships between the child and others.

(2) How is language used ?

So far we have been concerned with the question of describing linguistic structures; but we may also ask how these structures are used. Any linguistic structure may be used to achieve a variety of ends.

Perhaps the most important uses of language involve the speaker and a listener. The speaker may use an utterance of a particular type in conjunction with non-linguistic behaviour, like gesture, and in conjunction with a background of shared knowledge, to convey information to a listener. He may also use utterances to request information, to command, to placate,

console, or congratulate a listener, or to affect the listener in other ways. In addition to these interpersonal functions of language, there are also intrapersonal functions. We may use language to help clarify our thoughts, to construct hypotheses, or to make predictions, without necessarily intending to affect another speaker. We might call these cognitive functions of language. Another set of functions are not social, but are also not related to knowledge. We may simply exploit the formal properties of language for their own sake, in poetry or song, for example.

There have been a number of attempts to construct taxonomies of linguistic functions by Hymes (1974), Halliday (1973) and Jakobson (1960), for example. These writers have tried to specify a limited number of such functions and tried to classify them. In addition, writers like Grice (1957, 1968) have tried to specify rules that govern our use of language. They have tried to show that rules govern the way we combine utterances, gesture, intonation and our knowledge of the context, the listener's assumptions and past utterances, in order to produce a certain effect. Grice has tried to specify 'felicity' and 'relevance' conditions that include rules like 'provide new information' or 'be clear'.

The attempt to describe our uses of language and the rules that regulate our use of language should not be confused with the attempt to describe the structure of language which I discussed in the previous section. A particular linguistic structure may be used to achieve many different ends and very different linguistic structures may serve the same function. For example, the sentence "The cat is on the mat" may be used to convey the information that the cat is on the mat, but it may

also be a demand that the listener take the cat off the mat, an excuse for not picking up the mat, a request for an explanation of the cat's presence on the mat, an observation in an ethological account of cat behaviour, or a rhyme for "The gnat is on the hat". On the other hand, any one of these functions, say the demand that the listener take the cat off the mat, may be fulfilled by a variety of linguistic structures as "The cat is on the mat", "Take the cat off the mat", "Bloody cat" and "Are you aware that the cat is on the mat ?"

The function of a sentence, in a particular context, cannot be identified either with its meaning, or with its illocutionary force. In the example above, the propositional content of the various sentences used to demand that the cat be taken off the mat is different. Each sentence encodes a different set of beliefs about the world. In addition, the illocutionary forces of these sentences are different. Each of these sentences is systematically related to a different kind of speaker/hearer relationship. Searle (1969) distinguishes between the illocutionary force of an utterance, which is related to its structure, and its perlocutionary force, which is the actual effect it produces on a listener. Structurally speaking, "Are you aware that the cat is on the mat ?" is a request for information, even though it may function as a command in a particular context.

Of course we exploit our knowledge of the meaning or illocutionary force of a sentence when we use it to achieve a certain end. We are not likely to say "Look at the fire engine" in order to get someone to take the cat off the mat.

Moreover, the way we exploit that knowledge and combine it with other kinds of knowledge, may be rule-governed. We are unlikely to use an utterance of "The cat is on the mat" to convey the information that the cat is on the mat if the cat and the mat are in full view of the listener.

However, the relationship between the illocutionary force or meaning of a sentence and the function of an utterance of that sentence may be very indirect, particularly when there is a great deal of para-linguistic and contextual information available. Indeed, it might be argued that in certain dialects, such as Oxbridge, the effect an utterance of a sentence is intended to produce rarely has anything to do with its meaning or illocutionary force.

There have been some attempts to provide functional accounts of early language and to explain how children acquire functional rules. Halliday (1975), Bruner (1975, 1976, 1978) and Carter (1974) have provided functional analyses of early speech.

There have also been a number of 'holophrastic' analyses of the one-word period, such as those of Schlesinger (1974), Ingram (1971), Rodgon (1976), Antinucci and Parisi (1973, 1975) and Greenfield and Smith (1976) which have confused the functional and structural questions. These accounts have set out to describe the meaning of the child's single expressions. In fact, they have described the message that an utterance, along with gestures and knowledge of context, might be intended to convey. They have described part of the function of early utterances. However, for this message to be a meaning, it must be related to the structure of the child's language. The confusion of structure and function in these accounts

leads to grave methodological problems which will be discussed in the next chapter.

In the one-word stage the child's linguistic structure amounts to the fact that he uses different expressions. These accounts assign different meanings to utterances of the same expression and the same meaning to utterances of different expressions, depending on their account of the child's communicative intention. Greenfield and Smith argue for example, that an utterance of "ball" has an underlying Action-Object structure, if it occurs when the child throws a ball, and an underlying Object-State structure if it occurs when the ball falls. They then argue that the child has developed the semantic categories of action, object and state and the relationships between them.

However, this argument does not follow. In order to establish that the child has a semantic category, as Bloom (1973) and Brown (1973) have pointed out, it is not sufficient to show that the child has a certain concept, or that he tries to convey this concept to others, or even that he uses language to try to convey this concept. We must also show that this concept is actually encoded by the language, we must show that it is consistently related to the structure of the language the child produces.

We have seen that in the adult language the function of an utterance of a sentence, the message it conveys, or the effect it produces, may be quite different from its meaning or illocutionary force, that is the beliefs or social facts that are related to the structure of the sentence. There is no a priori reason why the child's language should be different.

In the Greenfield and Smith example the word "ball" might mean a round object, as indicated by the fact that it is only produced in contexts involving such an object and the child might use an utterance of "ball" with gestures and contextual information to convey the fact that the ball was thrown, or dropped, to demand that he be given a ball, or to predict that the ball would appear.

It is, of course, empirically possible that function and structure are isomorphic in the child's language, though they are not in the adult's language. All the utterances of a particular expression might be used in the same way. "Ball" might always be used to demand a particular ball, or it might always be a prelude to throwing the ball. In fact, Greenfield and Smith's evidence does not support this hypothesis. The children in their study used the same expression to fulfil different functions.

Halliday (1975) suggests that structure and function may be identified in the earliest language. He claims that at about nine months his son Nigel used different vocalisations to achieve different ends and that each type of vocalisation was associated with a particular function. Later there was a stage in which functional distinctions were carried by intonation and finally, at about 18 months, vocalisations became multi-functional, as they are in adult language.

Unfortunately, it is not clear how this sequence is related to what we normally think of as the emergence of language. This is because Nigel's language development was rather unusual. He apparently began to use two-word strings

at the same time that he began to use expressions of the adult language. Both these developments occurred at the same time that his vocalisations became multi-functional. Halliday suggests that the shift to a multi-functional system is correlated both with the emergence of syntax and with the emergence of expressions of the adult language. However, for most children expressions of the adult language appear considerably before syntax. It is not clear from Halliday's data whether these children would develop multi-functional expressions at the start of the one-word stage, when adult expressions appear and when we conventionally assume that language emerges, or at the start of the two-word stage when syntax appears.

Bruner (1976) argues that structure and function may be identified for the first words in the conventional sense, that is the first words of the adult language. In particular, he argues that a communicative system is developed pre-linguistically in which each vocalisation has a particular function. In the early stages of language, these pre-linguistic vocalisations are replaced by expressions of the adult language.

It seems clear from the work of Bruner (1976), Halliday (1975), Bates (1976) and Sugarman (1978) that there is a pre-linguistic communicative system in which vocalisations serve particular functions. It also seems clear that by the time the child produces two-word strings, his expressions are multi-functional. However, it is not clear when this multi-functionality emerges. Bruner and Halliday suggest that it only emerges after the one-word period has started.

If this is true, it lends support to the claim that early language develops out of the pre-linguistic communicative system. On the other hand, if the very first words are used to achieve a variety of ends, in contrast to pre-linguistic vocalisations, it seems more likely that there is a separate linguistic system which supplants the earlier system.

(3) How does language change ?

So far we have been concerned with the characterization of the child's language at various stages of development. This task is not essentially different from the task of psycholinguists who study the adult language. However, the real question for developmental psycholinguists is how the child proceeds from one stage to another. Again, there have been three general approaches to this problem stressing the strictly formal, cognitive and social aspects of language development.

(a) The Formal Approach:

The essential problem for any account of language learning, or any account of learning in general, is that the child's theory is apparently underdetermined by his data. The child produces an infinitely powerful grammar, but his linguistic input consists of a finite set of utterances, including those that are truncated, interrupted, or produced out of context.

The first attempt to deal with this problem supposed that much of the child's linguistic structure was innate, it did not have to be inferred from the data. In particular,

Chomsky (1965, 1968) argued that the child's linguistic hypotheses were stringently restricted. The child was forced by these innate constraints to develop a grammar that was like the grammar of the adult language. Fodor (1975) has recently rephrased this argument by saying that the language of thought, the language in which linguistic hypotheses are framed and the spoken language must have similar syntactic structures.

This general view was associated with several specific claims about the development of language. Nativists like Lenneberg (1967) supported Chomsky by claiming that changes in the child's language, and particularly the emergence of language, were the result of the maturation of innate structures. The Chomskyan view also stressed the acquisition of syntax. The child's job was to discover the rules that determine whether a sentence is well-formed. His data was considered to be restricted to a set of strings without semantic or pragmatic information. Finally, the order of acquisition of structures was thought to reflect their derivational complexity. Structures that were 'simple' or 'primitive', from the point of view of transformational syntax, should be acquired before syntactically complex sentences. For example, Brown and Hanlon (1970) argued that the development of tag questions reflected the gradual acquisition of transformational rules.

Given the emphasis on syntax, these early accounts had little to say about the one-word period. However, two predictions were at least implied. One was that the emergence of language was the result of a language-specific maturational

change and was not the result of development in other areas. The other was that the expressions of the one-word period should be syntactically simple. They should come from a limited number of syntactic categories, probably the categories of the base.

(b)(i) Cognitive Approaches 1 - The Semantic Approach:

The recognition that much linguistic structure was related to cognitive structures led to a revision of this early model. MacNamara (1972) suggested that the child had another source of information about linguistic structure, in addition to the strings of sounds he heard. Linguistic structure is related via semantics to the structure of our knowledge about the world. Since the child has already developed these cognitive structures before he learns language, he should be able to use them to help him to develop a theory of language. We could partly solve the problem of the underdetermination of the theory by arguing that linguistic structure is derived from cognitive structure, rather than arguing that it is innate.

In particular, since language, particularly language addressed to children, is produced in appropriate contexts, the child might map the mysterious linguistic inputs onto his representations of the contexts in which they appear. Because of the relationship between linguistic and cognitive structures, such a mapping will provide clues to the form of the grammar.

This hypothesis led to a flurry of interest in semantic structures of the adult language which are significant linguistically and are also related to cognition. Fillmore's

(Fillmore 1968) case-grammar categories, for example, underlie syntactic structures and are related to important cognitive categories. The primitives of generative semantics and the semantic features of Katz and Fodor (1963) and Pierwisch (1967) were also attractive. If early language was structured in terms of these categories, it could serve as an intermediary between pre-linguistic cognitive structures and the syntactic and semantic structures of the adult language.

Several of the recent analyses of the one-word stage have tried to show that early language is structured in this way. Greenfield and Smith (1967) have proposed a case-based analysis of one-word utterances and Antinucci and Parisi (1973, 1975) have proposed an analysis based on the primitives of generative semantics. Unfortunately, these accounts confused linguistic structures and the uses of those structures. They may have shown that the child's cognition can be described in terms of semantic categories, they may even have shown that his communicative intentions are structured in this way, but they have not shown that these categories are encoded by his language.

On the other hand, Clark's (E. Clark 1973, 1974) feature-based analysis could explain some linguistic facts. Clark argues that the over- and under-extensions of early names and changes in the application of names can be explained in terms of the acquisition of a set of semantic features. The child begins by assigning a word one or two such features and therefore over-extends it. As he grows older, he acquires the full set of features and gradually restricts his applica-

tion of the word. This model is also intended to account for changes in the application of later words. Clark explains Donaldson and Balfour's (1968) finding that "less" is initially interpreted as "more" in terms of missing semantic features. Clark argues that semantic features of early language correspond both to the semantic features of the adult language and to significant perceptual categories.

This sort of model retains the hypothesis that order of acquisition reflects derivational complexity. Here, however, the complexity is semantic, rather than syntactic. Structures that are simple or primitive in terms of the adult semantic system will appear before those that are complex. The child's linguistic development will proceed in three ways. He will acquire more semantic categories, whether these are cases, primitives, or features, he will organize and relate these categories and he will gradually develop more abstract syntactic categories.

(ii) Cognitive Approaches 2 - Constraints:

While the semantic approach emphasizes the parallels between the child's cognitive structure and the adult's linguistic structures, another approach emphasizes the differences. According to some writers, linguistic structures emerge when they do because of changes in the child's cognitive structures. Linguistic development reflects cognitive development.

It has been argued that certain formal features of language can only appear after similar formal structures have been developed in other areas of cognition. Greenfield et al (1972) have argued that the development of the ability

to organize sentences is correlated with the development of the ability to organize motor behaviour. Sinclair (1971) proposes similar correlations between the development of syntactic structures, like embedding, and cognitive development.

In terms of the one-word stage, the most common argument, following Piaget (1962), has been that the emergence of language depends on the emergence of a general symbolic capacity which is also reflected in imitation and play. However, Sugarman (1978) has argued that the emergence of language depends on certain developments in skilled action and tool use, while Moore and Meltzoff (1978) have argued that it is made possible by the development of object-identity rules.

Another approach emphasizes the relationship between the development of linguistic structures and the development of the concepts they encode. Slobin (1973) has argued that the child must develop the concept encoded by a structure before he can develop the structure. If this is true, we would expect the child's language at a particular stage to encode concepts he has developed recently. Another version of this hypothesis is the Piagetian concept of decalage. Piaget (1962, 1955) argues that the development of language recapitulates the development of the concept encoded by language. The child will encode concepts that were developed early before he encodes later concepts, even if both sets of concepts have been acquired by the time he begins to speak.

These two views would lead to different predictions about the one-word stage. In Slobin's view, the first words

might encode any of the concepts developed in the pre-linguistic period, developments during the one-word stage would reflect the cognitive changes that take place in that period. The decalage view would predict that the first words would encode the first concepts that are developed and that linguistic changes would reflect cognitive changes that have occurred pre-linguistically.

Bloom (1973) has argued, along Slobin's lines, that function words appear before substantive words because substantive words depend on the development of object permanence. Nelson's (Nelson 1974) argument that the child's names encode functional concepts before they encode perceptual concepts also seems to reflect her beliefs about the child's cognitive development. The view of Bates et al (1979) seems closer to a form of decalage. They argue that the child initially encodes specific action schemes and later encodes past action schemes, or future ones, although both these concepts have been developed pre-linguistically.

Notice that the predictions of accounts that stress the role of cognitive development are rather different from the predictions of semantic accounts. Concepts that are significant for a 12 month old, or that are developed early, might not play an important role in the semantic system of the adult language. Similarly, cognitive development might not reflect semantic complexity. For example, the distinction between male and female people plays an important role in the semantics of English, while the distinction between strangers and familiar people does not. However, the latter concept might be more significant cognitively for a 12 month

old and is certainly likely to develop earlier. Similarly, from a semantic point of view, specifying an object and an action on that object is more complex than simply specifying one or the other. However, from a cognitive point of view, the concept of a simple object might develop out of the concept of actions-on-objects.

(iii) Cognitive Approaches 3 - Strategies:

A third way of relating cognition to language development is to argue that children apply various strategies to the problem of language. The nativist position depends on a restricted view of the child's ability to learn. On the Chomskyan view, the child's only strategy is to construct model grammars and test them against the linguistic input. However, there is evidence that the child can solve all sorts of complex problems by using a variety of more sophisticated strategies.

Slobin (1978, 1979) and Karmiloff-Smith (1979) have argued that the child uses general problem-solving strategies when he tries to construct a theory of language. These include paying special attention to stressed words and to the ends of words (Slobin 1978, 1979). Another strategy is to pay attention to regular structures first and then deal with the exceptions and irregularities. From a semantic point of view, Slobin suggests that children will have less difficulty dealing with areas of the language in which the relationship between syntax and semantics is clearcut and consequently will acquire these areas before other areas and Karmiloff-Smith suggests that in their productive language children will initially try to match form and meaning.

In terms of the one-word stage, this kind of model might predict that the first words would be stressed in the adult language and that they would be unambiguous. Words that play a variety of syntactic roles, unstressed or ambiguous words, or words that are subject to much phonological variations would be likely to appear later.

Again, the predictions of this model would be different from the predictions of other approaches. A particular structure might be syntactically, semantically, or cognitively primitive, but it might be encoded in a confusing way. Slobin suggests, for example, that a semantic category that is marked by inflections, clearly and regularly, will be acquired before a category that is irregularly indicated, or is indicated by position, even if both categories are equally primitive syntactically, semantically and cognitively.

Thus there are at least three ways that cognition can contribute to language development. First, the similarities between the child's conceptual system and the semantic system of the adult language may be used to decode language. Second, the development of linguistic structure may depend on the prior development of similar cognitive structures, or on the development of the concepts the linguistic structure encodes. Finally, the child may apply strategies to the problem of language, strategies he may also apply to other problems.

3. The Social Approach:

A rather different approach stresses the role of the interaction between children and their caretakers in the

development of the child's language. The original Chomskyan position depended on the idea that the child's linguistic input was like normal adult speech. However, much of the child's input comes from people who have a special relationship with the child. Speech addressed to children might not be like normal adult speech. In addition, adults might structure the situations in which they talk to children in a way that would make language learning easier. Language might not just be acquired, or even developed or learned, it might actually be taught.

Recently there have been a number of investigations of adult speech to children (Snow and Ferguson 1977). Such speech does seem to be different from normal adult speech. Among other things, it is higher pitched, sentences are shorter and are more likely to be questions. There have also been suggestions that such speech is syntactically simpler, but this is not certain (Newport, Gleitman and Gleitman 1977). It seems that these features of speech addressed to children might facilitate language learning, but their exact effect is not clear.

In addition to the fact that speech addressed to children has distinctive formal properties, it is also produced in special situations. For example, it is more likely to refer to the child's immediate context, rather than to events that are distant in time and space. These features might also facilitate language learning and might affect the semantics of the child's language.

In terms of the one-word stage, attention has been focused on the pre-linguistic communicative interaction between children and adults. Bates (1976, 1975), Bruner

(1976) and Halliday (1975) (among others) have suggested that children and adults build on these interactions in order to produce language. Bruner has offered the most detailed account of how this transition takes place.

Bruner points out that adults and children participate in a number of games and routines that require joint attention and joint action, such as peek-a-loo, give and take and reading picture books. He argues that children regulate these interactions by using pre-linguistic vocalisations, while adults use words. As the child develops, he begins to substitute words for pre-linguistic signals. Bruner traces the appearance of several early words in these contexts. "Hereyare" appears in give and take games, for instance, while "that" appears in book-reading.

The social approach would again make different predictions about the first words. If we stress the properties of adult speech, we might expect the first words to play a prominent role in such speech. If we stress the role of the kinds of social interaction described by Bruner, we would expect the first words to appear in the course of such interactions. Linguistic development might reflect the development of more sophisticated and efficient forms of communicative interaction. In addition, words might gradually be extended to apply to non-social situations.

This Study.

The following study is concerned with the development of expressions other than names in the one-word period. Diary studies, such as those of Bloom (1973), Carter (1979) and Halliday (1975) mention such expressions and describe their use. These detailed descriptions will be discussed

below. However, there is no general account of the meaning of these expressions and the changes in meaning that take place in the one-word period. The principal aim of this study is to provide such an account. It will only incidentally be concerned with the function of these expressions, although I will try to show that these expressions are multi-functional. I will also try to show that some of these expressions, such as "that", "there", "gone", "no", "more" and "up" and "down" do not fit any of the models of language development I have described in this chapter and I will propose an alternative model.

Chapter 3.

METHODOLOGY.

The aim of this study was to discover general patterns in the meaning and development of non-nominal expressions in the one-year period. In order to do this, it was necessary to study a fairly large number of children from varied backgrounds, to record their spontaneous speech in a fairly detailed way and to observe them from the time they began to talk until the onset of the two-word stage.

The best accounts of the one-word period by Bloom (1973), Halliday (1975) and Carter (1974) are all studies of single children. As result, it is difficult to tell how generally applicable their findings are and to what extent they reflect the idiosyncrasies of the particular children. Moreover, the children were all middle class, only children and two of them were children of professional linguists. By looking at a large number of children from more varied backgrounds, it is possible to distinguish between idiosyncratic patterns and patterns that are shared by a number of children learning the same language. Also, by comparing the results of such a study with the case-studies of Bloom, Halliday and Carter, we can discover which aspects of their results reflect more general trends. I studied nine children of different sexes, with different numbers of siblings, from different social backgrounds.

A number of studies of the one-word period have relied on maternal diaries. However, diaries are not adequate if we want to understand the meaning of early expressions, particularly non-nominal expressions. Diaries tend to stress the emergence of new expressions, rather than changes in the use

of old expressions, changes that may be quite subtle. As we shall see, the fact that children use more different names than non-nominal expressions means that names play an unduly prominent part in diary accounts (see Chapter 11).

A second problem is that mothers generally believe that names are 'proper' first words. In this study mothers were asked at the start of each visit what new words the child was using. They almost never spontaneously reported non-nominal expressions, although they confirmed that the children had been using these expressions.

Another, more serious problem is that diaries embody instant hypotheses about the meaning of expressions. A typical diary entry will be "He applies 'dog' to animals" or "He says 'gone' when things disappear". These observations are actually abstractions from a number of different particular uses of the expressions. Even a very sensitive and careful observer may not initially notice all the important features of the contexts in which the child uses an expression. In this study where I was entirely concerned with the child's language, my initial hypotheses about the meaning of a particular word were almost always wrong. The record of the particular uses of an expression revealed that the child used the expression in ways that the hypothesis did not predict. Ideally, one should have a record of every use of every expression, but this is not practically feasible for a large number of children. The data for this study consisted of 71 hours of audio and video tape, recording more than 10,000 utterances.

Finally, in order to understand the development of non-nominal expressions, it was necessary to have longitudinal

records of the whole of the one-word period, including the very first words. This means visiting some children before they begin to talk. The early visits were particularly important because non-nominal expressions are especially prominent in very early language. Later, there may be a naming explosion that obscures the continued use of non-nominals. Five of the children in this study were not talking when they were first visited, five children had reached an M.L.U. of 1.4 or more by the last visit (see Table 1).

It is worth noting here that in practice it was not difficult to distinguish between pre-linguistic communication and the first words. While there are probably some continuities between these two kinds of behaviour, the discontinuities are just as striking. At about the same time children stop using idiosyncratic expressions and start to use expressions of the adult language, they stop relying on gesture and intonation and start to use constant and often complex phonological forms and they stop using forms in limited and restrained contexts and instead apply them to a wide range of new contexts. These changes lead mothers, fathers, big brothers, friends and observers to agree that the baby has finally begun to talk.

Keeping these general requirements in mind, three groups of children were studied.

Group I

I observed two boys, Jonathan and Henry, and one girl, Rachel. They were first visited at ages 11,3,3, 12,2,2, and 12,2,5 respectively. At this point none of the children used any expressions. The visits ended as each child reached

the two-word stage (M.L.U. of 1.5, 1.6, 1.5). They were then aged 27,0,0, 26,3,1 and 23,1,2 respectively.

The children all came from the Oxford area. One father was a student, one a journalist and one a civil servant, one mother worked part-time as a pre-natal counsellor. Jonathan had two older sisters, Henry and Rachel each had an older brother.

I visited the children in their homes once a month until they began to use expressions and then once a fortnight. No attempt was made to control the children's activities during the visits. They did whatever they normally did at that hour. They had meals, got dressed and played.

While there was no planned intervention, I did interact with the children. I played with them, talked to them and occasionally did ad hoc 'experiments' by setting up situations that might elicit speech. I came to be treated more as a friendly visitor than a psychologist and often took care of the children when mothers were busy or went out.

I did modify my behaviour in one respect. I consciously tried to avoid using the non-nominal expressions under investigation, or at least to avoid stressing them in my remarks to the child, before the child used them spontaneously.

Mothers were usually present during visits, but in most sessions there was some time when the mother went out, or into another room, and the child was left with me. Older children were almost always present during the visits and they occupied much of the mother's time and attention. In general, I was impressed by how busy mothers are in a normal situation and how little of their time and attention was

exclusively devoted to the twelve-months old child, though the children were certainly not neglected and participated in the general social scene.

One hour of the visit, which usually lasted about $1\frac{1}{2}$ to 2 hours, was audio-taped on a Sony cassette recorder. I 'talked in' notes on the context in which expressions were used. These spoken notes formed a sort of running commentary on the events taking place during the visit.

Groups II and III.

Two groups of three children were studied. I first observed the first group consisting of two boys, John and Christian, and one girl, Harriet, when they were 15 months old. One of these children, Harriet, used some expressions at this point (M.L.U. of 1). I first observed the children in the second group, two girls, Hannah and Anna, and one boy, Paul, when they were 18 months old. All three children were using some expressions at this point (M.L.U.'s of 1, 1.02 and 1 respectively). Both groups were observed for six months. Their M.L.U's in the last session were 1.06, 1.2, 1.01 and 1.6, 1.4 and 1.02 (see Table 1). All these children also came from the Oxford area, but their social backgrounds were more varied. Their fathers included a fireman and a tool-maker, as well as two University lecturers, a businessman and a primary school teacher. John and Christian were only children during the study. Anna had one older brother, Paul had one older sister, Harriet had two older sisters and Hannah had three older brothers.

I visited the children in their homes approximately once a month. In this study, I made some attempt to control the children's activities during the visits.

I encouraged the children to play with two toys, a 'postbox' with a lid containing blocks of various shapes which could be pushed through appropriate holes in the lid and a box of nested beakers. I also encouraged them to 'read' picture books. The children enjoyed these games and participated zestfully. They also engaged in other activities, played with other toys, had meals, etc.

There were several reasons for introducing these activities. First, similar activities had elicited speech, both nominal and non-nominal, in the first study. Second, these activities provided the children with contexts in which a wide variety of expressions might be appropriate. The picture books and the pictures on the box of beakers provided the children with a wide variety of nameable things, in addition to many familiar objects surrounding them. The postbox and the set of beakers provided opportunities for a variety of actions and events, pouring out the blocks, opening and closing lids, putting the correct block into the correct hole, piling the beakers, fitting the beakers into one another and so forth. These actions could be performed by adults, as well as by the child himself, and, in addition fortuitous or accidental events developed as the toys were used, towers of blocks fell down, lids came off, blocks were hidden under beakers.

Finally, the postbox and the beakers provided the children with new situations in which old expressions might be appropriate, particularly non-nominal expressions. The children had never seen the toys before I introduced them. Therefore expressions used in the context of these toys were unlikely to be particular responses build up in particular

situations. If a child used an expression in playing with these toys, some degree of generalization had to be taking place.

Aside from these interventions, my interaction with the children was similar to that in the first study. Unfortunately, however, I did not develop the same friendly relationship with the families.

In the second study, unlike the first, mothers were always present during the visits and other children were rarely present. In general, mothers in the second study were more nervous, more self-conscious and more pedagogical than those in the first study. They tended to prompt and influence the children much more frequently. This was partly due to the exigences of the video-tape equipment (see below), partly due to the relative unfamiliarity of the observer, since the visits were less frequent and shorter, and partly due to the fact that the two only children were included in this study.

Interestingly, almost all of this prompting and the much smaller amount of prompting in the first study, concerned nominal expressions. Mothers, at least these mothers, seem to believe, like psychologists, that the child's first words should be about things. Mothers would put a great deal of time and energy into getting the child to say "Teddy" or "Mommy" and ignore the non-nominal expressions that he was spontaneously producing all the time. I often heard "Say 'Daddy' for the lady, dear", but rarely heard "Say 'no' or 'there' for the lady".

One half-hour of each visit, which generally lasted about an hour, was video-taped, using a Sony portable camera, power

pack and video-recorder and a separate microphone.

Some of the differences between the audio-tape and video-tape records should be pointed out. Video-tape provides a considerably more complete account of the contexts in which expressions are used. Repeated viewings are possible and much that is necessarily lost on audio-tape may be recovered. On the other hand, the quality of the accounts of the context obtained from audio- and video-tape did not seem to be very different. A common sense account of the context spoken into the recorder at the time, e.g. "Jonathan picks up the beaker and puts it under his chair" was generally similar to a common sense account of the same events viewed on video. On repeated viewing, I might see the context of an utterance that would have been unintelligible at first, but it was almost never necessary to revise my first account of the context as a result of repeated viewings, at least at this rough common sense level.

Video-tape had several disadvantages which should be pointed out. The range of video-cameras is not particularly wide, children of this age are particularly mobile. Thus children must be artificially restrained, if only by closing the door of the room. Mothers are less happy about leaving children alone when unfamiliar, expensive and dangerous-looking equipment is around.

Most important, video-cameras intrude. A cassette recorder quickly becomes part of the furniture, but it is almost impossible for mothers to ignore a camera pointed at them and babies seem uncannily aware that they are on camera. There is a general feeling that expensive tape is being wasted if the children do not do something. As a result, mothers lean more heavily on stereotyped routines and games than they do when behaviour

is audio-taped, or than they do when no recording takes place. Children are more likely to ham it up, or go totally silent, when the video-tape is running.

Thus video-tapes of children in the home do not capture entirely normal behaviour. This should always be kept in mind when considering the results of this study. Fortunately, however, three factors minimized the importance of this bias in this particular study.

First, the video-tape bias seems to affect nominal expressions more than non-nominal expressions that are the subject of this study. As previously mentioned, maternal pedagogy is largely directed towards names. Non-nominal expressions are less likely to be involved in the mother's attempt to get the child to talk for the cameras.

Second, while video-taping might influence the frequency of certain expressions, or influence general features of the child's speech, it could not influence his abilities. If a child uses an expression in a range of contexts, he must have a particular internalized rule. The camera might encourage or discourage him to display this rule, but it could not bestow it or take it away.

Finally, the first study, using audio-tape recordings, provides a less complete account of a more normal situation. This allows comparisons to be made. A phenomena which occurs in both studies is unlikely to be an artifact of video-taping.

Individual Differences.

This study was designed to discover the common aspects of all children's language, rather than to detect individual differences. In general, the similarities between the expressions the children used and the way they used them were much

more impressive than the differences. However, there were two areas where there was some variation between children.

There were fairly large differences in the age at which children began to talk and the length of the one-word period (see Table 1). For example, Jonathan began to talk at 12 months, but only reached an M.L.U. of 1.5 at 27 months, while Rachel only began to talk at 17 months, but had reached an M.L.U. of 1.5 by 23 months. However, all the children went through a period where they only used one word at a time. These differences were not related to the content of the child's language, or to sex, class, or sibling position.

There were also differences in the number of names different children used. For instance, Rachel used a particularly large number of names particularly frequently. There appeared to be a continuum between more and less nominal children, they did not split up into two groups. Also, all children in each group used about the same number of non-nominal expressions, though some children used more names than others. This pattern will be discussed more fully in Chapter 11. These differences were not related to sex, class, or sibling position.

Transcription.

I transcribed the tapes as a series of utterances by the child with notes on the relevant context of each utterance.

The audio-tapes were simply transcribed by transcribing each utterance and transcribing the description of the context of each utterance that was spoken into the tape-recorder. I used a somewhat different procedure for the video-tapes. I listened to the audio portion of the tape first and transcribed each utterance. I then reviewed the tapes with the picture on

and described the contexts accompanying each utterance. This ensured that the transcription of the utterance was made on phonological grounds as much as possible and was minimally influenced by my description of the context.

I transcribed the tapes in normal English orthography with conventional techniques for showing deviations from normal pronunciation, dere and dat for instance.

For these purposes a narrow transcription, into i.p.a. for instance, would have been inappropriate. Such a transcription would not have enabled me to determine when two utterances should be counted as the same expression. A phonemic transcription would also be inappropriate. Such a transcription assumes that the speaker has acquired the phonemic system of a language, an assumption that could not be justified with these speakers.

Fortunately, the children's utterances were generally quite clearly differentiated. Utterances of "Oh dear" sounded much more like one another than like utterances of "dère" or "gone". Occasionally I asked mothers for their judgment if an utterance was unclear.

Generally speaking, I did not record intonation. In a few exceptional cases intonation patterns seemed to function almost phonemically, that is a difference in intonation seemed to correspond to a difference in meaning. For instance, Jonathan used "dere" or "de" to accompany pointing and "de de" with heavy stress on the second syllable to accompany giving. This difference in meaning, plus the fact that the "de" was always reduplicated in giving contexts, seemed to justify the assumption that two different expressions were being used.

and described the contexts accompanying each utterance. This ensured that the transcription of the utterance was made on phonological grounds as much as possible and was minimally influenced by my description of the context.

I transcribed the tapes in normal English orthography with conventional techniques for showing deviations from normal pronunciation, dere and dat for instance.

For these purposes a narrow transcription, into i.p.a. for instance, would have been inappropriate. Such a transcription would not have enabled me to determine when two utterances should be counted as the same expression. A phonemic transcription would also be inappropriate. Such a transcription assumes that the speaker has acquired the phonemic system of a language, an assumption that could not be justified with these speakers.

Fortunately, the children's utterances were generally quite clearly differentiated. Utterances of "Oh dear" sounded much more like one another than like utterances of "dère" or "gone". Occasionally I asked mothers for their judgment if an utterance was unclear.

Generally speaking, I did not record intonation. In a few exceptional cases intonation patterns seemed to function almost phonemically, that is a difference in intonation seemed to correspond to a difference in meaning. For instance, Jonathan used "dere" or "de" to accompany pointing and "de de" with heavy stress on the second syllable to accompany giving. This difference in meaning, plus the fact that the "de" was always reduplicated in giving contexts, seemed to justify the assumption that two different expressions were being used.

In this case and a few similar ones, I did note intonation.

On the other hand, if a child used "dere" with a falling intonation when he simply pointed at an object, "dere" with a whine when he wanted the object and "dere" with a shout when the object was exciting, I construed all these utterances as utterances of the same expression and did not record intonation.

There were several reasons for this decision. First, given the evidence from adult language, it seems reasonable to treat the pragmatic and emotive information carried by intonation as a separate system distinct from the phonological system that conveys semantic information. These systems seem to function in different ways, although they may, of course, interact. One obvious difference is that the para-linguistic system conveys information analogically, while the phonological and syntactic systems operate with discrete units.

A more important difference from the point of view of child language is that the para-linguistic system, at least in part, lacks the semantic arbitrariness of the phonological system. A whine, a shout, or a cry, seem likely to be fixed responses to particular internal states; it seems unlikely that an utterance of "gone" is an innate fixed response to disappearing objects. The cognitive prerequisite of such responses are very different indeed.

Of course it might be the case that these systems were not differentiated in child language. Children might experiment with using phonological forms like "dog" or "gone" to differentiate affective or pragmatic contexts, or with using intonation to comment on events around them.

In fact, English speaking children at least, generally use intonation to mark effect and phonological forms to comment on the world (Dore 1975a), except in the rare cases mentioned above where stress is treated phonemically.

The development of the para-linguistic system is interesting in its own right. The point is simply that it seems fair to regard this system as a separate phenomenon from the developing phonological and semantic systems under consideration here and to exclude para-linguistic features from the analysis. This is particularly true given the enormous practical difficulty of accurately transcribing such features.

The utterances transcribed in this way were accompanied by a brief account of the events that took place at the time, the objects that were involved, the child's own actions, the actions of others and, if appropriate, preceding remarks of other people around him. Sometimes an expression referred to an event that had taken place sometime in the past and this was also noted. Some examples follow :-

Down - Jonathan throws a brick on the floor.

Hot - Henry is sitting close to the fire and starts to move away.

Gone - I push a block through one of the holes.

Yes - Answer to "Are we going away on Friday ?" from mother.

John-John balloon - Jonathan has been to a party at which he played with balloons the day before.

The accounts of context tried to stay close to the data, but common sense interpretations of the child's motives and emotions were included, e.g. :-

Oh dear - Henry unsuccessfully tries to transfer pegs from one jar to another.

No - Henry rejects his mother's suggestion that he go to sleep.

No - Anna starts to put the block in one hole, changes her mind, and puts in another one.

Utterances that were simply repetitions of other speaker's utterances were excluded from the final analysis.

In the first study, I sometimes failed to note or record the context of an utterance; in the second study some utterances were produced when the child was out of range of the camera. In both studies some utterances seemed to have no relationship to the context, they were simply produced out of the blue. These utterances were also not included in the final analysis.

Analysis.

Once the transcriptions were obtained, the analysis of the child's language proceeded in the following way. I listed all the utterances of a particular expression and the accompanying notes on context in chronological order. As previously described, utterances were divided up on the basis of their phonology, an expression was really a class of phonologically similar utterances. I assumed that utterances that sounded more like each other than like other utterances were utterances of the same expressions and I transcribed them as such. These lists of utterances varied in length, some expressions were only uttered once, some were uttered hundreds of times.

Next, I examined the contextual notes accompanying the utterances of each expression. If there was some element common to all the contexts accompanying an expression which did not occur consistently in contexts in which other expressions were used, I assumed that that common element was encoded by the expression.

The proviso that the element must not occur consistently in other contexts eliminated factors that were trivially common to all contexts of a particular expression, simply because they were common to all contexts of any expression. For example, all the utterances of "ball" might take place in a particular room simply because they were recorded in that room. It would have been inappropriate to claim that the child was encoding the fact that he was in that room while he said "ball".

Sometimes two sets of utterances belonging to different expressions turned out to occur in indistinguishable contexts, the common element in both sets of contexts were the same. These utterances were treated as synonyms in the final analysis.

Sometimes I could not find a single, common element in the contexts accompanying the utterances of a single expression. These expressions seemed to be used in two separate ways. In these circumstances, I was forced to conclude that the expression had two meanings. Of course, my failure to find a common contextual element might be the result of my own dullness, rather than the result of the child's ambiguity.

The analysis was complicated by developmental factors. As the children got older, the contexts in which they used expressions changed. Often one form was used in several different contexts in the early sessions, but several different forms would emerge later on, or vice versa, several different forms would be replaced by a single one. Since the utterances were listed chronologically, it was possible to chart these changes. Of course, it was not always easy to tell what was due to genuine change and what was due to sampling variation.

If an expression occurred in a multi-word string, as occasionally happened in the latter sessions, it was accom-

panied by a note of the string in the final analysis.

It may be helpful to consider the application of this procedure to a particular example. Take the following sets of utterances and contexts :-

1. Down - The child scrambles off a chair onto the floor.
2. Down - The child knocks over a pile of bricks in a build-and-bash game.
3. Oh dear - The child knocks over a pile of bricks in a build-and-bash game.
4. Oh dear - The child tries to fit a piece in a jigsaw puzzle, but it will not go in.
5. Oh no - The child tries to put up the top of a doll's carriage, but it comes down again.
6. Oh no - The child tries to fit a block into the wrong hole of the mailbox.

Utterances 1 and 2, 3 and 4, and 5 and 6 are grouped together on phonological grounds. We now examine the contexts. At first the contexts of 1 and 2 seem very different, there are no common objects involved and the child is performing very different actions, but they do have an element in common. In each case a downward movement takes place and this movement is caused by the child. At least, on the basis of this data, we can hypothesize that the expression "down" encodes the concept of 'downward movement caused by the child'. This hypothesis could be altered by additional data. For instance, if we had an utterance like :

7. Down - An ornament falls of the mantiepiece,
- we could no longer conclude that the fact that the movement was brought about by the child was encoded, since this element would not be common to all contexts. We would hypothesize that

"down" encoded a concept of downward movement.

If we had an utterance like :

8. Down - The child points to a block hidden under the radiator,

we might be forced to conclude that a kind of location, rather than a kind of movement, was encoded.

Suppose, however, we had the following utterances :-

9. Down - The child picks up a feathery toy known as "Downy".

10. Down - The child throws the feathery toy at his brother.

These two utterances seem to have a common element, the presence of the feathery toy, but they do not seem to have an element in common with the contexts of 1, 2, 7 and 8. Under these circumstances, we are forced to conclude that the expression has two meanings, one involving the toy and one involving movement or location.

Now let us consider the contexts of utterances 3, 4, 5 and 6. 3 and 4 seem to have a common element, the child fails to complete a plan; in the first case he fails to complete the tower of blocks, in the second he fails to fit the jigsaw piece in. Note, by the way, that while the contexts of utterances 3 and 2 are identical, they are assigned different meanings because of their relationship to other phonologically similar utterances. If we consider 5 and 6, we see again a single, common element; the child fails to complete a plan, though in this case the plans involve keeping the carriage hood up, and fitting the block through the hole. In other words, both expressions "Oh dear" and "Oh no" seem to encode the same aspect of the situation, failure. We will therefore assume that they have the same meaning. Again, this hypothesis may be altered by new evidence.

The assumption underlying this procedure is as follows.

When a child uses an expression at this stage, he has a representation of the context, the exact nature of which is unclear, and a rule. The rule says "Apply an utterance of phonological form P to a situation the representation of which includes element X". The consequence of this rule is that the child will only say P in a situation which he represents as including X. We can get an idea of what P is by listening to the child's speech and assuming that his phonology is vaguely similar to ours. We can get an idea of what X is by examining the situations in which P is used and assuming that his representational system is vaguely similar to ours. In this way different patterns of linguistic behaviour may be used to justify different rules.

More complex rules are possible. For example, we might propose a rule like "Apply either an utterance of type P or type Q to a situation, the representation of which includes element X". We could justly ascribe such a rule to the child if two different expressions were used in the same sorts of situations, as in the case of "Oh dear" and "Oh no" described above.

Another possibility might be a rule like "Apply an utterance of type P to a situation represented as containing element X or element Y". Such a rule would be appropriately ascribed if the child used an expression in two sorts of situation which had no element in common.

Notice that only these patterns of behaviour could justify complicating the ascribed rules in these ways. If we could discern some difference between the situations in which P was produced and those in which Q was produced, we would use two simple rules which would capture the distinction. "Apply

utterance of type P in a situation represented as including X" and "Apply utterance of type Q in a situation represented as Y". Similarly, if we could discern some common element in the situations X and Y in the second case, say Z, we would only need one simple rule "Apply utterance of type P in a situation represented as including Z".

We can refer to P or Q as the expression and X, Y or Z as the meaning of that expression.

This point has been laboured partly to make the logical basis of the analysis as clear as possible and partly to point up the difference between this method of analysis and the method employed by the 'holophrase theorists, such as Greenfield and Smith, Rodgon, Schlesinger, Antinucci and Parisi (see Chapter 2). These writers assume that the child's single word utterance encodes a complex representational structure, that the same structure may be encoded by an utterance of a different phonological type and that an utterance of the same phonological type may encode a different complex representational structure.

These theories also assume that the child has a complex representation of the situation and a set of rules. However, here each rule connects a single utterance with a complex representation. Instead of one rule which accounts for all the utterances of a particular phonological type, each utterance is the result of a separate rule. Instead of one rule specifying one element common to a number of contexts, each rule specifies a complex representation of a single context. Every utterance may have a different meaning and every meaning may be as complex as the situation in which the utterance occurs.

There are at least two reasons for preferring the method of analysis outlined here to this holophrastic method. First, it provides a reliable way of determining, at least in part, what the child's representational system is like. Second, it tells us which aspects of that representational system are linguistically encoded.

It is notoriously difficult to tell how a child, or an adult for that matter, represents a situation. As adult observers, we can describe any situation in an infinite variety of ways, we can use a wealth of detail, or we can point out only a single element. We can describe a simple event, like a child throwing a ball, as a mechanical interaction of physical forces, as an intentional act, or even as a moral transgression. We can specify, or fail to specify, the agent involved, the nature of the event, the time, the place, the previous circumstances, the result, the motivation, and so on ad infinitum. Any one of these descriptions might be an accurate account of a particular observer's representation of the situation. However, the child might have an entirely different representation. He might just be employing a simple motor scheme, when anything comes to hand, throw it, or he might have a full dress adult-style representation, with all the knowledge about intentions, causality and space that such a representation implies. How on earth can we found out ?

We certainly cannot say that the child must have a certain kind of representation because adults do, or because such a system is reflected in the structure of adult language. To do so is to beg the developmental question. A system like Fillimore's case grammar (Fillimore 1968) may capture fundamental aspects of the adult representational system. However,

if we want to know how that system develops, we cannot just assume that it was there at the start. It is always possible that any system is innately specified, but this hypothesis needs to be empirically investigated, not pre-supposed.

We also cannot argue that the child has a certain system simply because its behaviour can be described in terms of that system. The child may be an agent or an experiencer, without having a representation of agency, just as he may fall at 32 ft. per second squared without having a representation of the law of gravity. The behaviour of any system, like any situation, can be described in an infinite number of ways; we need special evidence if we are to claim that the system describes itself in one of those ways.

Let us imagine the sort of special evidence that would convince us that a child really did represent a situation, including a situation involving his own actions, in a certain way. If we could train a child to press one buzzer in response to a circle and another buzzer in response to a square, and he generalized the response to new instances of circles and squares. we could reasonably claim that the child's representational system included a distinction between circles and squares. Similarly, if we could train a child to produce some arbitrary response, say a hand gesture, every time it stood up, and a different gesture every time it sat down, and these responses were appropriately generalized, we could claim that the child represented standing up and sitting down as different actions. We could not make these claims if the child had simply learned to respond to a particular square or a particular circle, or if the child just performed the actions of sitting and standing.

Fortunately, this training process is unnecessary with 1 - 2 year olds. They spontaneously produce a variety of

arbitrary responses to different situations. For instance, they say "dog" when one kind of object is present and "cat" when another kind of object is present. They say "fall" when they perform one kind of action and "throw" when they perform another and they generalize these responses to new situations. If we treat these linguistic responses as if they were the result of training experiments described above, we can discover at least some minimal facts about the child's representational system. Just as the child's generalization of the circle response indicates that he has a general concept of 'circularity' so his generalization of "dog" to new instances indicates that he has a general concept of 'dogginess'. By examining the range of situations to which the child responds with a particular expression, we can discover what kinds of concepts he has.

The fact that the child sometimes uses "ball" when he throws a ball and sometimes uses it when a ball falls off the table, does not allow us to draw similar conclusions about the child's representation of agent/object distinctions. We may conclude from this behaviour that he has a general concept of 'ball-inclusive' events, but we cannot conclude that he makes a distinction between 'ball-inclusive' events which involve an agent and those which do not.

An account of the semantics of the child's language should spell out a relationship between the child's linguistic behaviour and his representational system. If such an account is to be accepted, its characterization of the child's representational system must be accurate. By using the methodology described here, we can ensure that our account is accurate. The linguistic facts themselves guarantee the existence of the representational structures we posit. No similarly convincing

evidence is provided in a holophrastic account.

More crucially, this method not only provides evidence that the representational entities it posits really exist, it provides evidence that they are linguistically encoded. Even if we knew how the child represents a situation, we still would not know what aspects of that representation are encoded by the expression he produces. The child's conceptual system may be extremely rich and only a tiny part of it may be related to his actual linguistic behaviour; but it is this part that should be specified when we ask what the child means. Similarly, when we try to determine the meaning of an adult sentence, we do not specify everything going on in the mind of the speaker when he produces it. We are only interested in the conceptual structures that can be related to the structure of the adult's speech.

The structure of adult speech is extremely complex. In order to explain syntactic facts, it is necessary to postulate underlying structures that may be more complex than the apparent structure of the sentence. For instance, we may argue that there is an underlying second person subject in imperatives like "Wash!" because of the acceptability of strings like "Wash yourself!" and the unacceptability of strings like "Wash myself!" or "Wash himself!". Unless we have these additional linguistic facts, such an argument does not hold. We could not just say that it seemed logically necessary for "wash" to have a subject, or that you could not imagine washing without a washer, or that you would never say "wash" unless someone was there to do it. Because of the complexities of syntax, the relationship between an utterance and its meaning in the adult language is very indirect. Nevertheless, we can use linguistic facts to choose

between alternative formulations of this relationship.

In child language, however, the structure of speech is much simpler. In the case of 1 - 2 year olds, it is extremely simple indeed. Single expressions do not have an internal syntactic structure. There are no syntactic rules at this stage, no 'acceptable' or 'unacceptable' strings per se. It does not even make sense to talk about words and sentences at this stage. The child's syntax simply consists of a list of equally acceptable expressions.

In these circumstances, our hypotheses concerning semantic structures must be equally modest. We have to think of the semantic structure of the child's language as a set of rules which relate each expression on the child's list to a single conceptual element (with the exceptions described above). The method of analysis I have described here provides a way of discovering those rules and of determining when more complex rules are needed.

We have to take this vow of semantic poverty if our theory is to have any empirical force. We could hypothesize that the conceptual structures underlying language and the semantic rules that relate them to language are more complex than the language itself. However, the evidence for the existence of these rules comes from the language. Linguistic behaviour provides the evidence for semantic theories. If a simple theory and a complex theory account for the evidence equally well, we should choose the simpler one, not just for aesthetic reasons, but because we have no way of deciding between alternative complex theories. With the simple procedure outlined here, we can decide whether an expression means 'child-caused downward motion' or 'downward position' by looking

at the child's speech. With a holophrastic method, we cannot tell whether an utterance of "ball" means "I am throwing the ball", "There is a ball", or simply "Throwing has happened". At least we cannot decide on the basis of the child's linguistic behaviour.

Using the method of analysis described above, I formulated a tentative hypothesis about the meaning of each expression.

Names and Non-nominals.

After the analysis was completed, I divided the expressions into two groups, names and non-nominal expressions. I defined names as expressions that occurred in contexts whose common feature was a particular object or a particular type of object. Most names were nouns in the adult language, but some adjectives such as "hot", "wet" and "dirty" were also included. These expressions were used like names. Also, some onomatopaeic expressions were applied to objects - "brrm-brrm" was applied to cars, "tick-tock" was applied to clocks. I also classified these expressions as names (see Chapter 11, Table 10).

I classified all other expressions as non-nominals. As one might imagine, this group included a wide variety of expressions (see Chapter 10). However, some non-nominal expressions were used by almost all the children, were used particularly frequently and appeared particularly early (see Chapter 10). These expressions were "that", "there", "no", "more", "oh dear", "gone" and "down", "up", "in", "out", "off" and "on". These expressions turned out to be similar to each other in many ways. I examined the meaning and development of these expressions in some detail.

Developmental Trends.

In this study I was particularly concerned with changes in the meaning of non-nominal expressions during the one-word period. I used three kinds of evidence to discover developmental trends. One technique was to look at the order in which different meanings of an expression emerged. Another was to see whether meanings emerged in the first or second half of the recording period. A third was to look at differences between the three groups of children.

Frequently children would use an expression in one context first and only later use the expression in another context. For example, all the children used "no" to negate propositions after they used "no" to refuse proposals. When all the children behave in this way, it is reasonable to claim that there is a tendency for the 'refusal' meaning of "no" to appear before the 'negation' meaning.

Given the nature of this study, any very elaborate statistics would be inappropriate and unnecessary. However, a simple χ^2 test can help to confirm hypotheses about the order of appearance of various types of expressions, or various uses of expressions. I have assumed that if there is no developmental relationship between two uses of expressions, say A and B, then A is as likely to be recorded before B as B is to be recorded before A, the orders A-B and B-A are equally likely to occur. If significantly more children show one order than another, we can conclude that there is some developmental trend. We can use a chi-square test to determine whether the distribution of the two orders A-B and B-A differs from a random distribution.

For example, 8 children used "no" to mark aspects of plans before they used it to negate propositions, no children

used "no" to negate propositions before they used it to mark aspects of plans. In this case $\chi^2 = 8$ which is significant at the .01 level. We can reasonably conclude that there is a developmental trend. However, 3 children used "no" in refusal contexts before they used "no" in protest contexts; and three children used "no" in protest contexts before they used it in refusal contexts. $\chi^2 = 0$ which is not significant. Refusal and protest contexts did not seem to occur in a particular order.

There were two problems with this procedure. Sometimes both types of expression or both uses of an expression appeared for the first time in the same session. I have eliminated these examples from the data. A more serious problem arises when children use an expression in one way, but not in another. Usually, I have assumed, judging from the adult language, that children would eventually develop the other use. For example, some children used "no" to mark plans, but did not use it to negate propositions. Since adults and older children use "no" to negate propositions, I have assumed that these children would also eventually use "no" in this way. I have assumed that they showed a plan-proposition order.

However, this assumption did not always seem to be justified. For example, some children used "no" as a conversational device, a way of responding to all questions whether "no" was the appropriate response or not. Adults and older children do not use "no" in this way. In this case, I assumed that the children who did not use "no" as a conversational device in the recorded period would not do so later on.

Other kinds of evidence I will discuss later in this chapter also could support this hypothesis. If the children who

did use an expression in a particular way stopped using it in that way in their later sessions, that would support the hypothesis that other children would not develop that use later. Similarly, if the older children in Group III did not use the expression in that way, we would tend to conclude that this use appeared early and then died out later on.

If we just look at the order of appearance of expressions, we may miss some developments. A child might use an expression in one way the first time it appears, use it in that way for the next five sessions and then use it in another way in the last session, or he might use the expression in one way in the first session and another way in the second session. While the order of emergence of the two meanings would be the same, we would feel happier about proposing a developmental trend in the first case than in the second. Also, children sometimes used an expression in one context in the early sessions and then stopped using it in that way in the later sessions. This is an important developmental trend, but it cannot be captured if we only look at the order of emergence of the different meanings of an expression. We also have to see whether particular uses of an expression occurred in early or late sessions.

In order to do this, the period from the first appearance of an expression to its last appearance was split in half. If that period was X sessions long, I recorded the number of utterances in a particular kind of context in the first $X/2$ sessions (or $X/2 + 1$ sessions if X was an odd number). I compared this number with the number of utterances of that sort which took place in the remaining sessions. For example, suppose a child first used "no" in his third recorded session and continued to use "no" until his 13th recorded session.

We might see how often he used "no" to refuse proposals in sessions 3 - 8 and how often he used "no" to refuse proposals in sessions 9 - 13. We could also see how often he used "no" to negate propositions in these two periods. If he only used "no" to refuse proposals in sessions 3 - 8 and only used "no" to negate propositions in sessions 9 - 13, the hypothesis that 'refusal' meanings appear before 'negation' meanings would be strengthened. We would also be able to hypothesize that 'refusal' meanings appear early, but become less important later on.

Finally, we can compare different groups of children. The children in Group I were visited from 12 - 24 months, those in Group II were visited from 15 - 21 months and those in Group III were visited from 18 - 24 months. Five of the six children in Groups I and II were not talking at the start of this study, while all the children in Group III were talking at the start of the study. Similarly, five of the six children in Groups I and III reached an M.L.U. of over 1.4 at the end of the study, while none of the children in Group II did. If all the children in Groups I and II used "no" to refuse proposals and none of the children in Group III did, that would support the hypothesis that 'refusal' meanings appeared early and died out later on. On the other hand, if all of the children in Groups I and III used "no" to negate propositions and none of the children in Group II did, that would support the hypothesis that 'negation' meanings of "no" appeared late in the one-word period.

The individual differences in linguistic development complicated this picture. Paul in Group III appeared to be less advanced linguistically than Anna and Hannah. At 24

months Paul used hardly any two-word strings, while Anna and Hannah had M.L.U's of 1.6 and 1.4 (see Table 1). Paul used fewer expressions less frequently than Anna or Hannah (see Chapter 11, Tables 5 and 6). On the other hand, in Group II Harriet appeared to be more advanced than John or Christian. She was already using some expressions at 15 months and she used more expressions more frequently than the other two children (see Chapter 11, Tables 5 and 6). Sometimes Groups I and II, and Paul, would use an expression in an 'early' way, or Groups I and III, and Harriet, would use an expression in a 'late' way.

Linguistic and Cognitive Development.

The second half of this thesis is largely concerned with the relationship between the development of non-nominal expressions and the development of the concepts those expressions encode. A consideration of this relationship led me to the hypothesis that expressions encode concepts that the child is in the middle of developing, concepts that are at the edge of the child's cognitive competence. In order to prove that this hypothesis is true, I would have to have known the exact stage of each child's cognitive development when he acquired each non-nominal expression. Unfortunately, this information was not available.

Other studies that have tried to correlate linguistic and cognitive development in this period, such as the studies of Bates (1976, 1979), Corrigan (1976), Ingram (1978) and Sugarman (1978) are not helpful here because they are concerned with general linguistic development, the emergence of the first words or the first two-word strings, rather than with the emergence of particular expressions. A child might be linguistically advanced, he might use a large number of two-word

strings, for example, but he might only use expressions that encode simple concepts.

However, since some cognitive developments are related to age, if we know the child's age we can at least guess his level of cognitive development. In this study I recorded the age in months of each child when his first utterance of each expression was recorded.

It is important to realize that these ages represent the maximum possible estimate of the age at which each expression was acquired. Most expressions were probably acquired at an earlier age. This is particularly true for the children in Group III. These children were all talking at the start of the study and were all 18 months old. If a child's first recorded utterance of an expression occurred in his first recorded session, he had almost certainly been using the expression for some time before he was first visited, that is before he was 18 months old.

This was also true of the children in Groups I and II. Harriet was using a number of expressions at 15 months when she was first visited. She was probably using some of those expressions before 15 months. Also, since recording sessions took place at monthly or fortnightly intervals and only lasted for $\frac{1}{2}$ to 1 hour, it is highly unlikely that the first recorded use of each expression was actually the first use of that expression, even when the children were not talking at the start of the study.

Moreover, we know that in other areas of language comprehension precedes production. From a logical point of view, acquisition, that is the formulation of a hypothesis about the meaning of an expression, should precede comprehension

and production.

All this means that children acquired expressions at an earlier age than the age at which the expressions are first recorded and therefore at an earlier point in their cognitive development. However, the age at which the expression was first recorded at least gives us an upper limit for the acquisition of the expression.

By using the methods outlined in this chapter, I tried to understand the meaning and development of non-nominal expressions in the one-word period and the relationship between linguistic and cognitive development in 12 - 24 month olds.

TABLE 1.

AGES AND M.L.U'S OF CHILDREN AT FIRST AND LAST SESSIONS.

		<u>Session</u> <u>No.</u>	<u>Age in</u> <u>Months</u>	<u>M.L.U.</u>
<u>Group I</u>	Jonathan	1	12	1
		27	27	1.5
	Henry	1	19	1
		13	26	1.6
	Rachel	1	17	1
		13	23	1.5
<u>Group II</u>	John	1	17	1
		7	21	1.06
	Christian	1	16	1
		5	21	1.2
	Harriet	1	15	1
		6	21	1.01
<u>Group III</u>	Paul	1	18	1
		6	24	1.02
	Hannah	1	18	1
		6	24	1.6
	Anna	1	18	1.02
		6	24	1.4

CHAPTER 4

THE DEVELOPMENT OF "THAT" AND "THERE"

I will begin the detailed examination of non-nominal expressions by looking at the most frequently used and earliest expression, which was also one of the most complex expressions. The expression occurred as a single form, either "that" or "there" or an undifferentiated form, and later tended to split into two forms, "that" and "there". First, I will look at the contexts in which children produced "that/there". Then, I will consider the changes in the use of "that/there" during the one-word period. Finally, I will consider the meaning, or rather meanings, of "that/there" and the significance of the changes in meaning of "that/there".

All nine children used "that/there". 1802 utterances of "that/there" were recorded. "That/there" occurred in the earliest recorded sessions of all nine children.

The phonological form of the expression varied widely, particularly in the early stages. Some children simply used an initial "d" followed by any vowel. Others used "wat", "bat" or "watsat". Seven of the children initially made no distinction between "that" forms, such as "dat", "bat" and "watsat" and "there" forms, such as "dere", "dee" and "tha". There was no discernible difference between the contexts in which these types of utterances were produced, and there was no clear-cut phonological distinction between these types of utterances. Despite these variations it was almost always possible to distinguish utterances of "that/there"

from utterances of other expressions on phonological grounds.

Children used "that/there" in three kinds of contexts. They said "that/there" when they indicated an object, when they successfully completed a plan, and when they changed the location of an object, or indicated the location of an object. One child also used "there" to accompany giving and taking. 99% of the utterances of "that/there" appeared in one of these four contexts. 96% of the utterances appeared in indicative, success or locative contexts.

Contexts 1 : Indicative

All nine children used "that/there" a total of 1291 times when they attended to an object. Often, the children said "that/there" when they actually pointed to the object, but sometimes they used the expression when they simply turned and stared intently at the object, or when they held up the object, or showed it to someone else. In all these contexts it seemed clear that the object had captured the child's attention. Sometimes, it was less obvious that the child was paying attention to the object, but this still seemed to be the best interpretation of the context. For example, children said "that/there" when they picked up an object from the floor, touched an object or reached for it. Finally, children occasionally used "that/there" when they simply acted on an object.

A child might say "that/there" when he took down a toy from a shelf, or put a block on a pile of blocks, or fit a jigsaw puzzle piece in place.

In the first sort of context, when the child points to

an object, looks at it, or holds it up, it is particularly clear that the essence of the situation is that he is intrigued by the object. He doesn't act on the object, instead he seems to want to know more about it. In the second sort of context, when the child picks up an object, touches it or reaches for it, the child does act on the object, but the main effect of these actions is to make the object available for further exploration.

In the third and least frequent sort of context, the child is concerned with acting on the object in a particular way. His attention to the object seems to be a consequence of his action.

This is rather different from the second type of context where the child's action seemed to be a consequence of his interest in the object. Nevertheless, there are three reasons for supposing that the child was also indicating an object in these contexts. First, children only used "that/there" when they acted on an object. They didn't say "that/there" when they simply acted, when, for example, they jumped up and down or climbed on to a chair. Second, the objects the children acted on in these contexts were similar to the objects they pointed to or reached for. Finally, there was no other common feature in these contexts, children applied "that/there" to a wide variety of actions on objects.

I have called the first set of contexts "indicative", the second set "semi-indicative" and the third set "action" (see Table 2). I have distinguished between these three types of contexts partly in order to distinguish between

clear and less clear cases of indication, and partly to help resolve ambiguities later on (see below). However, there does seem to be an underlying common feature of all three types of context, that is, the fact that the child attends to an object.

Children used "that/there" when they attended to an almost incredibly wide variety of objects. In one session Henry says "watsat" attending to a Christmas tree, a cement mixer, a small drop of milk that has spilled on the table, a ring and a piece of candy. Similarly, Christian says "dere" attending to his father, a slip of paper, the noise of a distant bird and the baby in the next garden. Children often said "that/there" attending to the sound of invisible objects, such as the bird or a car approaching the house.

Unusual or new objects were particularly likely to elicit "that/there". The recording equipment regularly inspired a chorus of "that/there" as did the observer's ring, watch, and necklace. Also familiar objects that behaved in sudden or unexpected ways elicited the expression. Children said "that/there" when the television was turned on or off, when a dog began to bark, when a light was switched on. Henry said "dat" repeatedly holding up his finger which had a piece of candy stuck to it. But children also used the expressions to indicate old favorites like Daddy, or a teddy bear, or the baby next door. Finally, children used "that/there" when they attended to objects that were not particularly fascinating in themselves, but played an important role in a particular plan. For instance, Jonathan said "dat" pointing to the last missing piece of a

jigsaw puzzle which he had finally found. The children often applied the expressions, including "watsat", to objects they already had a name for, and they frequently combined the expressions, including "watsat", with names.

In short, the objects that elicited "that/there" had no common perceptual or functional features. "That/there" was applied to objects that interested the child and engaged his attention for a variety of reasons.

The children also did not use "that/there" in a particular type of social situation. When the child shows an object to someone else it is clear that he wants to engage their attention. But when he simply picks up the object, touches it or looks at it, and even when he points to it, it is not clear that he is concerned with other people's reaction to the object.

One-year-olds are rarely left alone so it is impossible to guarantee that the child's expression is not intended to direct another person's attention to an object. However, children often used "that/there" when they were apparently engrossed in a solitary game, and when the other people in the room were not paying special attention to them. This happened particularly often with Group I children, who were audiotaped. When parents or others ignored the child's utterances, as they frequently did, the children did not seem particularly upset, nor did they try to draw their parent's attention to the object in other ways. While it was clear that children said "that/there" when they attended to objects there was no reason to believe that they also said "that/there" consistently when they wanted other people to attend to objects.

Contexts 2 : Success

6 of the 9 children used "that/there" 231 times when they successfully completed a plan. For example, children said "there" when they managed to place a block on a tower of blocks without knocking the tower over, or when they managed to fit a jigsaw puzzle piece into the appropriate space. In these contexts the child tried to bring about a certain state of affairs by acting on objects in a certain way. If his action had the proper effect on the objects, and the objects behaved in the proper way, the state of affairs came about and the child said "that/there". Another expression, "oh dear", marked failure (see chap. 7) and "oh dear" often alternated with "there", marking unsuccessful and successful attempts to complete a plan.

Children said "that/there" when they successfully completed set tasks like the tower or the jigsaw puzzle, but they also used the expression when they completed invented tasks. In one sequence, Harriet tries to fit as many round blocks as she can on to a flat square slab. When she gets a new block on without pushing off a block that's already on the slab she says "there", when the new block displaces one of the old blocks she says "oh dear". Rachel plays with a toy car on an inclined block. She lets go of the car at the top of the ramp, and says "there" if it gets to the bottom without falling off the ramp. In one extraordinary sequence Jonathan is playing with a jigsaw puzzle. He is extremely good at solving puzzles, and has completed this one several times, saying "there" as he gets each piece in. In fact he seems to get rather bored with it.

Then he takes each piece and deliberately places it on top of the wrong space, saying "there" each time he does so. This strikes him as being hysterically funny. It is impossible not to imagine that he is making a joke about the notion of success.

These examples demonstrate another important point about success contexts. The actual goal of the child's actions seemed to be relatively unimportant. That is, the children were not expressing the fact that they were pleased or satisfied with a particular state of affairs. This state of affairs was significant because it was related to the child's intentions and actions. Children did not say "that/there" when someone else brought about a satisfying state of affairs, or when such a state came about by accident. They did not say "that/there" when someone else fitted the piece in the puzzle. Once the child achieved a goal he lost interest in it. Children would smash the tower down as soon as they finished it, or empty the jigsaw puzzle as soon as they got all the pieces in. Also, the same event could count as a success or a failure depending on the child's action. If a tower of blocks fell when the child was trying to put another block on top of it, the child would say "oh dear". If it fell when he deliberately pushed it over, he would say "there". Finally, children would deliberately complicate a task to make it more difficult if the goal was accomplished too easily. All these facts indicate that the children were not marking the fact that some state of affairs was intrinsically desirable or satisfying. Instead, they marked the fact that they

managed to bring about the state of affairs by acting in a certain way.

Contexts 3 : Location

Seven children used "that/there" 197 times in four different types of contexts involving the movement and location of objects. In the first type of context children brought about a change in the location of objects. Children said "that/there" when they put a peg in a hole, took a block out of a box, placed a block on top of another block, or took a block off the table and placed it on the floor. In these contexts, when the children placed objects inside or outside the enclosure, or above or below another object, "that/there" was sometimes accompanied by "in", "out", "up" or "down". This fact supported a locative interpretation of these contexts (see chap. 9). Children also used "that/there" when they simply placed a block at the end of a line of blocks or put a toy chair in a particular spot in a toy caravan. Children often said "that/there" before the action actually took place, or when they tried to change an object's location but weren't able to.

In the second type of locative context children pointed to the destination of an object. A child would say "that/there" pointing to the hole in which he was about to place a peg, to the spot on the floor on which he was about to put a toy lion, or to the top of the block on which he was about to put another block. The child acted to change the location of the object in these contexts, as he did in the first type of context. Here, however, the expressions did not accompany the child's actions. Instead, children

said "that/there" when they indicated the intended new location of the object.

Children also used "that/there" in contexts that involved location but did not involve action. They said "that/there" when they pointed out the location of an object. Henry says "monster up dere" pointing to a monster on a high shelf. Rachel says "Simon out dere" pointing through the window at Simon who is outside in the garden. Hannah says "dere" and "monkey dere" pointing to a picture of an embryo inside its mother's womb and "dere" pointing to a picture of a teddy bear hiding under a table. The fact that children often combine "that/there" with "in", "out", "up" and "down" in these contexts suggests that they are indicating the location of the object. Also, in all these contexts the most significant fact about the objects is their spatial relationship to other objects. However, in these contexts the object's location is not the result of the child's action, or, for that matter, of any other action.

Finally, children occasionally said "that/there" in reply to "where" questions. For example, Christian says "dere" and points to his nose in answer to the question "Where's your nose?" If the children understand "where" questions the way that adults do then they are also indicating a location in these contexts. However, children may interpret "Where's your nose?" as if it meant "Show me your nose". In that case they would actually be indicating an object rather than a location in these contexts.

All four of these types of contexts have a common

feature, they are apparently concerned with the location of objects. It seems fair to say that there is a common underlying locative meaning of "that/there" in these contexts, just as we said that there was a common underlying indicative meaning of "that/there" in the three different kinds of indicative contexts. However, just as in the indicative case, it is useful to make finer distinctions between different kinds of contexts. First, this enables us to distinguish clear cases of locative uses of "that/there" from less clearly locative cases, like answers to "where" questions. Second, it helps us to resolve ambiguity. Finally, children use "that/there" in different locative contexts in a clear developmental order. In particular children never used "that/there" to simply indicate locations before they used "that/there" in contexts that involved actions (see below).

I have described eight different types of contexts in which children use "that/there". These are indicative, semi-indicative and action contexts, success contexts, locative action, destination, indicative locative, and answer to where contexts. The first three types of contexts appear to have a common feature, in all of them the child attends to an object. Similarly, the last four contexts appear to have a common feature, in all of them the child marks the location of an object. However, there does not appear to be a common feature in the indicative contexts, the success contexts and the locative contexts. I was forced to conclude that "that/there" can have three different meanings, an indicative meaning, a success

meaning and a locative meaning.

Ambiguities

Some utterances of "that/there" are ambiguous. These utterances were produced in contexts that involved success and location, indication and success, indication and location, or indication, success and location. For example, when the child successfully fits a piece into a jigsaw puzzle he attends to the piece, he successfully completes a plan, and he changes the location of an object. Similarly, when a child points to a teddy bear under a table he is indicating an object, and the location of an object. If a child says "that/there" in these contexts we have to decide which aspect of the situation he is trying to convey. If "that/there" always occurred in contexts with a single common feature we would not have this problem, but "that/there" occurs in contexts with three different common features. If a child says "that/there" in a context that includes more than one of these common features, we have to decide which feature the utterance encodes. To put it another way, since "that/there" has three different meanings an utterance of "that/there" may be ambiguous.

A certain amount of ambiguity is unavoidable. However, sometimes we can at least guess which meaning of "that/there" is encoded by a child's utterance by looking at his other utterances of "that/there".

The first problem is to decide whether an utterance of "that/there" marks the fact that an action was successful, or that it changed the location of an object. There are

some clear cases of locative actions that are not successful. For example, when the child tries to push a block through the wrong hole in the puzzle post-box he is clearly trying to change the object's location, but he is not successful. Similarly, when the child says "there" before he performs an action, he can't be marking the fact that the action was successful. There are also clear cases of successful actions that are not particularly locative. When the child says "dere" after she manages to get her doll's carriage hood to stay up, after several unsuccessful attempts, she has been successful, but she has not tried to change an object's location. Finally, there are the ambiguous cases. As we have seen when the child places a jigsaw puzzle piece in the appropriate space, he is successful, and he changes the location of an object.

I have assumed that if there are clear cases of one kind in a particular session, and ambiguous cases, the ambiguous cases should be interpreted in the same way as the clear cases. If there were clear cases of both kinds, or there were no clear cases, ambiguous cases were classified as ambiguous.

For example, suppose in a particular session a child said "that/there" 12 times in contexts that involved location but not success, 6 times in contexts that involved success and location, and never said "that/there" in contexts that involved success but not location. The six ambiguous contexts would be classified as locative actions. On the other hand if a child said "that/there" 6 times in clearly locative contexts, 6 times in contexts that clearly involved

success and 6 times in ambiguous contexts, the six ambiguous contexts would be classified as ambiguous contexts.

The second type of ambiguity was more difficult to resolve. An utterance may encode the fact that an action was successful or locative or it may encode the fact that the child attended to the object he acted on. There are clear cases of actions on objects that are not successful or locative. However, all successful or locative actions are also actions on objects. Therefore all successful or locative actions are ambiguous. Furthermore, we can't use the technique we described in the preceding section to resolve this type of ambiguity.

In a number of sessions a child would use "that/there" frequently in indicative and semi-indicative contexts, when he pointed to objects, for example, occasionally when he performed actions on objects that were not successful or locative, and occasionally when he performed successful or locative actions. Should we conclude that in such a session the child is using "that/there" indicatively, and it is just coincidence that some indicative contexts also involve success or location, or should we conclude that he is using "that/there" in several different ways?

Clearly, our decision will depend on the specific facts of the case. For example, in Paul's session 3 he says "dat" 34 times when he indicates objects, twice when he acts on objects and his actions don't involve success or location, and twice when he performs a successful action. We would tend to conclude that Paul's "dat" encoded his

attention to objects, and, coincidentally, some of these objects were involved in successful actions. On the other hand in Harriet's session 6 she says "de" 12 times when she indicates objects, 23 times when she performs successful actions, and she never says "de" when she performs unsuccessful actions. In this case we would tend to conclude that Harriet's "de" encoded her attention to objects and also encoded success.

It is particularly important to resolve these ambiguities since we are concerned with the development of "that/there". If we specify all the locative and success contexts separately, including contexts that are really indicative, there will appear to be spurious changes in the meaning of "that/there". On the other hand if we classify all locative and successful actions as indicative actions, we will miss genuine changes in meaning. We might conclude, wrongly, that Paul had developed a success meaning of "that/there" in session 3, or that Harriet hadn't developed a success meaning of "that/there" in session 6.

I adopted the following rule in order to solve this problem. If, in a session, a child used "that/there" more often in indicative contexts than in locative or success contexts, then the successful or locative actions were classified as indicative actions on objects. If the child used "that/there" less often in indicative contexts than in success or locative contexts, or if he used the expression an equal number of times in both types of contexts, successful or locative contexts were classified separately. Thus in Paul's session 3 the two successful actions were

classified as indicative actions, while in Harriet's session 6 the 24 successful actions were classified as successful actions.

Locative indicative contexts and "destination" contexts cause similar problems. When a child points to a destination, or points to an object that is in a striking location, how can we be sure that he is not simply pointing to the object, rather than the location of *the* object? Again if a child said "that" 20 times pointing at interesting objects, and also said "that" once pointing to the box in which he was about to place a block, we would tend to conclude that he was indicating the box, and it was simply a coincidence that the box was the destination of the block. On the other hand if the child said "de" 12 times when he indicated interesting objects, 12 times when he performed locative actions, and 12 times when he indicated destinations or objects that were in a striking location, we would tend to conclude that he used "de" indicatively and locatively.

A similar rule was applied to these ambiguous contexts. If, in a session, a child used "that/there" more often in indicative contexts than in locative contexts, "destination" contexts and locative indicative contexts were classified as indicative contexts. If he used "that/there" less often in indicative contexts than in locative contexts, or if he used "that/there" equally often in both types of contexts, ambiguous contexts were classified as destination contexts or locative indicative contexts.

Finally, we should notice that another kind of ambiguity is possible in indicative contexts. When a child uses "that/

there" very often in locative contexts, and occasionally uses "that/there" pointing to objects, we might interpret these indicative contexts as locative contexts. For example, when a child says "dere" pointing to a particular picture of an animal in a page full of pictures of animals he might be indicating the position of the animal on the page, rather than the animal itself. I did not attempt to resolve this rather marginal source of ambiguity. However, it should be kept in mind, particularly when we consider some of the late sessions when children used the form "there" frequently in locative contexts, and only occasionally in indicative ones.

To sum up, three rules were used to resolve ambiguities.

Rule I If, in a session, a child uses "that/there" in a context that may be classified either as a successful action, or as a locative action:

- 1) If he uses "that/there" in unambiguous success contexts, but not in unambiguous locative contexts, classify it as a successful action.
- 2) If he uses "that/there" in unambiguous locative contexts, but not in unambiguous success contexts, classify it as a locative action.
- 3) If he uses "that/there" in unambiguous success contexts and unambiguous locative contexts, classify it as an ambiguous context.
- 4) If he never uses "that/there" in unambiguous contexts, classify it as an ambiguous context.

Rule II If, in a session, a child uses "that/there" in a context that could be classified as an indicative action or

as a locative or successful action:

- 1) If he uses "that/there" more often in clearly indicative contexts than in success or locative contexts, classify it as an indicative action.
- 2) If he uses "that/there" more often in success or locative contexts than in clearly indicative contexts, classify it as a successful or locative action.
- 3) If he uses "that/there" equally often in indicative contexts and in success or locative contexts, classify it as a successful or locative action.

Rule III If, in a session, a child uses "that/there" in a context that could be classified as an indicative, or as a destination or an indicative locative context :

- 1) If he uses "that/there" more often in indicative contexts than in locative ones, classify it as an indicative.
- 2) If he uses "that/there" more often in locative contexts than in indicative ones, classify it as a destination or an indicative locative context.
- 3) If he uses "that/there" equally often in indicative and locative contexts, classify it as a destination or an indicative locative context.

Rule I was applied first, then Rule II and then Rule III. 115 ambiguous contexts were classified as either locative or successful actions under Rule I. 60 successful and locative contexts were classified as indicative actions under Rule II. 5 locative indicatives and destinations were classified as indicatives under Rule III. There were also some ambiguous contexts that were not covered by these rules. These contexts were classified as ambiguous contexts.

Developmental Trends

The clearest developmental trends involved the indicative and locative meanings of "that/there". The development of success meanings of "that/there" was more complicated.

Children consistently used "that/there" in indicative contexts before they used it in locative contexts. Two of the youngest children, John and Harriet, used "that/there" indicatively but did not use it locatively. The other seven children all used "that/there" in indicative contexts first, and later used it in locative contexts (see Tables 3,4).

All the children in groups I and III, the older groups, used "that/there" indicatively and locatively. Only one of the children in group II, the younger group, used "that/there" in locative contexts, and he only used it as an answer to "where?" questions. We have seen that this is a marginal locative use. We can see the gap between the emergence of the indicative meaning and the emergence of the locative meaning particularly clearly if we look at group I, who were studied from 12-24 months (see Table 2, Table 3).

The second developmental trend involved the use of "that/there" in different types of locative contexts. Children consistently used "that/there" when they changed the location of an object, that is, in locative action contexts and destination contexts, before they used "that/there" to indicate the location of objects (see Tables 3a and 4).

Seven children used "that/there" in locative contexts. One child, Christian, only used "that/there" in answer to "where?" questions. Two children, Paul and Anna, used "that/

there" when they brought about a change in the object's location, but did not use it to indicate an object's location. Three children, Jonathan, Henry and Hannah, first used "that/there" when they brought about a change in the object's location, and later used "that/there" when they indicated an object's location. One child, Rachel, used the expression in both ways for the first time in the same session. None of the children used "that/there" in locative indicative contexts before they used it in destination or locative action contexts, and none of them used "that/there" in locative indicative contexts without using it in destination contexts or locative action contexts (see Table 2, Table 3a).

The relationship between the use of "that/there" in success contexts and the indicative and locative uses of "that/there" was more complex. Three children used "that/there" in indicative contexts but not in success contexts. Four children used "that/there" first in indicative contexts and only later in success contexts. One child used "that/there" for the first time in both contexts in the same session. However, the remaining child, Rachel, reversed this order. She used "that/there" for several sessions in success contexts before she used it in indicative contexts. While there was a strong tendency for children to use "that/there" in indicative contexts before they used it in success contexts, Rachel indicates that this was not an absolute rule (see Tables 3 and 4).

The relationship between success meanings and locative meanings of "that/there" was also not entirely clear. One

child used "that/there" in success contexts but not in locative contexts. Four children used "that/there" first in success contexts and only later in locative contexts. One child used "that/there" in both ways for the first time in the same session. However, two of the older children, Anna and Henry, used "that/there" in locative contexts but never used it in success contexts. This suggests that while there was a tendency for children to use "that/there" to mark success before they used it to mark location, children could choose not to use "that/there" in success contexts at all (see Tables 3 and 4).

Two of the children in the youngest group, group II, used "that/there" to mark success, while only one of these children used "that/there" marginally to mark location. Nearly half of the utterances of "that/there" in success contexts (114 out of 232) occurred in the first half of the recording period. ^{While only 4% of the locative utterances did,} This also indicates that success uses tended to appear earlier than locative uses (see Table 2, Table 3).

To sum up, children clearly use "that/there" in indicative contexts before they use it in locative contexts. They also clearly use "that/there" in locative contexts that involve action, before they use it in locative contexts that simply involve the location of objects. If they use "that/there" in success contexts, they tend to do so after they use the expression in indicative contexts, but before they use it in locative contexts.

The relationship between the development of the meanings of "that/there" and the development of the two forms "that"

and "there" was extremely complex (see Table 6). We can divide the children into three groups. Two of the youngest children, Harriet and John, used "that" and "there" in free variation throughout. There was no discernible difference in the contexts in which each expression appeared, and there was no clear cut phonological distinction between "that" and "there" forms.

Jonathan, Christian, Paul, Hannah and Anna also began by using "that/there" in free variation, but later they developed two separate forms, "that" and "there", which were used in different types of contexts. Henry and Rachel each began by using a clearly differentiated "that" or "there" form, "watsat" for Henry and "dere" for Rachel, and then added another clearly distinct form later on.

In the first group, John always used his undifferentiated form in indicative contexts. Harriet initially used her undifferentiated form in indicative contexts, but later she also used it in success contexts.

Hannah, Jonathan, Christian and Paul used "that/there" in a number of different contexts, before they split "that/there" into two separate forms. Jonathan, Christian and Hannah initially used the undifferentiated "that/there" in indicative contexts and later used it in success contexts. Paul initially used "that/there" in indicative and success contexts. Jonathan and Hannah eventually used the undifferentiated "that/there" in locative contexts as well. On the other hand, Anna only used the undifferentiated "that/there" in indicative contexts.

After they distinguished between "that" and "there"

all the children in the second group only used "that" in indicative contexts. However, all the children used "there" in indicative contexts and in success or locative contexts. Paul and Jonathan used "there" in all three contexts. However, Anna, Jonathan, Hannah and Paul, used "there" indicatively infrequently in the later sessions. Some of these infrequent indicative uses may actually be locative uses (see p. 90 above). Hannah and Christian also stop using "there" in success contexts in their last sessions.

The third group of children, Henry and Rachel, behaved rather differently. Henry uses "watsat" in indicative contexts and then introduces a new form "dere". He only uses "dere" in locative contexts. Rachel uses "dere" first in success contexts, then in indicative contexts and finally in locative contexts. In session 12 she introduces a new form "dat" which she only uses in indicative contexts.

As we can see there is no clear or consistent relationship between the development of meanings and the development of forms. However, there does seem to be an initial state and a final state. All the children begin by producing a single form, which may be an undifferentiated "that/there", which has a single meaning. At least some of the children end up with two forms, "that" which has a single indicative meaning, and "there" which primarily has a locative meaning. However, for all the children there is an intermediate state between these two states when a single form may have several meanings, or two different forms may share some meanings.

"That/there" in Multi-Word Strings

Children frequently combined "that" and "there" with other expressions. In fact, "that" and "there" were among the first expressions to appear in two-word strings. Frequently children combined "that/there", usually "that", with names or "that/there", usually "there", with direction expressions, such as "in", "out", "up", "down", "off" and "on". All the children who produced two-word strings produced "that+name" strings. Usually, "that" occurred before the name, and "there" occurred after the direction expression, but there was some variation. Children used "that+name" strings in indicative contexts, and "direction+there" strings in locative contexts. "That" and "there" also appeared frequently in "that+there" strings and in "verb+there" strings, such as "sit there".

Other Reports of "That/there"

A number of writers have noted the early occurrence of a d-initial form that is used indicatively. (Lewis, 1951; Leopold, 1949; Werner and Kaplan, 1963; Ninio and Bruner, 1978; Carter, 1978; Bloom, 1973). Bloom (1973) reports that 'Allison used "there" to point out objects or people that were noticed or found (with or without gesture), and also as an answer to "where" questions. However, the video-tape transcriptions of Allison's speech include examples of "there" being used in success and locative contexts. Allison says "there" when she successfully climbs up on a chair after several attempts and when she manages to make a doll sit on the chair after it has fallen over several times. She also says "there" when she points to the spot on which she is about to place a horse. We might interpret these contexts

and other similar contexts as indicative contexts, but a success or locative interpretation seems more appropriate, particularly given the data for other children. It is striking, though perhaps not surprising, that even a sensitive and careful observer like Bloom, using video-tapes and observing her own child, apparently failed to notice some of the ways that the child was using expressions. Carter (1974, 1978) also reports that David used an undifferentiated d-initial form indicatively. Later he developed two forms, "that", which continued to be used indicatively, and "there", which initially marked success and later marked location. In addition, Farwell (1977) has noted that children use "there" to indicate success and location. Farwell stresses the fact that the children use "there" locatively when they try to change the position of an object. This is consistent with the data presented here. Ervin-Tripp (1977) and Bowerman (1978) also report the use of "there" in success contexts.

The Meaning of "That" and "There"

We have seen that "that/there" has three meanings, an indicative meaning, a success meaning and a locative meaning. Now I will investigate the nature of these meanings in more detail. What sort of concepts do "that" and "there" encode?

First, these expressions don't encode properties of objects or relationships between objects. When the child uses "that/there" indicatively, the objects he picks out have no common properties. Nor are the relationships between the objects important. A child may say "that/there" when he attends to any object. Instead, the child marks his own

relationship to the object.

Similarly, when the child uses "that/there" in success contexts he does not pick out any common properties of objects or any relationship between objects. A successful plan may involve any objects and those objects may be related to each other in any way. Again the child marks the relationship between himself, his actions and objects.

Even when the child uses "that/there" in locative action or destination contexts he is not solely concerned with the relationships between objects. Instead he marks a change, or intended change, in that relationship. Moreover, the change in the spatial relationships between objects that is marked by "that/there" is usually a consequence of the child's actions.

We can only say that "that/there" encodes relationships between objects when the child uses "that/there" in locative indicative contexts. In these contexts, the child indicates the spatial relationship between objects, or rather indicates that the objects have a spatial relationship, whether or not he acts on these objects. However, children only began to use "there" in these contexts at the end of the one-word period.

While "that/there" doesn't encode properties of objects or relationships between objects, it also doesn't encode particular actions or types of action. Just as children use "that/there" in contexts that involve a wide variety of objects, they also use "that/there" in contexts that involve a wide variety of actions. In indicative contexts, the child may point to an object, pick it up, or touch it, or he may

not act on it at all. In success contexts the child may knock objects over, pile them on other objects, slide them down ramps, or place them in a hole.

The same action may be marked as a success or a failure depending on the effect it has on objects. In locative contexts the child may change the object's location by dropping it, pushing it, placing it on a surface, or removing a supporting object, or he may not act on the object at all. When he does act, he seems to be more concerned with the consequence of his action than with the action itself.

Finally, these expressions don't encode social relationships or emotional states. The expressions served a wide variety of social functions. They could be used to capture attention, request action, demand objects, make jokes, or divert attention. Frequently, utterances of the expressions did not seem to serve a social function at all. Children said "that/there" when they were preoccupied with their own private play. In these contexts, "that/there" seemed to have what Halliday calls a mathetic function. The children seemed to use the expressions to sort out their experiences. Similarly, children used these expressions when they were in a wide variety of emotional states. They would say "that/there" when they were pleased, startled, annoyed or frustrated. Usually, however, the children were calm and contented.

The three meanings of "that/there" have some positive common features. "That/there" encodes concepts with a certain egocentric quality. Children did not say "that/there" when someone else paid attention to an object, when someone else

succeeded or when someone else changed the location of an object. Except when they indicated the location of objects, children marked relationships between themselves, their own actions and objects.

While the expressions don't encode specific actions or types of actions, actions do play an important role in the contexts in which children use "that/there". Children tend to act on an object when they pay attention to it, they act in order to achieve success, they tend to act to change the location of objects. In all these contexts, particularly in success and locative contexts, the children don't simply act, they act on objects in order to achieve goals. We might say that they implement a plan. I will discuss this concept of a plan more fully in the next chapter.

Finally, "that/there" encodes concepts with a certain abstract quality. "That/there" doesn't refer to a set of perceptual configurations or a set of behaviors, we can't define indication, or success, or even changing an object's location in perceptual or behavioral terms. First, these concepts involve quite complex relationships between events and actions. But, more profoundly, "that/there" seems to encode aspects of the child's interpretation of events, rather than intrinsic features of the events or actions themselves. The children decide to pay attention to an object, they decide what counts as success, they decide to change an object's location. Their utterances mark these decisions, rather than marking the occurrence of events, or the performance of actions. Also, "that/there" doesn't pick out subsets of objects or actions. Any object may be indicated, any

plan may succeed, any object may be moved, all objects are in a location. Instead, the children seem to be concerned with what it is to be an object or a plan. We might say that "that/there" encodes meta-features of objects and plans. I will discuss this concept of a meta-feature more fully in later chapters.

Thus the three meanings of "that/there" have several features in common. "That/there" doesn't encode properties of objects, relationships between objects, specific actions or types of action, or social relationships or emotional states. The concepts encoded by "that/there" are egocentric, they tend to involve plans, and they are abstract. However, there are also significant differences between the three meanings of "that/there".

When children use "that/there" in indicative contexts they are particularly concerned with objects, and their relationship to objects. Actions and plans play a more peripheral role. At the same time, "that/there" doesn't encode the concepts of properties of objects or relationships between objects. Instead, "that/there" seems to encode an aspect of the general concept of the object. I will discuss the conceptual underpinnings of the indicative meaning of "that/there" in chap. 15. We will see that other expressions, such as "gone", "in" and "on", also encode concepts that involve aspects of the general concept of the object and that "gone" also encodes a relationship between the child and objects.

The locative meaning of "that/there" also concerns an abstract aspect of objects. However, when children use "that/

there" in this way they seem less concerned with their own relationship to objects and more concerned with the spatial characteristics of objects, in particular, with changes in the location of objects. I will discuss the conceptual basis of the locative meaning of "there" in chap. 14. We will see that direction expressions also encode changes in the spatial relationships of objects.

Moreover, the child's actions play a more important role in locative contexts than they do in indicative contexts. The children consistently mark changes they act to bring about. They use "there" when they have a plan of a particular type, a plan to change the location of an object. We will see that "gone" and direction expressions also tend to be used when the child plans to act on objects in a particular way.

When children use "that/there" in success contexts, they encode a rather different concept. In success contexts actions and particularly plans are crucial and objects play a more peripheral role. At the same time "that/there" doesn't mark a type of action or even a particular type of plan. Instead, it marks the fact that any plan succeeds. Just as the indicative meaning of "that/there" involves the general concept of an object rather than particular types of objects, so the success meaning of "that/there" involves the general concept of a plan rather than particular types of plans. I will discuss the conceptual underpinnings of the success meaning of "that/there" in chap. 12. We will see that other expressions such as "no", "more" and "oh dear" also mark abstract aspects of plans.

Changes in the Meaning of "That/there"

We discovered two particularly important trends.

First, children tend to use "that/there" indicatively before they use it locatively. That is, children use the expression to point out objects first, and only later use it to point out the location of objects. We will see that this development is related to certain cognitive developments in 12-24 month-olds (chap.15).

Also, children use "that/there" in locative contexts that involve their own actions and plans before they use "that/there" to indicate the spatial relationship between objects. There is a development from egocentric, action-oriented meanings of "there" to a more objective meaning. We will see a similar pattern in the development of other expressions, such as "no", "more", and especially "gone" and direction expressions. We will also see that this development is related to cognitive developments in the 12-24 month period.

Jonathan (continued)

Sess. No.	Indicative		Locative								Ans. to Where	Other
	Indic.	Semi- Indic.	Action	Success	Loc. Action	Destination	Loc.	Indic.	Ambig.			
11 De	15		1									
12 De	23		1	49								1
13 De	14											
14 De	2			16								1
15 De	4		6	5								
16 De	3		2	9								
17 De	6		6									
18 De						3					1	
19 De				5	1	1					6	
20 De				3							7	
21 De	3			8	2							
22 De	3				3						3	

Jonathan (continued)

Sess. No.	Indicative		Action	Success	Locative		Destination	Loc.	Indic.	Ambig.	Ans. to Where	Other
	Indic.	Semi Indic.			Loc. Action							
23 De				5	7		1					
24 De	3			4	2		1					
25 De	6			3	6		1		1	3		
Dat 26	15	4	6									
Dere 27	7		1									
Dere			1	4	16				3			3
Dat	2	2							4 (with "out")			

Rachel

Sess. No.	Indic.	Semi- Indic.	Loc. Action	Success	Action	Locative		Indic.	Ambig.	Ans. to Where	Other
						Destination	Loc.				
1 Dere				2							
2 Dere				17							
3 Dere				1							
5 Dere				17							
6 Dere	2								2		
7 Dere				6							
9 Dere				3							
10 Dere				4					9	4	
11 Dere	2			1							
12 Dere	2			2		2	8		1		
Dat	3										
13 Dere	2		6	4					3		1

Henry

Sess.No.	Indic.	Indicative		Locative			
		Semi-indic.	Action	Loc.Action	Destination	Loc.Indic.	Other
1 Wazat	3						
2 Wazat	4						
3 Wazat	1						
5 Wazat		2					
6 Wazat	17	9					
7 Wazat	2	2					
8 Wazat	5						
9 Wazat	19						
10 Wazat Dere	25	2	2	3			
11 Zat	18	7		1		4	
12 Zat	10	6	8	12		2	
13 Zat Dere	12		2	3		6	1
14 Dat	6						

Group II

Christian

Sess.No.	Indicative		Action	Success	Ans.to "Where?"	Other
	Indic.	Semi-indic.				
1 Dat/Dere	30	6				
2 Dat/Dere	25	5				
3 Dat/Dere	34	1	4			1
4 Dat/Dere	3	1		4		2
5 Wasat Dere	8 3		3		6	1

John

Session No.	Indicative		Actions
	Indic.	Semi-indic.	
1 Dat/De	41	16	3
2 Dat/De	28		
3 Dat/De	7	8	2
4 Dat/De	8	5	

Harriet

Session No.	Indicative		Action	Success	Give & Take	Other
	Indic.	Semi-indic.				
1						
Dat/De	3	1				
2						
Dat/De	7	6	4		11	2
3						
Dat/De	26	11	6		15	
4						
Dat/De	9	5	2		5	
5						
Dat/De	6		3		1	
Dat/De	10	2		23	2	

Group III

Paul

Sess.No.	Indic.	Semi-indic.	Action	Success	Loc.Action	Destination	Ambig
1							
Dat/Dee	6			1			
2							
Dat/Dee	9	1	7				
3							
Dat/Dee	28	5	13				
4							
Dat	34	19	4	2			6
Dere							

Paul (continued)							
Sess.No.	Indic.	Semi-indic.	Action	Success	Loc.Action	Destination	Ambig
5							
Dat	6	1	1				
Dere				6	3		
6							
Dat	22	1	8				
Dere			1	3	11	3	

Hannah

Indicative					Locative					
Sess. No.	Indic.	Semi- Indic.	Action	Success	Loc. Action	Destination	Loc.Indic.	Ans. to Where	Ambig.	Other
1										
Dat/Dere	16	3	3							
2										
Dat/Dere	4		4	5		3			3	1
3										
Dat/Dere	12				5			4		
4										
Dat	1	6	1							
Dere	1				5	6				
5										
Dat	15	8								
Dere	1				10	4	2			
6										
Dat	24	5	12							
Dere	7				7		7			

Anna

Sess.No.	Indic.	Indicative		Locative		Destination
		Semi-indic.	Action	Loc.A	Action	
1 Whatsat/Dere	15		3			
2 Whatsat Dere	4 1	3	2		1	
3 Whatsat Dere	21 17	2	1			
4 Whatsat Dere	26 7	5 5	6 3		13	3
5 Whatsat Dere	10	6	1		5	2
6 Whatsat Dere	12 1	1	1		5	2

TABLE 3

Order of Appearance of Indicative, Success,
and Locative Uses of That/There

GROUP 1

Jonathan

Indicative

Success

Locative

Rachel

Success

Indicative

Locative

Henry

Indicative

Locative

GROUP II

John

Indicative

Christian

Indicative

Success

Locative

Harriet

Indicative

Success

GROUP III

Paul

Indicative/Success

Locative

Hannah

Indicative

Success/Locative

Anna

Indicative

Locative

TABLE 3a

Order of Appearance of Different Locative Uses of That/There

GROUP I		
<u>Jonathan</u>	<u>Rachel</u>	<u>Henry</u>
Destination	Ans. to Where	Action
Action	Destination/Indicative	Indicative
Indicative	Action	
Ans. to Where		
GROUP II		
<u>John</u>	<u>Christian</u>	<u>Harriet</u>
	Ans. to Where	
GROUP III		
<u>Paul</u>	<u>Hannah</u>	<u>Anna</u>
Action	Destination	Action
Destination	Action/Ans. to Where	Destination
	Indicative	

TABLE 4

Number of Children Using Various Orders of Use of That/There

Indicative < Locative

9

Locative < Indicative

0

$\chi^2 = 9$ sig. at .01 level

Change < Static Location

5

Static Location < Change

0

$\chi^2 = 5$ sig at .05 level

Indicative < Success

7

Success < Indicative

1

$\chi^2 = 4.5$ sig at .05 level

Locative < Success

2

Success < Locative

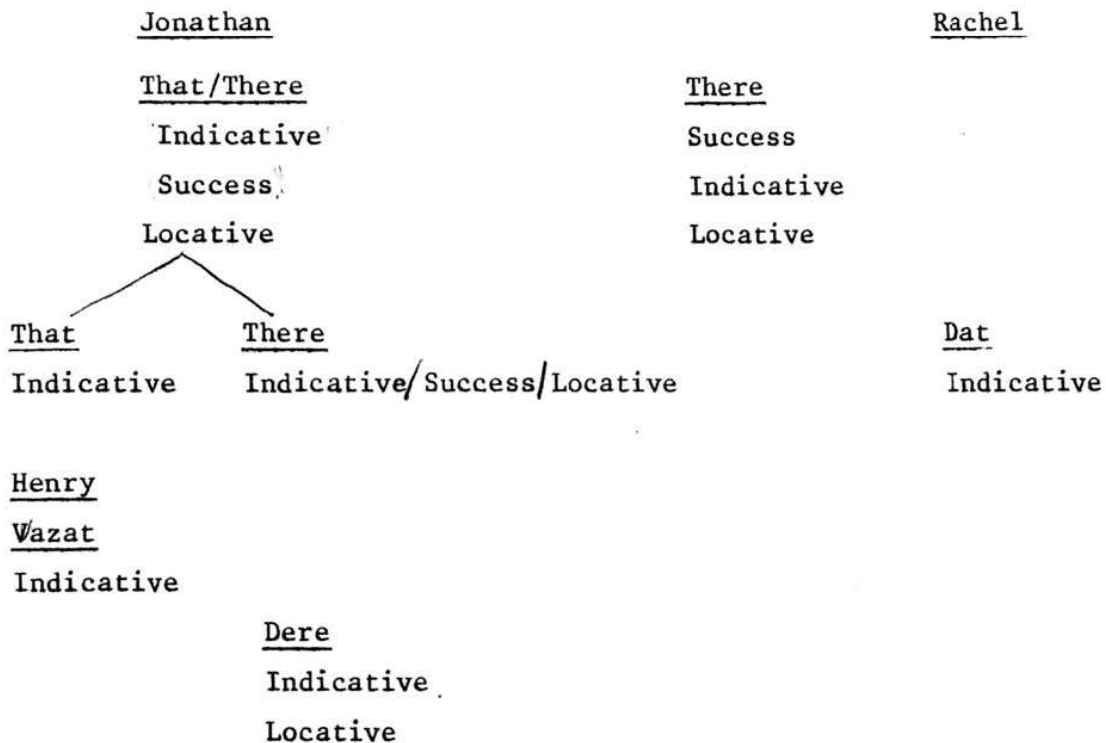
4

$\chi^2 = 2$ not sig.

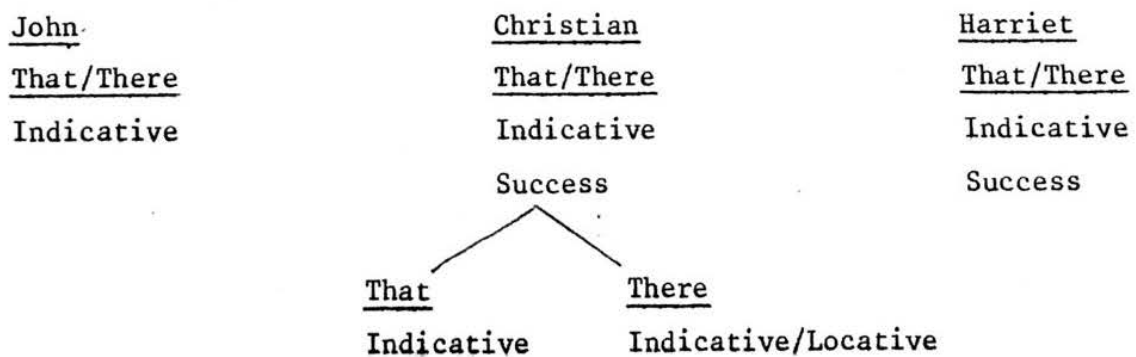
TABLE 5

Relationship of Form and Function of That/There

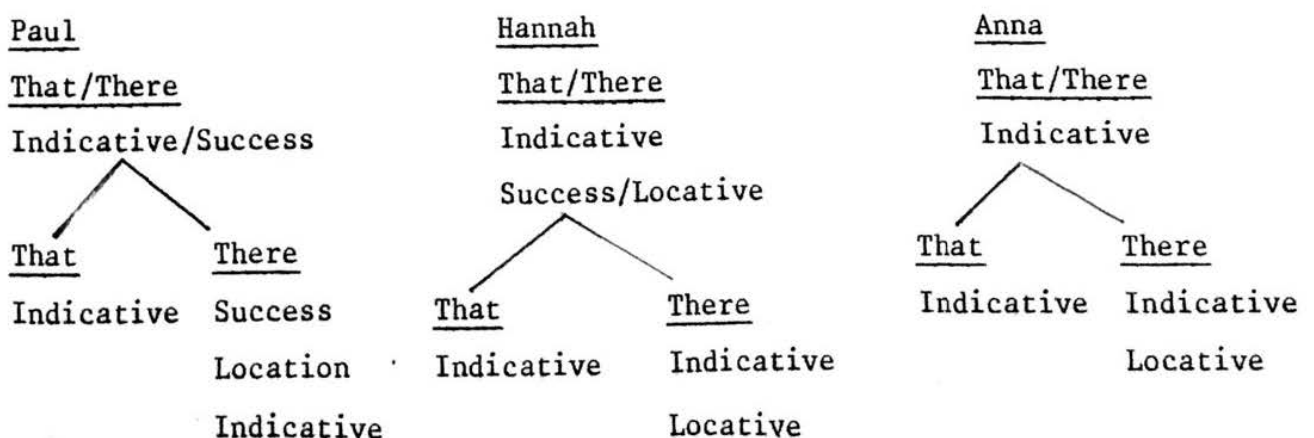
GROUP I



GROUP II



GROUP III



CHAPTER 5

THE DEVELOPMENT OF "NO"

494 utterances of "no" were recorded. Eight of the nine children studied used "no" in a variety of contexts. "No" appeared relatively early, though later than "that/there". One of the least linguistically developed children (see Chap. 3, p.70), Christian, never used "no", the other, John, only used "no" twice.

More than 98% of the utterances occurred in one of six kinds of contexts. Most of the children used "no" in most of these contexts. Children said "no" when they refused to perform an action proposed by someone else, when they protested at the action of another, when they failed to complete a plan, and when they decided not to perform an action. "No" was also used as a conversational device, and eventually was used to negate propositions. I will now describe these contexts in more detail.

Contexts 1 : Refusal

Eight children used "no" 144 times when someone suggested or proposed that they do something, and they refused to comply. For example, Henry's mother says "Shall we put your shoes on" and takes Henry's feet, Henry says "no" and resists. I say to Anna "Come over here", she clings to her mother and says "no". The suggestion could come from anyone and could concern any action.

Most of the time, the other person made the suggestion verbally, as well as acting appropriately, but sometimes no explicit verbal proposal was made. Henry says "no" when he

resists being carried into the bathroom to wash his hands, and says "no" when I try to restrain him from hitting the tape recorder. Jonathan says "no" as he rejects a proffered biscuit. Furthermore, when an explicit statement was made its linguistic form seemed to be irrelevant. Proposals might take the form of requests; "Shall we finish the drawing"; commands: "Stop it, Henry"; questions: "Do you remember 'Baa Baa Black Sheep'?" "Do you want to show Alison your new toy?"; or statements: "You mustn't touch that", "Yes, you can get it in there". Utterances that were formally similar, but did not involve proposals for action, like "Do you like jelly?" or "Did you want to shake hands with Snoopy?" did not generally elicit "no". The children seemed to read through the form of the other person's utterance, using contextual clues to discover that an action was proposed, although linguistic clues were probably used as well.

For these reasons it is inappropriate to regard this "no" as a response to a particular kind of utterance. Instead, it seems to be a response to a particular kind of situation, a situation in which other people were likely to speak.

Children used "no" in this way playfully, as a tease. While "no" was sometimes accompanied by genuine anger and resistance, often the child was just being coy. "Come and give Mommy a kiss" or "Show Alison how well you can sing" were as likely to elicit "no" as "Stop it" or "Wash your hands".

Contexts 2 : Protest

Seven children used "no" 198 times to protest at someone else's actions. Rachel says "no" as her brother pours his juice into the pan she has been playing with.

Harriet says "no" as she pushes the cat off a chair. Anna says "no" when her mother takes the doll out of the bath, Anna then puts it back in. Usually, there was some conflict between the child's actions or desires, and the actions he protested against. "No" is often used in this way when children fight with a sibling or parent, Harriet says "no" as she struggles with her sister for the possession of a teddy bear. Henry says "no" when his brother turns off the television which Henry wants to watch.

Contexts 3 : Failure

"No" was also used when no other person was involved. Seven children used "no" 98 times when they were unable to complete a plan, because of some feature of the world. Hannah says "no" as she tries unsuccessfully to fit a block in a hole of the puzzle mailbox. Anna says "no" as she tries unsuccessfully to climb out of her chair. These contexts may be seen as the converse of those contexts in which "there" was used to mark success. A fairly complex plan was attempted. Its successful completion depended on the behavior of objects as well as the child's behavior. When the objects didn't co-operate the plan failed, and the child said "no". A separate expression, "oh dear", was also used in these contexts (see Chap. 7).

Contexts 4 : Change of Mind

Six children used "no" 34 times when they changed their mind about a course of action. Jonathan , playing a dice game, shakes the dice, starts to throw them, says "no", hesitates and decides to shake them some more. Anna starts to get into her chair, says "no", stops and goes to the other

side of the room to draw a picture. Sometimes, the child's decision was precipitated by the failure of a plan, Anna puts a block in the wrong hole of the mailbox, says "no" and tries it in a different hole. But usually the decision seemed more arbitrary. The child started to do one thing, and then simply decided to do something else instead.

Contexts 5 : Conversational Device

Four children used "no" 13 times as a kind of conversational device, a way of replying to questions or statements, even when the reply was inappropriate.

Children used "no" the way adults use "uh-huh" or "yeah". They showed that they had registered the fact that someone else had spoken, but didn't commit themselves to a specific reply. In these contexts, the child showed no indication of acting on his "no". Anna says "no" when her mother says "Shall we look at a book?" but she goes and gets the book and looks at it. Henry says "no" when his mother says "Do you want a chocolate rabbit" although he grabs the chocolate at the same time. Similarly, "no" is sometimes used inappropriately as a response to statements. Hannah says "no" when her brother says "Saul rhymes with Paul" although it is highly unlikely that she understands the sentence. The common factor in these contexts was simply that someone produced an utterance. Although they may have been sensitive to prosodic or syntactic features of the utterances, for example, questions were particularly likely to elicit "no", the children didn't seem to care what the utterance meant.

Contexts 6 : Propositional Negation

Five children used "no" 69 times to genuinely perform something like propositional negation. Either they appropriately answered information seeking questions, appropriately denied the truth of a statement made by someone else, or combined "no" with other expressions in a particular way. Hannah's mother asks "Who took the hamster out of the cage?" Hannah says "Hannah", mother asks "Was it Saul?" , Hannah says "no". Jonathan's mother asks "What was in the swimming pool? Was it milk?", Jonathan says "no", "Was it lemonade?" Jonathan says "no", "Was it water?", Jonathan says "yes".

Jonathan says "no" when his mother says, falsely, "You've got my T-shirt on" and "You're growly bear". Similarly, Hannah says "no" repeatedly and indignantly when her mother points to a picture of a baby breastfeeding and says "You used to eat like that", and she says "no" again when her mother says "You did, you know".

Jonathan combines "no" with other expressions in a way that implies propositional negation. Thus, he follows his mother's statement that he is growly bear and growly bear is him by several utterances of "no bear". He points to a doll with a hat on and says "hat off no". In a discussion of swimming he produces one of his longest strings, "No John-John clothes on no". These utterances reinforce the belief that when he uses "no" by itself, he is genuinely denying the truth of statements made by others.

Ambiguities

There was some scope for ambiguity in this classification scheme. In particular, some utterances of "no" might be interpreted either as refusals or as protests, some might

be interpreted as refusals or conversational devices, and some might be interpreted as denials of propositions or as conversational devices.

When Harriet says "no" as she struggles with her sister for the toy bear, the context might be interpreted in one of two ways. She may be refusing to comply with her sister's proposal that she relinquish the bear, or she may be protesting at her sister's action in taking the bear. Because of the element of conflict in most protest contexts almost all of them may be interpreted as refusals, although this interpretation seems more natural in some contexts than in others.

In fact, a little logical juggling can transform any protest into a refusal or any refusal into a protest. "I want to keep you from doing that" can always be interpreted as "I refuse to comply with your proposal that I don't keep you from doing that". Similarly, "I will not do what you propose" can be interpreted as "I want to keep you from making me do what you propose".

There is no simple empirical way to decide which interpretation of the context the child is using. Nevertheless, it seems intuitively more plausible to opt for a refusal interpretation when the child's Mother says "Put on your shoes" and the child runs away, and a protest interpretation, when the child says "no" as her brother pours juice into her doll's pan. We might put it this way. In both refusal and protest contexts there is a conflict between the child's plans and someone else's plans. In refusal, the child's plans seem to be more central. In protest, the other person's

plans seem more central.

These admittedly vague and intuitive principles were used to distinguish refusal and protest contexts. Alternatively we might classify these contexts together, and admit that they all might be interpreted either as protests or as refusals.

Another difficulty arises when "no" is used as a conversational device, a stock way of responding to utterances. If a child says "no" in response to an utterance that expresses a proposal, and still complies with the proposal, and says "no" in response to utterances that don't express proposals, we may conclude that he is using "no" as a conversational device. At least he isn't using "no" to mark refusals. If he says "no" resisting a proposal that is not expressed in an utterance we may conclude that he is using "no" to mark refusals. But when a child says "no" in response to an utterance which expresses some proposal, and he also refuses to comply with that proposal, how do we know that "no" marks that refusal, and is not just a stock response to the utterance?

This difficulty only arises if the child uses "no" both to refuse proposals and as a conversational device. If "no" is never used inappropriately, if it is never obviously just a stock response, we can give the child the benefit of the doubt, and assume that when he does reply to an utterance his reply is meaningful. In fact, only three of the eight children who use "no" use it in both these ways in the same session.

In all but one of these sessions, the children used

"no" more frequently when they refused to comply with a proposal, than they did when they complied with a proposal or responded to other utterances (see Table 6). If "no" was simply a conversational device, it seems odd that more than half of the utterances that elicited this device just happened to express proposals that were actively resisted. Even on the most pessimistic view of the relationships between children and their families, it seems unlikely that more than half of the utterances directed to the child express proposals which he resists. Yet we would have to make some such assumption if we claimed that the children simply used "no" as a conversational device in these sessions.

In addition, the affective accompaniments to "no" in conversational contexts and in refusal contexts were very different. When "no" was used as a conversational device, it was unlikely to be repeated, and there was no indignation, anger, or any other affect in the child's voice. "No" seemed to be casually tossed off, as similar stock responses are casually tossed off by adults. When "no" was used in refusal contexts it was usually repeated persistently, and was accompanied by anger if the child was serious, or malicious giggles if the child was teasing.

For these reasons, "no" was always classified as a refusal if it occurred in a refusal context. It was only classified as a conversational device, if a refusal interpretation could not be made.

A similar problem arises when we consider contexts in which a child purportedly denies a proposition. If he only uses "no" appropriately in response to information seeking

questions or false statements, we may again give him the benefit of the doubt, and conclude that he is genuinely using "no" to deny propositions. But if he uses "no" in this way, and also uses "no" as a conversational device, how do we know that it isn't just a coincidence that some of his stock responses are also appropriate replies? How do we know that he is responding to the proposition implied by the utterance, and not just to the fact that an utterance was produced?

There are some reasons why this problem is more difficult to solve than the similar problem concerning refusal contexts. First, except for Jonathan's multi-word strings, propositional contexts, unlike refusal contexts, always involved an utterance by someone else. There were no cases where a conversational interpretation couldn't be made. Second, the evidence of affect was less strong. While there were some cases where contextual or affective clues strengthened a propositional interpretation, this was not always true.

Fortunately, there were very few sessions in which children apparently used "no" to deny propositions and also used it as a conversational device. Six utterances are ambiguous. They have been classified as "other" utterances.

Developmental Trends

The clearest developmental trend is the late appearance of propositional negation uses of "no". The two children in group II, the youngest group, who use "no" never use it to negate propositions. Neither does Paul, the least developed of the Group III children. The children who did use "no" in this way used it in all the other ways first. In addition,

all but two of the utterances of "no" used to negate propositions occurred in the last half of the period during which "no" was recorded (see Table 6, Table 7, Table 8).

There was also some evidence which suggested that children used "no" in social contexts, that is, in refusal or protest contexts, before they used "no" in non-social contexts, that is in failure or change of mind contexts. However, seven of the eight children used "no" in both these ways before they used "no" to negate propositions, the other child only used "no" to refuse proposals (see Tables 7, 8).

Finally, there was some evidence which suggested that children used "no" in failure contexts before they used "no" in change of mind contexts (see Tables 7 and 8). However, refusal and protest contexts did not appear in any special order.

"No" in Multi-word Strings

"No" was frequently combined with other expressions. It occurs with names and with non-nominals like "there", "off", "on", "more", "mine" and "rub out", and it occurs in a number of three or four word strings. Generally, "no" was the first word in such strings, but there are some exceptions.

There are two kinds of constructions. In the first, "no" is simply conjoined with some other expression. Anna says "no off dress" when her mother tries to put a dress on her doll and Anna wants to take it off. Jonathan says "no there" when I put a puzzle piece in one spot and he moves it to another. Hannah says "no mommy" when I go to help her and she wants her mother's help instead. In these cases the two-word string seems to be equivalent to an utterance of "no"

followed by an utterance of "off dress", "there", or "mommy". In adult English we might gloss these strings as "No, take the dress off", "No, it goes there" and "No, I want mommy".

Sometimes, however, the multi-word string seems to mean more than a sequence of "no" and some other utterance would mean. Anna says "no off" when she doesn't want her mother to take the doll's dress off. Henry says "no stairs" when he refuses to go up a flight of stairs. Anna says "no bed" when she takes the blanket off a doll. In these strings, the other expression refers to the course of action which the child refuses to take, protests against, fails to complete, or decides not to do. In the first kind of construction, it refers to some other aspect of the situation. We might gloss these strings of the second kind as "Don't take the dress off", "I won't go up the stairs", or "I don't want the doll to be put in bed". Constructions of both kinds occur in some of the contexts in which "no" is used by itself, refusal, protest, failure and change of mind contexts.

One child, Jonathan, also uses multi-word strings to negate propositions. He uses both kinds of constructions. Sometimes the other expression refers to some fact which Jonathan asserts in opposition to a proposition put forward by someone else. He says "no bear" pointing to the bear when his mother says that the bear is Jonathan, and "no tennis" when I point to a picture of a tennis court and ask "Are they playing football?" Usually, however, Jonathan combines "no" with an expression that refers to the proposition he denies. He says "And John-John, and Buffer, and Ason no, and Emlyn no"

and then "Ason no roundabout" in a discussion of the roundabout at the fair, which Jonathan and Buffer, but not Alison or Emlyn, had ridden on. Similarly, he says "hat off no" pointing to a doll with it's hat on, and "John-John clothes on no" in a discussion of swimming. It may be significant that Jonathan only uses a post-posed "no" in constructions of the second kind. Although the sample is very small, this might indicate that he is using a syntactic device to mark the difference between these two constructions.

All the children used the second kind of construction either after they used the first kind of construction, or, in one case, at the same time as the first construction.

Other Reports of "No"

A number of writers have noticed the early appearance of "no". Bloom (1973) reports that during the one-word period Allison used "no" to express "rejection" and "protest". Carter (1974) also reports the use of "no" to reject proposals. These uses seem to be similar to the use of "no" in refusal and protest contexts I have described here. Allison also used "no" in contexts involving disappearance. Allison's "no" seems to have been rather like "gone" (see Chap.8 below).

Piaget (1962) describes the early use of "non" in failure contexts. Some of the contexts Carter calls "dislike" contexts also involve failure. For example, David makes a nasal sound when he attempts unsuccessfully to climb into his mother's lap.

Bloom (1970), Schlesinger (1974), Brown (1973) and McNeill (1968), report that at the start of the two-word stage children use "no" to reject proposals and also to deny propo-

sitions. This report is consistent with the developmental pattern reported here.

The Meaning of "No"

We may now consider the problem of the meaning of "no". Can we find a common element in the contexts in which "no" is used? Some such element seems to link refusal, protest, failure and change of mind contexts. However, these contexts are quite different from conversational and propositional negation contexts.

Refusal, protest, failure and change of mind contexts are similar to each other in many ways. Unfortunately, this similarity isn't easily expressed in terms of a single common element. Instead, all these contexts have some elements in common with some of the other contexts, and other elements in common with others. There is more of a Wittgensteinian family resemblance between the contexts than a straightforward shared feature. Nevertheless, these similarities can be spelled out in more detail.

In all these contexts some plan of action is involved, either a plan to be completed by the child, or, in protest contexts, a plan to be completed by someone else. This plan variously will not, can not, or should not be carried out. Refusal and protest contexts are similar in that they both involve a conflict between the child's plans and someone else's plans. Failure and change of mind contexts are similar in that they don't involve anyone but the child, they involve the child's relationship with the world rather than his relationship with other people. Refusal and change of mind contexts are similar in that in both the child decides

not to carry out a plan, though he is capable of doing so. On the other hand, in protest and failure contexts the child cannot carry out a plan, though he would like to do so, because of the interference of other people or the world. Furthermore, in protest contexts, unlike the other three contexts, the child also comments on the fact that he wants to prevent someone else from completing a plan.

There is a common factor in refusal, failure and change of mind contexts. In all these contexts the child does not complete a plan. But in protest contexts the plan involved is not the child's, but someone else's, and the plan may well be completed. There is also a different common factor in refusal, protest, and change of mind contexts. Here the child tries to ensure that some plan is not completed, either his own plan or someone else's. However, in failure cases, the child does try to complete a plan but that plan is thwarted.

We can also find a common factor in all four contexts if we reinterpret protest contexts as refusals. As we have already seen these contexts are ambiguous, and such a reinterpretation is at least logically possible. If we made this reinterpretation, all these contexts would involve the fact that the child did not complete a plan. The benefits of this economical interpretation of the meaning of "no" are offset by the fact that it involves somewhat unnatural interpretations of protest contexts.

There seem to be four alternative hypotheses that characterize the meaning of "no".

1) We can accept the notion of a family resemblance between

these four contexts, and abandon the search for a more specific common factor.

2) We can say that "no" encodes either the fact that the child does not complete a plan, or the fact that he wants to ensure that someone else does not complete a plan.

3) We can say that "no" encodes either the fact that the child does not complete a plan, or the fact that he cannot complete a plan.

4) We can reinterpret protest contexts as refusals, and simply say that "no" encodes the fact that the child does not complete a plan.

There is no empirical way of deciding between these alternative hypotheses. Each of them accounts for the data, each has some benefits and some disadvantages in terms of more abstract theoretical values like rigor, simplicity and naturalness. Fortunately, the concepts involved in all these alternatives are generally similar, and share a number of features with the concepts encoded by "that/there".

Conversational "No"

The use of "no" in conversational contexts is, however, very different from these uses of "no". In conversational contexts, the child is not concerned with plans at all, or with any other feature of the world, or with any relationship between himself and the world. He is only concerned with the fact that someone else has produced an utterance, and expects a response. "No" in these contexts is simply a conversational device.

This use of "no" may illustrate some important points concerning the pragmatic aspect of early language. In

particular, consideration of this use may help to explain why I have resisted pragmatic interpretations of other expressions, and of "no" as used in other contexts.

When we talk about the pragmatic aspect of language we may mean one of two things. We may mean that certain linguistic structures can only be explained in terms of their social or conversational function. Thus, "please" and "thank you" in adult English only seem to occur in order to establish a certain social relationship between speaker and hearer. They don't encode any facts about the world. This is partly indicated by the fact that they have no truth value, and don't affect the truth of strings in which they occur. On the other hand, sometimes when we discuss the pragmatic aspect of a linguistic structure we mean that, in addition to encoding facts about the world, the structure may serve a social function. For instance, "the dinner was delicious" may serve the same social function as "thank you". However, it also encodes certain aspects of the world as indicated by the fact that it has a truth value.

In child language, we might discover expressions like "please" and "thank you" that only occur in order to serve a certain social or conversational function. In that case we might legitimately say that the expressions were purely social devices. On the other hand, we should not confuse these expressions with a second class of expressions, expressions that genuinely encode features of the world. This second type of expression may simultaneously be used to serve social ends. It may occur in a dialogue, it may be used to placate, annoy or generally influence other

people. However, in this case we can separate the semantic content of the expression, the way it encodes concepts relating to the world, and it's social function. This is not possible with expressions of the first sort, which have no meaning apart from their social function.

This distinction between purely social expressions, and expressions which have a semantic content but may be used socially, can be given empirical force using the methodology of this study.

If we examine the contexts in which an expression is used, and discover that the only common factor in these contexts is a certain conversational structure or social relationship, we may conclude that the expression is purely pragmatic. If we discover that the expression occurs in a wide variety of social and conversational contexts, and in contexts in which no social relationships or conversations are involved, but some other common factor is present, we may conclude that the expression "has a meaning", that is, it encodes some concept relating to the world, and also may be used socially.

In the case of "no" the pattern of evidence is somewhat more complex. Some children, in some sessions, seem to use "no" as a conversational device. In other sessions the same children use "no" as if it had a semantic content, and sometimes "no" was used as a conversational device and a meaningful expression in the same session. That is, in some sessions some contexts share a common conversational feature, the production of an utterance by someone else, and other contexts share a feature that relates to the world,

the non-completion of a plan, for instance.

I have previously discussed this pattern of evidence, and I concluded that in this case the expression "had more than one meaning". We have already dealt with a similar problem when we sorted out the different meanings of "that/there". A similar solution may be advanced here, but with the conversational "no" this "meaning" is not really a meaning at all but a pragmatic function. We may say that "no" has at least two meanings, one involving the non-completion of plans and one involving propositional negation, and it is also used as a conversational device.

We might say that "no" is ambiguous in the language of some children in the same way that an expression like "Pleased to meet you" is ambiguous in adult English. This expression might be used purely as a pragmatic device, similar to "hello", or it might be used to express the proposition that the speaker was pleased to meet someone. In the former case we would feel that it was inappropriate to ask whether the sentence was true, in the latter case we would not.

Fewer children used "no" in conversational contexts than used it in any other context, and this was one of the least frequent uses of "no" in the speech of these children. While it is interesting that children of this age are sensitive to conversational demands, and use linguistic devices to deal with them, this use of language, at least this use of "no", seems relatively marginal.

Propositional "No"

The propositional use of "no", while it is related to

other uses, seems very different from them. First, it has a different developmental pattern, it arises much later than other uses. Second, it does not encode concepts concerning plans of action either the child's or other people's, nor is it a purely pragmatic device. Instead, propositional "no" seems to encode rather abstract relationships between objects in the world, or even relationships between linguistic expressions and the world.

There are several interesting features of propositional "no" which may be mentioned briefly. There seems to be a connection between this use of "no" and the emergence of two-word strings. Children seemed to use "no" in this way at the same time that they started to use two-word strings. Also, children use these expressions early on to comment on the truth of statements other people make, or to answer information-seeking questions. There seems to be a relationship between propositional negation and dialogue. Finally, the kinds of relationships involved in propositional negation are often quite abstract, as when Jonathan denies that he is Growly Bear. Early negation doesn't just involve relationships of objects and properties.

The propositional use of "no" is certainly interesting and important. However, because of its late appearance there are relatively few instances of it in the data, and these are often very difficult to interpret. For the time being, the main point is that this use of "no" has little in common with the other uses, and "no" in these contexts seems to have a separate meaning.

"No" and "That/There"

The concepts encoded by "no" in refusal, protest, failure and change of mind contexts are similar in many ways to those encoded by "that/there". Like "that/there", "no" in these contexts does not encode particular features of objects, or relationships between objects. On the other hand, it does not encode particular actions or plans, any action may be involved in these contexts, and usually no action is actually completed.

Does "no" encode social relationships? Note that this is a different issue from that of "no"'s pragmatic function. An expression may have a semantic content which involves social relationships. In adult English "husband" and "parliament" are not purely pragmatic expressions like "please" or "thank you", but they refer to social relationships and institutions.

The evidence concerning "no" is rather confused. Clearly, "no" can be used to encode structures that are not social. When "no" is used in failure or change of mind contexts, it is not used to encode relationships that involve other people. Furthermore, these contexts seem analogous to refusal and protest contexts, which do involve other people, in many ways. If these analogies could be expressed in terms of a common feature, the common feature could not be exclusively social. If, for example, we interpret protest contexts as refusals, and say that "no" encodes the fact that the child does not complete a plan, this concept is clearly not particularly social.

Unfortunately, we have seen that no simple common feature can be found. Also, children seemed to encode social

relationships before they encoded non-social relationships. We may simply have to say that "no" is used both to encode social relationships, and to encode non-social ones, and in addition that these social and non-social relationships are similar in many ways.

Like the concepts encoded by "that/there", the concepts encoded by "no" have an egocentric quality. In refusal, failure and change of mind contexts the actions involved are to be performed by the child. Even in protest contexts, where other people's actions are considered, they are considered only in so far as they conflict with the child's desires. The children didn't use "no" when other people failed to complete plans, changed their minds or were in conflict with each other.

The claim that the structures encoded by "no" are egocentric does not imply that the child is unaware of social relationships. Clearly, the child distinguishes people from objects, and is aware that other people may want him to do something and that his desires may conflict with those of others. The claim is simply that the structures encoded by "no" seem to be particularly centered on the child's plans and interests. At least on the basis of this bit of linguistic behavior, the child does not seem to regard himself as entirely analogous to other people, nor as a participant with others in a fully reciprocal set of social relationships.

"No" was also similar to "that/there" in that it tended to be used in contexts that involved actions. Refusal, protest, failure and change of mind contexts all involve action. More specifically, "no", like the success-marking and locative

"there", tended to be used in contexts that involved actions that were performed on objects to achieve a particular goal, contexts that involved plans. It may be helpful to consider the concept of a plan more closely.

In my discussion of the use of "that/there" in success-marking and locative contexts, and the use of "no" in refusal, protest, failure and change of mind contexts, I have used terms like "action", "plan", "intention" and "desire" rather loosely. If we compare these contexts, we may be able to see a closer similarity, and to give a more accurate account of the concepts "no" and "that/there" encode.

In all these contexts two states of affairs are involved. One is the present state, the other is a non-existent, possible, future state. The present state may be transformed into the future state. This transformation involves the intervention of an actor, usually the child. This transformation also involves objects and other people. They must also behave in a certain way if the transformation is to take place. The situation might be represented diagrammatically as:

Present state + child's action + behavior of objects or
people → Future State

The notions of action, intention, and desire don't quite capture this complex structure. The child might act without conceiving of his action in terms of this sort of framework. For example, he might act out of habit, repeat a previous action, imitate an action, or respond to a particular stimulus with a set response. Conversely, the child might perceive a situation in this way and not actually perform an

action. He might decide not to intervene in the appropriate way, either because the future state was undesirable, or because some other plan was more appealing, or because the appropriate intervention was not to act at all. Similarly, this structure can't be characterised in terms of intentions to act. The child might intend to repeat a previous action, or imitate an action, without perceiving his action in these terms, as the means to an end. And he might perceive that the situation could be characterised in means-ends terms without intending to act.

We also can't describe these contexts by saying that the child desires a change in the state of affairs. The child might want to bring about a future state of affairs, but have no idea how to set about it. Conversely, he might perceive the possibility of changing a state of affairs by intervening in some way, and he might even intervene appropriately, without desiring the future state of affairs. He might, for example, experiment to see whether an action produced the expected result.

Perhaps the best term for the complex, means-ends structures I have described is "plan". Plans are possible courses of action, with a calculation of consequences. A plan may be implemented or may not be implemented. That is the actor, in this case the child, may or may not intervene appropriately. A plan may succeed or fail, the objects or other people involved may or may not act in the expected way, and their behavior plus the child's action may or may not yield the appropriate result. This result, that is the future state of affairs, may or may not be desirable.

There are two particularly important features of plans. First, the child sees the action as a means to an end, he sees it as a way of achieving a goal. Second, the child appreciates the relationship between his actions, the behavior of objects and his goal. He recognises that the action will bring about the goal because of its interaction with objects. In order to achieve his goal he has to act, and objects also have to behave appropriately.

A number of writers have suggested that plans, that is, intelligent, goal-directed courses of action, are fundamental cognitive structures. Piaget's stage 5 sensory-motor schemata (Piaget 1953) are similar to plans. Bruner, (1971, 1973), and Miller, Galanter and Pribram (1960) have also described similar structures. Their work will be discussed in Chap. 12 when I will also describe the development of plans.

The concept of a plan helps to explain the early uses of "no" and "there". When children use "there" in success contexts they mark the fact that a plan is successfully implemented. Children say "there" in situations where they act, objects behave appropriately, and they achieve a goal.

When children use "there" in locative action contexts or in destination contexts they pick out plans with a particular type of goal. In these contexts the child tries to change the location of an object. Again, in these contexts an action by itself, or an event by itself does not elicit the expression. "There" was used when the child acted, and his action led to a particular type of event.

When children use "no" in refusal, protest, failure,

and change of mind contexts they mark the fact that a plan is not successfully implemented. The future state that is the goal of the plan does not come about. This may be because the child simply doesn't act, in refusal and change of mind contexts, because objects don't behave appropriately, in failure contexts, or because plans conflict with the plans of others, in protest contexts. The fact that the child uses "no" in all these contexts suggests that he recognises that actions and objects are both necessary components of plans. We will see that the concept of a plan also helps to explain children's use of "more", "oh dear", "gone" and direction expressions.

Like "that/there", "no" encoded an abstract concept. The concepts encoded by "no" couldn't be defined in specific perceptual or behavioral terms. More specifically, "no" was like "there" in success contexts. It encoded an important abstract aspect of plans.

"No" does not pick out a particular type of plan. The child may refuse to complete any plan, any plan may conflict with the plans of others, any plan may fail, the child may decide not to complete any plan. Just as any plan may succeed so any plan may be formulated without being successfully implemented. Moreover, the distinction between formulation and implementation, like the distinction between success and failure, plays an important part in the concept of a plan.

"No" encodes the fact that a plan is formulated but is not successfully implemented. We may envision a possible future state of affairs, and calculate a course of action that would transform the present state of affairs into that

future state of affairs without actually acting. Even if we do act, our action may not be successful. Plans are useful largely because we can formulate them without actually carrying them out. We can run through possible plans in our heads without actually implementing them. This allows us to choose the most effective plan, and to reject courses of action that lead to undesirable consequences. Children say "no" in contexts that accentuate this general, fundamental aspect of plans, that is, in contexts where a plan is formulated but, for some reason or another, does not come to fruition. I will discuss the conceptual basis of "no" more fully in Chap. 12.

Changes in the Meaning of "No"

Children only used "no" in propositional negation contexts after they used "no" in refusal, protest, failure and change of mind contexts. In propositional negation contexts children are not concerned with plans or with their relationship to plans. Instead, they are concerned with relationships between objects, or with relationships between linguistic expressions and objects. Also, the propositional negation meaning of "no" is not egocentric. Children used "no" to comment on propositions that were advanced by others, as well as propositions they advanced themselves.

Thus, the children moved from early egocentric action-oriented uses of "no" to a later more objective use of "no". We saw a similar trend in the development of the locative "that/there". Children initially used "there" to encode the goal of their actions, and later used "there" to encode spatial

relationships between objects.

TABLE 6

Uses of "No" in Different Contexts

GROUP I

Rachel

Sess.No.	Refusal	Protest	Failure	Change of mind	Conversational Device	Propositional Negation	Other
4		2					
5	1	2					
6	1	1					
7	1	7					
8	2	2					
9		3					
10		3	2				1
12			5				
13	5	20	7			7	

Jonathan

Sess.No.	Refusal	Protest	Failure	Change of mind	Conversational Device	Propositional Negation	Other
18	1		1				
19	1						
21		3	2				
22	1	2	16	1			
23	7	2	1	3		2	
24	4	13	2	1			
25	5		1				
26		2	1			11	
27	10	1	2	2		7	
28						12	
29	3	1	6	3		10	

TABLE 6 (continued)

Sess.No.	Refusal	Protest	Failure	Henry Change of mind	Conversational Device	Propositional Negation	Other
4	6				1		
13	4						
14	2	2					
15		2			1		
17	7	1					
18	3	17	8				
19	2	8	4				
20	1	2					
21	4	1					2
22			2				
23	9				2	1	
24	14				1	4	1

GROUP II

Sess.No.	Refusal	Protest	Failure	Harriet Change of mind	Conversational Device	Propositional Negation	Other
2		3	2				
3	2	2					
5				3	1		
6	6	2	1	1			
Sess.No.	Refusal	Protest	Failure	John Change of mind	Conversational Device	Propositional Negation	Other
4	2						

TABLE 6 (continued)

GROUP III

Sess.No.	Refusal	Protest	Failure	Paul			
				Change of Mind	Conversational Device	Propositional Negation	Other
1	1	1					
2	7	1	3				
3	6	3		1			
5	1		4				1

Anna

Sess.No.	Refusal	Protest	Failure	Change of Mind	Conversational Device	Propositional Negation	Other
1	5	3	1	1	2		2
2	2	2	5	1	2		1
3	2	7	8	1			2
4	1	3	2	4		4	
5	6	1		2		1	
6	5	4	5	6	1	1	1

Hannah

Sess.No.	Refusal	Protest	Failure	Change of Mind	Conversational Device	Propositional Negation	Other
1		2			2		1
2		8			2		1
3	1	4	5				
4	3	2		2		10	
5	2	1		1		5	
6	1	3	1				

TABLE 7
Order of Appearance of "No" in Different Contexts

GROUP I

Jonathan
Refusal/Failure
Protest
Change of Mind
Propositional
Negation

Rachel
Protest
Refusal
Failure
Propositional
Negation

Henry
Refusal/Conversational
Protest
Failure
Propositional Negation

GROUP II

John
Refusal

Harriet
Protest/Failure
Refusal
Conversational

GROUP III

Paul
Refusal/Protest
Failure
Change of Mind

Hannah
Protest
Conversational
Refusal/Failure
Change of Mind
Propositional
Negation

Anna
Refusal/Protest/Failure/
Change of Mind/
Conversational
Propositional Negation

TABLE 8

Numbers of Children with each order of use of "No"

Social Plans (e.g. Refusal, Protext) < Propositional

8

Propositional < Social Plans

0

 $\chi^2 = 8$ sig at .05 level

Non-Social Plans (e.g. Failure, Change of Mind) < Propositional Propositional < Non Social Plans

7

0

 $\chi^2 = 7$ sig at .05 level

Non-Social Plans < Social Plans

0

Social Plans < Non Social Plans

5

 $\chi^2 = 5$ sig at .05 level

Failure < Change of Mind

6

Change of Mind < Failure

0

 $\chi^2 = 6$ sig at .02 level

Refusal < Protest

3

Protest < Refusal

3

 $\chi^2 = 0$ not sig

CHAPTER 6

THE DEVELOPMENT OF "MORE"

194 utterances of "more" were recorded. Seven of the nine children in this study used "more" in contexts involving repetition or recurrence. Four children also used "again". "More" was not used by the two least linguistically developed children (see Chap.3), John and Christian.

More than 98% of the utterances of "more" occurred in one of four sorts of contexts. Children used "more" when they performed an action on an object and then repeated, or wanted to repeat, that action on a similar object. It was used when the children performed an action on an object, and then repeated or wanted to repeat the action on the same object. It was used when the children wanted someone else to repeat an action. Finally, children used "more" when they noticed that two objects were similar, or noticed an increase in the quantity of an object.

Context 1 : Repeated Actions on Similar Objects

7 children used "more" 124 times when they had performed an action on an object, and they announced their intention to perform a similar action on a similar object. Anna puts a piece in a jigsaw puzzle, and then says "more" as she goes to put another piece in the puzzle. She pours water into a beaker, and then says "more" as she goes to pour more water into it, and she pushes a block into the puzzle mailbox, and then says "more" as she picks up another block, which she pushes in. Similarly, Hannah finishes "reading" a picture book, and then says "more" as she gets another book to read. Paul puts a block

in a straight line of blocks, and then says "more" as he goes to get another block, which he puts in the line.

Sometimes children said "more" when they wanted to repeat an action on a similar object, but no object was available. Henry says "more" after he has finished eating a piece of candy and he wants to eat another piece, but there is no candy left. However, "more" was used to express thwarted demands much less frequently than it was used to announce intentions which were successfully fulfilled.

Contexts 2 : Repeated Actions on the Same Object

Six children used "more" 40 times when they acted on an object, and then repeated the action on the object. Henry opens the flap of the tape recorder, and then says "more" as he opens it again. Hannah says "more" as she goes to shake a box she has shaken once already. Anna builds a tower of dominoes, it falls, and she says "more" and builds it again.

The children occasionally used "more" when they wanted to repeat an action on an object but were unable to do so because the object was unavailable. Rachel says "more" when her mother takes the broom away from her and she wants to continue sweeping. "More" was used less frequently in these contexts than in contexts in which the actions were actually repeated.

Contexts 3 : Repetition of Actions by Others

Three children used "more" 7 times when they wanted someone else to repeat an action. Henry says "more" asking his mother to mark his face with a make-up pencil, as she has done once before. Anna says "more" asking her mother to empty and fill a bottle of water again. Hannah says "more" when she wants her mother to sing with her again.

Contexts 4 : Object Similarity

Five children used "more" 22 times to comment on the similarity of two objects or on the increase in quantity of an object. Harriet says "more" as she takes a block out of a box which is similar to those she has been playing with, and shows it to her mother. Anna says "more" pointing to her mother who enters the room carrying a pile of newspapers, there is already a pile of newspapers next to Anna. Hannah looks at a picture of an embryo in the womb, looks at the next picture in which the embryo has grown, and says "more". Rachel takes a green pencil out of a box, puts it beside another green pencil already on the table, and says "more".

"More" is occasionally used in this way when children want an object similar to another one, or want an increase in the quantity of an object, without wanting to repeat an action. Anna says "more" when she wants to immerse her doll in a bucket of water, but there is not enough water to cover it. After she says "more" Anna gets more water and pours it in. In this context, Anna did not seem to want to re-immers her doll, or repeat the action of pouring in water, she simply wanted more water.

Uses of "Again"

While "more" was used in all these contexts, "again" was only used by four children nine times in contexts of the second kind, where the child acted on an object and then repeated the action on the object.

Developmental Trends

By far the clearest developmental trend was the late appearance of "more" in contexts involving object similarity.

Two children used "more" to mark repetition but did not use it to mark similarity. Four children used "more" to mark object similarity after they used it to announce the repetition of an action on an object, or a similar object. One child used "more" in both ways for the first time in the same session. Furthermore, all the utterances of "more" used to mark object similarity occurred in the last or next to last session in which "more" was used (see Tables 9, 10 and 11).

There was some less convincing evidence that "more" was used to refer to the repetition of actions by others after it was used to refer to the child's own repetitions of actions. The two least linguistically developed of the children who used "more" did not use it to demand that other people repeat an action. Two of the three children who did use "more" in this way did so only after they used it to refer to their own actions. One child first used "more" in both ways in the same session. None of the children used "more" to refer to the actions of others before they used it to refer to their own actions (see Tables 9, 10 and 11).

Finally, the development of "again" was rather odd. Anna and Henry both used "again" for the first time in their last session. Jonathan used "again" once in the 27th of 29 sessions. Hannah, however, used "again" but not "more" in the first two sessions, "again" then disappeared and was replaced by "more" until the last session, when it reappeared with "more".

"More" and "Again" in Multi-word Strings

"More" occurred in 40 multi-word strings. It was combined with nominals, and with "want", "up" and "do it". "No more" occurred three times, but it seemed to be a separate expression rather

than a combination of "no" and "more". "Again" was combined once with "water" and once with "read story". "More" always occurred before nominals and always occurred after non-nominals.

"More+Nominal" strings occurred when an action was repeated on a similar object, or when object similarity was marked, but not in the second context, where there was no recurrence of an object. The nominal generally referred to the similar objects that were acted on in similar ways, or to the objects whose similarity was noted. In a few cases the nominal referred to the person who was addressed. "Non-nominal+More" strings occurred in the first and second contexts, but were not used to mark object similarity. Anna said "again water" when she wanted to play with a basin of water again, Jonathan said "read story again" when he started to read a book, after he had finished a previous book.

Other Reports of "More"

A number of writers have noted the early occurrence of "more". Bloom (1973) reports that Allison used "more" to "request the recurrence of events". The contexts Bloom describes appear to be similar to the contexts described here. The child performs an action on an object and then repeats or tries to repeat the action on the same object or on a similar object. Allison says "more" when she wants to read another book, she plays ring-a-rosy again, and she slides down her slide again. Bloom notes that Allison also used "more" to note object similarity, but only did so after she used "more" to request the recurrence of events. This is consistent with the trends reported here.

Carter (1974, 1975) reports that David used "more"

to request the recurrence of an object. However, all the examples she describes are requests for additional food or drink. These contexts involve the repetition of an action, eating or drinking, as well as the recurrence of an object. Halliday (1975) reports that Nigel also used "more" to request additional food or drink. It is not clear whether David and Nigel also used "more" in other contexts. It is worth noting that while several of the children in this study used "more" when they wanted more food and drink, none of them used "more" exclusively in these contexts.

The Meaning of "More"

Clearly, the common factor in all the contexts in which "more" occurs is similarity. However, two very different kinds of similarity are involved. One is the similarity between an action and a repetition of that action, the other is the similarity between two objects. When the child repeats an action on a similar object both these factors are present, the child repeats an action and two similar objects are present. When the child repeats an action on the same object, or asks someone else to do so the common factor is simply the repetition of an action, there are no similar objects involved. When the child notes object similarity, similar objects are present, but no action is repeated.

There are several hypotheses that might explain this general pattern of evidence. We might argue that the general abstract concept of similarity is encoded by "more", regardless of whether actions or objects are similar.

There are two objections to this hypothesis. First, two of the seven children never use "more" in the last context,

and therefore we have no evidence that object similarity, tout court, is marked by these children. Second, the children who do use "more" in this context do so only in their last or next to last session. We have no evidence that these children use "more" to mark simple object similarity before that.

While this general hypothesis may explain the use of "more" at the very end of the one-word period, it cannot explain the use of "more" in the earlier speech of the child. There seems to be a shift in the meaning of "more" for these children. In their later speech "more" may encode a general concept of similarity, but for most of the period studied here "more" seems to encode something else.

We might hypothesise that in the early period "more" simply encodes the concept of the repetition of an action, and is later expanded to encode the concept of object similarity. After all, repeated actions are involved in all of the first three contexts, while similar objects are only involved in the first context.

However, there are also objections to this hypothesis. First, why is it that in the vast majority of cases when an action is repeated the action is performed on an object similar to one that had previously been acted upon? Is it simply a coincidence that so many situations which involve repeated actions also involve similar objects? Second, if "more" simply encodes the repetition of an action, why isn't it used when an action is repeated on a different object? Why doesn't it occur, for example, when the child successively bangs a table top, a chair and the floor with a spoon, or puts

a doll in a box after he has put a block in the box?

Finally, from a developmental point of view, the fact that so many of the early contexts in which "more" occurs involve similar actions and similar objects, seems relevant to the eventual use of "more" to comment on object similarity regardless of actions. This fact would not be captured by the hypothesis that in the early period "more" simply encodes the repetition of actions.

We might abandon the simple notion that "more" encodes the repetition of an action, and claim instead, that in the early period, "more" encodes the repetition of a plan, as we have defined the term in the previous chapter. Plans involve relationships between actions and objects. An action is performed, and this action plus the behavior of objects leads to predictable consequences.

There are two ways in which plans could be similar. Either two similar actions could be performed on the same object, or two similar actions could be performed on two similar objects. In both these cases we would expect the objects to behave in similar ways, both times that the actions were performed, and we would expect similar consequences to result. Two plans would not be similar if similar actions were performed on dissimilar objects, or if two similar objects were acted on in different ways, or were not acted on at all. In both these cases we would not expect the objects to behave in similar ways both times the actions were performed, and we would not expect similar consequences to result.

This hypothesis has several advantages. It allows us to explain the fact that so many of the contexts in which "more"

occurs involve similar objects as well as similar actions. Both kinds of similarity contribute to the similarity of plans. Furthermore, this hypothesis explains the fact that "more" is not used when similar actions are performed on different objects. In these contexts, the actions may be similar but the plans are not. Finally, this hypothesis provides a bridge between the early and later uses of "more". The transition from the concept of similar plans, which involves the concept of similar objects, to that of similar objects per se, seems less problematic than the transition from the concept of the repetition of actions to that of similar objects.

So we see that the hypothesis that "more" encodes the repetition of plans can deal with the objections to the simpler hypothesis that "more" encodes the repetition of actions. There are other advantages to this hypothesis. It provides a more perspicuous view of many of the contexts in which "more" is used. The actions involved in these contexts are typically purposeful, they are the kinds of actions involved in plans. For example, "more" was frequently used when the child set himself a task, successfully completed it, and went to repeat the operation on a new object. Harriet says "more" after she has gotten one block through the hole in the puzzle mailbox, as she goes to push a similar block through the hole. Anna fills one beaker with water, says "more" and then fills a similar beaker with water, and repeats this operation with several more beakers.

The hypothesis seems particularly insightful when contexts involve the repetition of a complex series of actions,

rather than a single action. For example, Anna says "more" after she has finished stacking a pile of dominoes , and the pile has fallen down, as she again stacks all the dominoes into a pile. Hannah says "more" after she has finished the complex process of "reading" a picture book, as she picks up another book which she will also read through. In these contexts the children seem to repeat a set of actions which have a particular consequence, instead of simply repeating a particular action. The concept of a plan, rather than an action, seems particularly applicable here.

The "plan" hypothesis also helps to deal with the contexts in which the child wants to repeat an action on an object, but he is thwarted by the absence of an appropriate object. Plans can fail or be frustrated in a way that actions cannot. In these contexts the child is perfectly free to repeat his previous action, but this action will not lead to the desired consequence, since the appropriate object behavior is not forthcoming. What the child seems to want is not just a repetition of his previous action, but a repetition of the whole action-object behavior-consequence sequence that constitutes a successfully completed plan.

We may say, then, that "more" encodes two kinds of concepts. In the early stage it encodes the similarity between a past and a future plan. This similarity is present in two kinds of contexts. Similar plans are involved when an action is performed on an object, and is performed again on that object, and when an action is performed on an object, and is performed again on a similar object. In the later stage, this meaning is extended

so that "more" also encodes the similarity of objects that are not involved in plans.

"More" and other Non-Nominals

If this hypothesis about the meaning of "more" is correct, the concepts encoded by "more" are similar in many ways to the concepts encoded by other non-nominal expressions.

"More" does not encode particular features of objects, or particular relationships between objects. In the early stage, "more" does not refer to objects at all, but to plans, that is, to complex relationships between actions and objects. Even when "more" is used to comment on the similarity of two objects in the later stage, no particular common feature of the objects is marked. Instead, "more" marks the fact that the objects share some feature, and that, in this respect, they are similar to other objects that share some other feature. We might say that "more" marks the relationship of similarity, but if so, this relationship is an extremely abstract one.

On the other hand, "more" does not encode particular actions or plans, or particular features of actions or plans. The plans involved in the contexts marked by "more" range from beaker-filling to domino-stacking to book-reading to puzzle-solving.

Finally, "more" does not seem to serve a particular social, conversational or expressive function. While "more" may be used to demand that the child be allowed to repeat an action, or to demand that someone else repeat an action, it may also be used to state the child's intention to repeat a plan. In this case, the utterance has no apparent social or conversational function, nor does it express a particular emotional state.

"More" is also similar to other non-nominal expressions in more positive ways. The concepts encoded by "more" in the early stage are typically egocentric. The child almost always comments on the repetition of his own plans. Even in the seven cases there the child uses "more" to demand that someone else repeat an action, that action is related to the child's intentions and desires. Children don't use "more" to comment on the fact that someone else repeated an action, or to comment on the similarity of someone else's action and their own. Instead, they used "more" when they wanted someone else to act in a way that would bring about a particular desirable result.

We might even argue that the actions of others were seen as components of that plan. Just as the child manipulates objects in order to achieve certain results, so he tries to manipulate other people to get certain results. The child might recognise that people and objects behave in different ways, and that you use different techniques if you want objects to do things, and you want people to do things, but he still might not see other people as creatures with plans that are analogous to his own plans. Instead, he might see them as creatures that could be gotten to do certain things, and consequently could feature in plans.

In this case, "more" in these contexts would not refer to the fact that someone else repeated a plan, but to the fact that the child wanted to repeat a plan that involved someone else's actions.

Whether or not we accept this interpretation of these contexts, the fact remains that 168 of 175 occurrences of "more"

comment on the repetition of the child's plans, and that the actions of others are only marked if they are related to the child's interests.

"More" and "No" and "There"

The concepts encoded by "more" in the early stage involve relationships between the child, his actions and objects. These relationships are similar to those encoded by "no" and "there" in success contexts. In particular, they involve the interaction of an action on an object and the behavior of that object, which brings about a certain consequence. I have called these relationships "plans". "There" and "no" mark the success or the non-implementation of plans. "More" marks the fact that two plans are similar.

In addition, "more" like "no" and "there" encodes a kind of meta-feature of plans. It encodes the fact that two plans, any two plans, are similar. In order to use "more" as he does, the child must recognise two levels of similarity. He must first recognise that two plans have some particular feature in common, say, they both are instances of book-reading. He must then recognise that because of this these plans are similar to two other plans that have a different common feature, say, they both are instances of beaker-filling. This second recognition, the recognition that two instances of book-reading are similar to two instances of beaker-filling, seems to require a higher conceptual level than the recognition that one instance of beaker-filling is like another instance of beaker-filling. The concept of similarity encoded by "more" is highly abstract. We have previously noted the similar abstractness of the concepts encoded by other non-nominals.

Changes in the Meaning of "More"

The development of "more" is also similar to the development of other non-nominal expressions. The concepts encoded by "more", like those encoded by "no" and "there", become less egocentric and action-oriented and more objective as the child develops. "More" initially comments on the repetition of the child's plans. Later, almost at the end of the one-word period, the child extends his use of "more" to mark the similarity of objects regardless of the role those objects play in his own plans.

We saw similar trends in the development of the locative "there" and especially in the development of "no". "No" initially marks the fact that the child's plans are not implemented. Later, the child also uses "no" to mark the fact that objects are not related in a particular way, regardless of the role these objects play in the child's plans. In both these cases, there is some continuity between the concepts encoded in the early and later periods. Both early and late concepts involve similarity or negation. However, these concepts are initially applied to the child's actions and plans, and are only applied to objects which are unrelated to those actions and plans at a later stage.

The development of "more" and "again" is similar, in a different way, to the development of "that" and "there". It is interesting to note that "again", which is always used to mark the repetition of an action on an object, that is, is always used in contexts that don't involve two similar objects, appears as an alternative to "more" just after "more" is first used to mark the similarity of objects. This suggests that

the child is beginning to mark linguistically the distinction between object similarity and the repetition of actions. Of course, in the adult language, "more" will be applied to objects and "again" will be applied to actions.

In a similar way, "that" and "there" seemed to mark linguistically the distinction between indication, and location and success towards the end of the recorded period. However, in the case of "more" and "again", as in that of "that" and "there", the mapping of linguistic and conceptual distinctions seems to be a long, drawn-out and messy business. Even in the last sessions, "more" continues to be used to mark both the similarity of objects, and the repetition of actions on objects.

TABLE 9

Uses of More in Different Contexts

Contexts

- 1 = Repeated actions on similar objects
- 2 = Repeated actions on the same object
- 3 = Requests for repeated actions by others
- 4 = Object Similarity
- 5 = Other

GROUP I

Jonathan

Sess. No.	1	2	3	4	5
22		2			
23	4	2			
25	10				1
27	7				1
28	2				
29	3				

Rachel

Sess. No.	1	2	3	4	5
5	1	1			
6	1				
8	7				
10	1			1	
13					

Henry

Sess. No.	1	2	3	4	5
13	5	1			
15	5				
17	1				
18	1				
19	7	3	2		
20	16				
21	2				
22	4	8			1
24	12	4	1	6	

GROUP II

Harriet

Sess. No.	1	2	3	4	5
3	2				
4	2				
6	2			1	1

GROUP III

Sess. No.

5
6

1
2
1

2
1

Paul

3

4

5

Sess. No.

5
6

1
3

2
1
2

Hannah

3
1

4
1
4

5

Sess. No.

1
2
3
4
5
6

1
1
4
16
1

2
4
1
8
2

Anna

3
3

4
2
7

5

1

2

TABLE 10

Order of Appearance of More in Different Contexts

GROUP I

Jonathan

Repetitions on Same Object
Repetition on Similar Object

Rachel

Repetition on Same/Repetition on Similar
Object Similarity

Henry

Repetition on Same/Repetition on Similar
Request for Action
Object Similarity

GROUP II

John

Harriet

Repetition on Similar
Object Similarity

GROUP III

Paul

Repetition on Same/Repetition on Similar

Hannah

Repetition on Similar/Request/Object
Similarity
Repetition on Same

Anna

Repetition on Same/Repetition on Similar/Request
Object Similarity

TABLE 11

Numbers of Children Using Different Orders of Uses of "More"

Repetition < Similarity

6

Similarity < Repetition

0

$\chi^2 = 6$ sig at .02 level

Self Actions < Other Actions

5

Other Actions < Self Actions

0

$\chi^2 = 5$ sig at .05 level

CHAPTER 7

THE DEVELOPMENT OF FAILURE AND SUCCESS EXPRESSIONS

We have already seen that "no" and "there" are sometimes used when the child's plans fail or succeed. In addition, eight children used other expressions 335 times when their plans failed and four children used other expressions 37 times when they succeeded. The form of these expressions varied considerably from child to child and sometimes one child used several different, though usually related, forms. These forms included "Oh", "oh dear", "oh dash", "come off", "can't", "woops", "wrong" and "ow" for failure and "good", "right", "done it" and "hooray" for success. Five children only used failure expressions when their plans failed. Three children, who primarily used the expression "oh", did so when plans failed and in other contexts, particularly when they noticed objects. The children who used success expressions only did so when plans succeeded. I will now describe the contexts in which these expressions occurred in more detail.

Failure Contexts : 1 Interrupted Tasks

Failure expressions were used by all eight children 246 times when they were in the course of completing a task and something went wrong. In one session, Harriet says "Oh" and "Oh Dear" when she is unable to fit a large top on a small box, when she tries to put a block on a slab that is already full of blocks, when she starts to nest a set of beakers and can't find a beaker small enough to fit into another beaker

and when she goes to place a doll on the canopy of a toy bed and the canopy falls down. Similarly, in one session Jonathan says "oh Dear" when a nut he is trying to take off his workbench sticks, when a pair of dice fall out of the box he is shaking them in and when he tries unsuccessfully to fit a toy boat on top of a toy camper. Children often used failure expressions when they were unable to fit a block in a hole in the puzzle mailbox, or when they placed a beaker on a tower of beakers and the tower fell down.

Failure Contexts 2 : Completed Tasks that Go Wrong

Three children used these expressions 35 times when they actually completed a task but something went wrong immediately afterwards. Jonathan says "oh Dear" when he pushes a flap in the tape recorder down and it then pops up again. Rachel says "come off" when a piece she has placed in a jigsaw puzzle pops out again, and when she raises the hood of a pram and it then falls back down.

Failure Contexts 3 : Violations of Standing Orders

Finally, seven children used the expressions 54 times when something simply went wrong. These children seemed to have certain standing orders, general notions of the fitness of things, and they used failure expressions when these orders were violated. Harriet and Henry say "Oh Dear" when they drop objects that they are holding. Henry says "Oh Dear" when a toy falls off a shelf. Harriet says "Oh Dear" when a mailbox falls on its side. Jonathan says "Oh Dear" holding up a broken toy, and in one interesting case says "Oh Dear" and then "fall down" pointing to a picture of a waterfall. Generally the children tried to correct the situation if there was any

way of doing so.

These contexts did not just involve unexpected or startling events. The mailbox Harriet played with was rather unsteady and fell frequently. It was on its side as often as it was upright. Similarly, Jonathan was well aware that the toy was broken. It had been broken for some time. He was also very familiar with the picture of the waterfall. These contexts had a certain normative feel. Failure expressions marked events that were wrong and not just unexpected.

There were several interesting characteristics of all these contexts. The expressions were often repeated as the child continued, unsuccessfully, to attempt to complete a task or to correct the undesirable situation. They were often followed by success expressions when success was finally achieved. The tasks were frequently quite complex and required a whole sequence of actions for their completion. The tasks were almost invariably set up by the children themselves, often in opposition to adults. Finally, failure seemed to be marked in playful contexts. Children didn't use these expressions, for example, when they failed to obtain something they wanted. In those contexts they used more effective devices like yelling. Utterances of "oh dear" were often accompanied by smiles and laughter.

Other Contexts

The three children who primarily used "oh" as their failure expression also used failure expressions in contexts that did not involve failure. In particular, they said "oh" and in one case "oh dear" 35 times when they noticed or attended to objects. Harriet says "oh" when she looks at pictures in a

book and when she hears a noise at the door. Anna says "oh" when the cat enters the room and when a puppet pops out of a cone. In addition, these children used "oh" 22 times in a number of contexts that seemed to have no common features. For example, Anna says "Oh" when she brings a mailbox from the side of the room, when she takes an animal out of her pocket and when she picks up a beaker of water. These may be cases of notice (see Chapter 4), it may be that the observer simply didn't note the relevant contexts or "oh" may be used randomly. One child, Hannah, only used "oh" when she noticed objects and in other contexts. She used "can't" to indicate failure.

Success Contexts

Four children used expressions 37 times to indicate the success of a plan. Rachel says "done it" when she gets a difficult piece into a jigsaw puzzle and when she retrieves a picture which has fallen under her chair. Paul says "good" and "right" after he gets a block into the puzzle mailbox and after he places one beaker over another.

These contexts were indistinguishable from the contexts in which children used "there" to mark success. Two children, Anna and John, used "did it" to mark success but did not use "there" to mark success. Six children used "there" to mark success. Thus, eight of the nine children in this study used some linguistic form to mark the successful completion of a plan.

Developmental Trends

Failure expressions did not seem to occur in the various contexts in any special order. However, some contexts of the third kind, where the child's standing orders were violated,

seemed less child-centered than others. For example, when Jonathan said "oh dear" pointing to the waterfall or when his sister threw a bear on the floor, he seemed less concerned with himself than he did when he commented on his broken toy or when he said "oh dear" when he dropped an object, though in both cases the important factor is that his ideas of the fitness of things are violated. The expressions seemed to be used in these less self-centered ways at a rather late stage. These two examples from Jonathan's corpus occur in the 27th of 29 sessions. However, there was no simple way of deciding how self-centred a particular context was, and thus there was no way of proving that this developmental trend existed.

Uses of "oh" in contexts that didn't involve failure seemed to become less frequent in the later sessions, particularly in proportion to the number of utterances produced in failure contexts (see Table 12).

Success and Failure Expressions in Multi-Word Strings

There were relatively few combinations of failure and success expressions with other expressions. Failure expressions were combined with "down" and "fall down" when a plan failed because objects moved downwards and with "stop" when it failed because objects stopped. Rachel specified the recalcitrant object in the strings "Lucy's come off" and "Piece come off". Anna says "Oh dirty" when she picks up a dirty cup. The other expression sometimes duplicated the meaning of failure or success expressions in strings like "Dere done it" or "Oh wasat". Nominals generally preceded the expressions and non-nominals generally followed them.

Other Reports of Failure Expressions

Failure expressions have not been widely reported in the literature, perhaps because their forms are so variable. However, Bloom (1973) reports that Allison used "uh-oh" as a notice expression "particularly for unexpected or startling events". The examples in the corpus suggest that "uh-oh" also marks failure. Allison says "uh-oh" when she is looking at a picture and it falls, when she is trying to set a toy animal upright and it repeatedly falls over, when she tries to lie a doll down in a truck but the doll falls off, when she spills juice out of her cup as she tries to drink and when she tries unsuccessfully to get a stick out of a jar. Bowerman (1978) notes that her daughter, Eva, used "heavy" in contexts involving failure. Eva says "heavy", for example, when she tries unsuccessfully to unhook the gas pump line from a toy petrol station. Halliday (1975) briefly notes a form like "uh-oh", "a slow high rise followed by a glottalised fall" which he glosses as "let's be sad, it's broken, come off".

The Meaning of Failure and Success Expressions

When we come to consider the meaning of failure expressions it seems reasonable to separate the contexts that involve failure and other contexts. First, four children only used the expressions to mark failure so we can't propose that the expressions had a wider meaning for them. Second, the failure contexts don't seem to have any features in common with other contexts. Also, the other contexts did not share a common feature. Although there does seem to be a tendency to use "oh" to indicate notice it is also used in what appears to be a random way. Finally, it seems significant that it was the

children who primarily used the form "oh", who used failure expressions in contexts that did not involve failure. They were not used in this way when the form was "can't" or "come off" or "oh dear". This is particularly true since one child used the form "oh" to indicate notice and in other contexts, but did not use it to indicate failure.

All these facts suggest that the use of "oh" in contexts that don't involve failure is the result of an understandable confusion about the meaning of "oh", rather than the result of a conceptual confusion. These children behave as if "oh" had more than one meaning, although the most important of these meanings involves failure. In what follows I will try to explicate the concept of failure encoded by these expressions.

The common factor in the contexts that involve failure seems to be a mismatch between the actual state of affairs and a state of affairs the child wants, or tries, or intends to see instantiated. One way of saying this is to say that the child's plans fail. However, the concept of a plan I have employed so far must be extended in order to explain the use of these expressions in all contexts that involve failure.

We can imagine two kinds of plans. One is a short-term plan. The child perceives that a certain course of action will transform the present state of affairs into an envisioned state of affairs. If the child follows or tries to follow this course of action, we may see that he has implemented the plan. If the intended consequences ensue, we may say that the plan has been successfully implemented. If the child acts appropriately but the intended consequences don't ensue, we

may say that the plan has failed. I have already argued that "no" marks the fact that such a plan is not successfully implemented, and "there" marks the fact that it is successfully implemented.

We can also imagine another kind of plan, what we might call a long-term plan. In this case the child has a concept of a desirable state of affairs. As long as the reality matches this concept the child does nothing. However, if the reality does not match this concept, the child will act to instantiate the concept. He will implement a short-term plan to correct the situation. Long-term plans operate continuously over a long period while short-term plans operate at a particular moment.

For example, we might contrast the short-term plan "climb on to the chair" with the long-term plan "keep upright". In one case the child contrasts an envisioned state, in which he is on the chair, with the present state, in which he is not on the chair, and if he decides to instantiate the envisioned state he acts in a way that will transform the present state into the envisioned state, he climbs on to the chair. In the other case the child normally perceives that the envisioned state matches the present state. If he wants to maintain the envisioned state he normally does nothing. However, if the envisioned state and the reality become discordant, the child will act to bring the reality back in line with his ideal. In this case the child will usually be upright, his long-term plan will go through, and he will do nothing. However, if he trips, the long-term plan will fail, and he will act to become upright again. Other examples of long-term plans might be "keep hold

of objects", "keep cups clean" or "keep toys unbroken".

It is difficult to see how the implementation or success of long-term plans would be marked, or even whether these concepts apply to such plans at all. A long-term plan is always being implemented and it is usually succeeding. There is no moment when it would be appropriate to comment on these facts. However, there are definite moments when a long-term plan fails, and these moments might be marked linguistically.

When the child uses a failure expression in the first sort of context, when he is interrupted in the course of completing a task, for instance, he seems to mark the failure of a short-term plan. When he uses a failure expression in the third sort of context, when he comments on the fact that something has gone wrong, he seems to mark the failure of a long-term plan. Uses in the second sort of context, when he completes a task and something goes wrong immediately afterwards, might fall into either category.

We might argue either that failure expressions encode two concepts, one the failure of a long-term plan, and the other the failure of a short-term plan, or that they encode a general concept of failure, which includes these two concepts. It is difficult to tell which of these alternatives to choose. Long-term plans and short-term plans are similar in many ways but they are also different in many ways. However, it may be significant that only one child used the expressions in one way without using them in the other. Also, there were no developmental differences between uses of the expressions in the two contexts. Children did not use the expressions in one way first and then in the other way. These facts suggest that the

second alternative is more plausible. I would argue that failure expressions encode the fact that a plan, either long-term or short-term, fails.

It is worth noting that failure expressions do not encode an emotional state, a feeling of disappointment or frustration, for instance. First, the fact that these expressions are often accompanied by laughter hardly suggests disappointment or frustration. Second, the "undesirable" states of affairs that are marked by these expressions are not intrinsically unpleasant or obnoxious to the child. There is nothing about the fact that a mailbox is lying on its side or the fact that a block doesn't fit into a hole, that would naturally produce a certain emotional state. These states of affairs are only unsatisfactory in the context of a larger plan. Finally, children seemed to actively seek out situations in which failure was likely. For example, once Paul had mastered a simple puzzle, he promptly abandoned it and tried a more difficult one with an accompanying resumption. Similarly, Harriet perseveres in trying to fit a large a small box, despite a string of failures and "oh dear"s, though she knows that the smaller top fits, the smaller top right in front of her, and her mother encourages her to put the small top on. In an even more striking incident, Jonathon climbs on to his bike, pedals for a few moments, stops and says "oh dear" and "oh dear stop", gets off, and pretends to tighten an imaginary nut with a toy wrench. In this case Jonathan intentionally fails so that he can have the pleasure of correcting the situation, even though nothing is actually

that children are not using failure expressions to express a feeling of disappointment or frustration. Instead, they seem to be experimenting with the concept of a plan. They seemed to be intrigued by the fact that even the best-laid plans may fail and marked this fact linguistically.

The meaning of success expressions is more easily specified. They are synonymous with the success-marking "there" (see chap. 4). They mark the fact that a plan is successfully implemented, that the child's actions and the behavior of objects have been co-ordinated to produce the intended result. The expressions are not applied to long-term plans because there is no particular moment of success to point out.

Failure and Success Expressions and Other Non-Nominal Expressions

Failure and success expressions have many features in common with other non-nominal expressions. They apply to a very wide range of actions and objects. A child may say "oh dear" when he drops a teddy bear, searches for a puzzle piece, or trips on the stairs. The same event may be marked by failure or success expressions depending on the larger context.

These expressions do not occur in a particular social, emotional or conversational context. If anything, they are most likely to be produced when the child is engaged in solitary play.

Like the other non-nominal expressions, these expressions generally encode egocentric concepts, particularly in the early stages. The child encodes the failure or success of his own plans rather than the plans of others.

Like "there", "no" and "more", success and failure expressions seem to encode features of the child's plans. That

is, the concepts they encode involve an envisioned state of affairs which the child may act to instantiate. Failure expressions encode the failure of plans, that is, that the child envisions a state of affairs and tries to instantiate it, and it is not instantiated. Success expressions encode the fact that plans succeed, that is, that the child envisions a state of affairs and tries to instantiate it, and it is instantiated. Unlike the other non-nominal expressions, failure expressions are applied to long-term and short-term plans.

Like "there", "no" and "more", failure and success expressions encode abstract aspects of plans. That is, instead of picking out a sub-class of plans, these expressions are applicable to all plans. Success and failure expressions mark the fact that any plan succeeds or fails.

Like "no", failure expressions encode concepts that must be expressed in negative terms. The expressions mark the fact that a state of affairs which the child wants instantiated is not instantiated. The use of these expressions implies an ability to separate the envisioned state of affairs and the actual state of affairs. I will discuss the conceptual basis of success and failure expressions more fully in chap. 12.

TABLE 12 (continued)

Sess. No.		Harriet (Oh, Oh Dear)			
1	2	3	4	5	
2	2	1			
3	1		9	1	
4	4	2	4		
5	2	1	2		
6	43	8	11	1	

GROUP III

Paul (Oh)

Sess. No.		1	2	3	4	5
3				1		
4	3			1	1	5
5	3					
6	26	1				4

Hannah (Can't)

Sess. No.		1	2	3	4	5
5	5					
6	21					

Anna (Oh)

Sess. No.		1	2	3	4	5
1	2			2	7	1
2	2			3		
3	1			1	2	3
4				4	1	4
5	1			6	3	4
6	11				1	1

CHAPTER 8

THE DEVELOPMENT OF "GONE"

All nine children in this study used "gone" or variants of "gone" in a variety of contexts. 378 utterances of "gone" were recorded. Six of the nine children used "gone" in their earliest recorded sessions. 95% of the utterances of "gone" occurred in one of four contexts. Children said "gone" when they searched for a missing object, when an object disappeared, when containers were emptied (or empty containers were present), and when objects were suddenly transformed.

Contexts 1 : Search

Nine children used "gone" 113 times when they searched for an object. Children searched for a wide variety of objects including dolls, mothers, jigsaw puzzle pieces and the slit in the puzzle postbox. Usually, the child had not actually seen the missing object disappear, at least not immediately before he used the expression. As a result the child's search was usually not immediately successful, he would try a number of possible locations, and often he would not succeed in finding the object at all.

In one particularly interesting type of context the children searched for hypothetical objects, objects they had never actually seen, but whose existence they deduced. Harriet nests a set of beakers, but there is still a space left in the smallest beaker. She says "gone" as she searches for another smaller beaker to place in this space, although there is no such beaker. Similarly, Jonathan places a group of small dolls on the seats of a toy truck. Several seats are left vacant

and he says "gone" as he searches for more dolls to fill them, although there are no more dolls. In these and other similar contexts, the child seems to decide that a particular object exists, and then to try to discover the location of that object.

Contexts 2 : Disappearance

All nine children used "gone" 153 times when objects disappeared. Any object could disappear and this disappearance could take a variety of forms. Children said "gone" when they turned away from an object so that they could no longer see it. Christian points to the video-camera, says "that", turns his back to it and says "gone". John says "gone" as he turns his back to a shawl I hold out in front of him. In fact, he uses this as a general technique for dealing with disturbing objects. Children also said "gone" when they moved an object out of their immediate vicinity, so that they could no longer see it. Harriet says "gone" when she throws a block behind her, John says "gone" when he places a car behind his back, and when he gives a watch to the observer. In these contexts the object is not hidden in any absolute way, it is just not visible to the child.

Children also said "gone" when objects were placed behind other objects, Henry says "gone" when I hold a mask in front of my face. They said "gone" when objects were placed under other objects, or were placed inside containers. Henry says "gone" when he places a ring under a cushion, Christian says "gone" when he puts a doll inside a shoe, several children say "gone" as they push blocks into the puzzle postbox. Children also used "gone" when objects disappeared in other ways, Jonathan

says "gone" when a light bulb is switched off, and when the picture on the television suddenly disappears. Finally, children said "gone" when objects "disappeared" aurally as well as visually. Harriet says "gone" when the noise of an airplane dies away. Henry says "gone" when the noise of a train stops. In all these contexts the child perceived an object, an event took place, and the child no longer perceived the object.

Children said "gone" most frequently when they themselves caused the object's disappearance. This is clearly the case when the child moves away from the object or moves the object away from him but it was also true in other disappearance contexts. Most of the time the child placed the object behind another object, or under or inside another object. However, children occasionally said "gone" when someone else made an object disappear, when, for example, I put a mask over my face, or when a disappearance simply happened. Hannah said "gone" when a block dropped underneath a table.

Contexts 3 : Emptiness

Eight children said "gone" 75 times in a number of contexts involving containers and their contents. Children said "gone" as they emptied containers. Henry says "gone" as he pours all the pegs out of a tin. Harriet says "gone" as she takes a doll out of a crib. Several children say "gone" as they empty all the blocks out of the puzzle postbox. The expression was used three times when other people emptied containers. Children frequently said "gone" as they peered into a container they had just emptied. They also said "gone" when they looked into a container that had been emptied by

someone else, or that was simply empty. In the latter case the children often expected that the container should have something in it. Henry says "gone" sadly as he opens an empty paper bag that usually contains biscuits.

Contexts 4 : Object Transformations

Five children said "gone" 15 times when objects were suddenly transformed. Rachel says "gone" when a lego construction suddenly falls apart, and when her brother tears up a drawing she has made. Henry says "gone" when his mother folds up the ironing board. In these contexts, unlike the disappearance contexts, the transformation of the object was never caused by the child.

Developmental Trends

The search, disappearance and emptiness uses of "gone" did not appear in any particular order (see tables 13 and 14). However, children tended to use "gone" to mark object transformations in the early period, and then stopped using "gone" in these contexts later on. Also, children tended to use "gone" when they made objects disappear before they used "gone" to mark disappearances they did not cause.

All the utterances of "gone" in object transformation contexts occurred in the first half of the period in which "gone" was used. In fact 6 of the 15 utterances of this sort occurred in the first session in which "gone" was recorded, and 7 utterances occurred in the second session. None of the children in Group III, the oldest group, used "gone" to mark object transformations (see Table 13).

Children always used "gone" to comment on disappearances they caused themselves before they used "gone" to comment on disappearances caused by others, or accidental disappearances.

28 of the 33 utterances of "gone" that marked disappearances that were not caused by the child occurred in the last half of the period in which "gone" was recorded. The remaining 5 utterances occurred in the last session of the first half of this period. In group I, the youngest group, only Harriet, the most advanced of the children, used "gone" in these contexts (see Tables 14, 16, 17).

"Gone" in Multi-Word Strings

All nine children used "gone" in multi-word strings. The most common form was Name+Gone or less frequently Gone+Name where the named object had disappeared or was searched for. Before they reached the two word stage some children alternated "gone" with the name of the missing object. Another common string was Where's+Gone or sometimes Where's+Name+Gone . However, "where's" did not occur independently and did not seem to add to the meaning of "gone". "Gone" was combined with a verb once in the string "Simon made it all gone".

Other Reports of "Gone"

The early appearance of "gone" and other expressions encoding disappearance has often been noted. Bloom (1973) reports that Allison used "gone", and "away" and "no" to comment on the disappearance or non-existence of an object or person just after its immediate presence in the context". Bloom's corpus suggests that Allison also used "gone" as she searched for objects that she had not seen in the immediate past. There is even one case where Allison searches for a hypothetical object. Halliday (1975) reports that Nigel used "gone" and also "no more" to mean "no longer there", and used "where's" when he searched for objects. Carter (1979) reports that David

used a b-initial expression when he threw objects away from him. However, her description of his use of this expression suggests that it was not like the "gone" described here.

The Meaning of "Gone"

Is there a common factor in all the contexts in which children use "gone"? Does "gone" encode a particular concept?

Search and disappearance contexts, the most common contexts, do seem to have a common feature. In these contexts the child comments on the fact that he does not perceive an object. The child may have turned away from the object, placed it in another object, or under another object, or the object may have disappeared in some other way. The child may not know how the object disappeared, in search contexts for instance, or he may be mistaken, there may be no object for him to perceive, when, for example, he searches for hypothetical objects. The common factor in these contexts is not a particular type of event, instead it is a particular relationship between the child and the object.

In the vast majority of these contexts it was clear that the child believed in the continued existence of the object he did not perceive. At least, he clearly believed that the object would reappear at some location (see Chapter 13). This is particularly clear in search contexts. The child's search would have no point if he did not believe that the object would reappear somewhere. However, this also seemed to be true in disappearance contexts. The children behaved as if they expected the object to reappear. Typically, the child would make the object disappear, say "gone", and then make the object reappear, by turning back to it, uncovering it, taking it out of a

container, etc. These hiding and finding games could continue indefinitely.

When the child says "gone" in emptiness contexts is he also commenting on the fact that he does not perceive an object? This interpretation seems plausible when the child looks into an empty container which he expects to contain an object. We might even argue that when the child looks into a container he has just emptied he comments on the fact that the objects to one side of the container are not visible. On this interpretation these contexts would be analogous to the contexts in which the child turns away from the object. The child sees the object, looks into the empty container and no longer sees the object. However, when the child is in the middle of emptying a container the objects in the container are clearly visible.

Another explanation of these contexts is more interesting but also more speculative. An adult assumes that when all the objects are taken out of a container, objects will no longer be visible inside the container. The child might not make this assumption. He might believe that objects should still be visible inside the container even after the container has been emptied. If this were true, the child could use "gone" to comment on the fact that these objects were not visible inside the container in emptiness contexts.

Although these claims about the child's beliefs may seem bizarre they are supported by the general pattern of behavior in emptiness contexts. In a typical emptiness context, the child would take all the objects out of a container one by one, saying "gone", turn back and look in the empty container and say

"gone" with a mixture of triumph, interest and surprise. Their behavior was reminiscent of the behavior of children who discover that flipping a switch makes a light disappear. They learn to predict that their action will consistently have a certain effect, but they find this fact surprising and interesting. Similarly, these children could predict that the objects would not be visible in the container after they emptied the container, but they seemed to be surprised by the connection between these two events.

There is some non-linguistic evidence which supports this view. Bower (1974) has suggested that children don't fully understand the relationship between containers and the things they contain until they are about 18 months old. He argues that some of the difficulties children experience in object permanence tests are due to this fact (see Chapter 14). In the course of this argument Bower reports an interesting observation. "One behavior which can be observed in infants of this age (15 - 18 months) and which seems particularly bizarre occurs after the infant has found the object several times under the same cup. If the object is then placed to one side of the cup in full view, the infant will still pick up the cup, examine it and shake it as if expecting objects to pop out. The cup is seen as a cornucopia rather than as a container, something that objects can emerge from without first having to go into". (Bower 1974, p 213).

This kind of behavior is similar to the child's behavior in emptiness contexts. Bower's observation suggests that 15-month olds might indeed expect to see objects in a container even after the container had been emptied. Even an 18 month

old who had discovered an empirical connection between the act of emptying a container, and the fact that objects were not visible in the container, might find this connection surprising.

If this were true the child would see emptiness contexts as analogous to disappearance contexts. For the child the sequence: see object in container, empty container, do not see object in container, might be equivalent to the sequence see light, turn switch, do not see light, or see ring, place cushion on ring, do not see ring. In emptiness contexts, as in search, and disappearance contexts, the child would comment on the fact that he did not perceive an object. Alternatively, we may simply need to propose two meanings of "gone". We may need to say that "gone" encodes the fact that the child does not perceive an object, and also encodes some concept related to the problem of containers.

Finally, we may consider whether the child comments on the fact that he does not perceive an object in object transformation contexts. From the adult point of view the object does not disappear in these contexts. Instead it changes in a particular way. However, it is at least possible that children understand these contexts rather differently. Bower (1974) suggests that up to 18 months children define objects in terms of certain perceptual rules. For the child the object is a bounded volume of space whose contours move together (see Chapter 14). In object transformation contexts these rules are violated. After the object is transformed it no longer has the same boundaries, and in some cases its component parts don't

Moreover, these transformations are sudden.

unexpected and are not caused by the child.

We don't know how 18-month-olds react to such peculiar transformations. However, it is at least theoretically plausible that they interpret them as if the original object was replaced by another object or objects. From the child's point of view the original object, the whole lego construction, the drawing, the open ironing board has disappeared and has been replaced by scattered bits of lego, fragments of paper, or the closed ironing board. In that case these contexts would be analogous to disappearance contexts. In any case, children very rarely used "gone" in these contexts and only did so for a short time.

We may conclude, then, that "gone", usually means that the child does not perceive an object, at least when it is uttered in search and disappearance contexts. "Gone" may also have this meaning when it is uttered in emptiness and object transformation contexts, but only if children understand these contexts in a different way than adults do. There is some non-linguistic evidence which suggests that 12-24 month olds could treat the emptying of a container, or the violent transformation of an object, as disappearances.

"Gone" and other Non-Nominal Expressions.

How are the concepts "gone" encodes related to the concepts other non-nominal expressions encode? There are some general similarities between "gone" and all the other non-nominal expressions. "Gone" doesn't encode features of objects or relationships between objects. Any object may be searched for, may disappear, may be removed from a container or may be transformed. Nor does it encode actions or types

of action. The actions involved in searching for an object, making an object disappear, and emptying a container are all very different. In some disappearance contexts and in object transformation contexts the children didn't perform any action at all. Finally, the concepts encoded by "gone" have no obvious social or emotional significance.

The concepts encoded by "gone", like the concepts encoded by other non-nominal expressions, have an egocentric quality. The child comments on the fact that he does not perceive an object. In some disappearance contexts, when, for example, the child turns away from the object or moves the object away from him, the object has only disappeared from the child's point of view. Other people can still see the object perfectly well.

While "gone" is similar to all the other non-nominal expressions in these ways, in other respects it is less like "no", "more" and success and failure expressions and more like "that" and the locative "there". We have seen that "no", "more" and success and failure expressions encode abstract aspects of plans. That is, these expressions encode relationships between the child, his actions and the consequences of those actions. "Gone" does not encode an aspect of plans. Instead, it encodes an equally abstract relationship between the child and objects.

In this respect, "gone" is more like "that" and the locative "there". These expressions also were concerned with objects rather than plans. We have seen that these expressions did not pick out sub-sets of objects, but instead encoded important features of all objects. All objects can be perceived, and all objects can move or are in a location.

Similarly, "gone" picks out an important aspect of all objects, the fact that they may not be perceived. Also "gone", like "that", encodes a relationship between the child and objects.

While "gone" does not encode an aspect of plans, plans play an important role in many of the contexts in which "gone" is used. We have seen that children are particularly likely to say "gone" when a disappearance is a consequence of their actions, that is, when it is the goal of a plan. Similarly, children were particularly likely to say "there" when the movement of the object was the goal of a plan, and they often said "that" when the object they noticed played an important role in their plans.

The non-nominal expressions we have discussed so far may be divided into two groups. "That", locative "there" and "gone" encode abstract aspects of objects. "No", "more" and success and failure expressions encode abstract aspects of plans. We will see that direction expressions, like "that", locative "there" and "gone" are more concerned with objects than with plans.

"Gone" and "No"

Although "gone" is concerned with objects, and "no" is concerned with plans, there are some similarities between the two expressions. Both "gone" and "no" encode concepts which must be characterised in negative terms. "Gone" marks the fact that an object is not perceived, and "no" marks the fact that a plan is not successfully implemented. In order to use these expressions the child must be able to distinguish between conceiving of an object or a plan, and actually perceiving the object or carrying out the plan. Just as the

distinction between formulating a plan and carrying out a plan is significant cognitively, so is the distinction between conceiving of an object existing in a location, and actually perceiving the object in the location. I will discuss this distinction, and the conceptual development of the concepts encoded by "gone" more fully in Chapter 13.

There is an interesting parallel between the relationship of "that" and "gone" and of "there" and "no". "That" marks the fact that an object is perceived, while "gone" marks the fact that it is not perceived. "There" marks the fact that a plan is successfully implemented, while "no" marks the fact that it is not successfully implemented. Two elements, objects and plans, are involved and their relationships to perception and action respectively are marked.

Changes in the Meaning of "Gone".

The development of "gone" is similar to the development of the locative "there". In both cases children initially used the term when they brought about a disappearance or a movement and only later used the term when they did not bring about the disappearance or movement. More generally, this trend reflects the general tendency for children to initially use non-nominal expressions in an egocentric, action-oriented way, and later to move to more objective uses.

TABLE 2.
Uses of "Gone" in Different Contexts

Sess.No.	Rachel Search	Disappearance	Emptiness	Transformation	Other
9	1				
10	1	1			
11	5				
12				7	1
13	2	4 5			

Sess.No.	Jonathan Search	Disappearance	Emptiness	Transformation	Other
21		1			
23			3		
24			2		1
25	3	2	1	1	
26		2	1		

Sess.No.	Henry Search	Disappearance	Emptiness	Transformation	Other
11				1	
13	1		2		1
14		1	5		
15			2		
16			4	1	
17		20			
18	9	14	4		
19	3	3	3		
20	4	2	2		1
21	1	3			
22	2	2	2		1
23	3	4	6		1
24	21	14	5		2

Sess.No.	John Search	Disappearance	Emptiness	Transformation	Other
1	4	5	9	1	
2	1	3	6		
3		3			
4	1	10			

Sess.No.	Christian Search	Disappearance	Emptiness	Transformation	Other
3	3	3	3	4	1
4	4	10	1		1
5	1				

TABLE 13 (continued)

Group II (continued)

Sess.No.	Harriet Search	Disappearance	Emptiness	Transformation	Other
1	1	1	3		
2	2	11			
3					
4	2	3	2		1
5		5			
6	10		1		1

GROUP III

Sess.No.	Paul Search	Disappearance	Emptiness	Transformation	Other
1		1	2		
2	2	1	4		
3	7		1		
4	5	3			
5	3				
6		2			

Sess.No.	Hannah Search	Disappearance	Emptiness	Transformation	Other
1		1			
2	5				4
3		2			
4		2			
5					
6	3				

Sess.No.	Anna Search	Disappearance	Emptiness	Transformation	Other
1	1	3	1		1
2					1
3					
4					
5					
6	1	6	2		2

TABLE 14

Uses of Gone in Different Disappearance Contexts

GROUP I

Rachel

Sess.No.	Position Change	Move Away	Self Initiated	Other Initiated
9			1	
12				4
13			2	3

Jonathan

Sess.No.	Position Change	Move Away	Self Initiated	Other Initiated
22			1	
25			2	
26			2	

Henry

Sess.No.	Position Change	Move Away	Self Initiated	Other Initiated
13			1	
17	1		19	
18		1	9	4
19			3	
20			1	1
21				3
22				2
23			2	2
24			10	4

GROUP II

John

Sess.No.	Position Change	Move Away	Self Initiated	Other Initiated
1		2	5	
2	1		2	
3			3	
4	7		3	

Christian

Sess.No.	Position Change	Move Away	Self Initiated	Other Initiated
1		1	3	
4	2	1	8	

Harriet

Sess.No.	Position Change	Move Away	Self Initiated	Other Initiated
1			1	
2	1	6	4	
4				3
5			2	3

TABLE 14 (continued)

GROUP III

Sess.No.	Position Change	Paul	Move Away	Self Initiated	Other Initiated
1					
2	1				
4					
5				1	
6				3	
				2	

Sess.No.	Position Change	Hannah	Move Away	Self Initiated	Other Initiated
1					
6				3	
				2	
					1

TABLE 15

Order of Appearance of "Gone"
in Different Contexts

GROUP I

Jonathan

Disappearance/Emptiness

Transformation

Search

Rachel

Search/Disappearance

Transformation

Henry

Transformation

Search/Emptiness

Disappearance

GROUP II

John

Search/Disappearance/
Emptiness/Transformation

Christian

Search/Disappearance/
Transformation

Harriet

Search/Disappearance/
Emptiness

GROUP III

Paul

Disappearance/Emptiness

Hannah

Disappearance/Search

Anna

Search/Disappearance/
Emptiness

TABLE 1

Order of Appearance of Types of Disappearance Uses of Gone

GROUP I		
Jonathan	Rachel	Henry
Self-Initiated	Self-Initiated	Self-Initiated
Other Initiated	Other Initiated	Position Change
		Move Away/Other Initiated
GROUP II		
John	Christian	Harriet
Move Away/Self Initiated	Move Away/Self Initiated	Self Initiated
Position Change	Position Change	Position Change/Move Away
		Other Initiated
GROUP III		
Paul	Hannah	Anna
Position Change	Self Initiated	Self Initiated
Self Initiated	Other Initiated	Other Initiated

TABLE 17

Numbers of Children Using Different Orders of use
of Gone

Self Initiated Disappearance $\leq$ Other Initiated Disappearance

Other Initiated Disappearance $\leq$ Self Initiated Disappearance

0

$\chi^2 = 9$ sig at .01 level

CHAPTER 9

THE DEVELOPMENT OF DIRECTION EXPRESSIONS

All nine children used expressions in contexts involving the movement and location of objects. In particular, "down", "up", "in", "out", "off" and "on" were commonly and frequently used in these contexts. I will call these six expressions "direction expressions". 598 utterances of these expressions were recorded. The expressions were all used in similar ways. 95% of them occurred when children caused the movement of an object, or tried to cause an object to move, when they moved themselves, when other people caused objects to move, when objects moved accidentally, and when the children indicated the position of stationary objects. Each expression was applied to movements in a particular direction, or to particular kinds of positions. I will first give a general account of the contexts in which all these expressions were used, and will then examine each expression separately.

Contexts 1 : Self-Initiated Movement

Direction expressions were used by all nine children 398 times when they moved or tried to move an object, or when they brought about, or tried to bring about the movement of an object. Christian says "down" as he knocks the dolls balanced on top of a house on to the floor, and when he drops an airplane on the floor. Anna says "off" as she tries to undo a set of nesting Russian dolls, and when she tries to pull a peg out of a hole. Paul says "inhide" as he puts beakers into a box, and as he pushes blocks into the puzzle mailbox. Jonathan says

"up" as he presses down on the keys of a cash register, which causes numbered tabs to pop up. The expressions were often used before an action was actually performed, and were sometimes used when the child attempted to move an object, but was unsuccessful.

Children also used these expressions when the object they moved was their own body, or when their own bodies were involved in movements. John says "down" and "up" as he scrambles down from chairs, or climbs up into them. Jonathan says "in" as he climbs into a toy car. Henry says "out" as he struggles to get past my arm which is blocking the doorway. Several children use "on" and "off" as they put on or take off clothes. Again the expressions sometimes occurred before the child moved, or when the child tried unsuccessfully to move.

Contexts 2 : Other-Initiated Movement

7 children used these expressions 65 times in contexts involving movements initiated by other people. The expressions were sometimes used when other people simply moved an object. Jonathan says "down" when I put a doll down on the table, Anna says "down" when her mother puts a ball of dough on the table. But they were also used when children asked someone else to move an object. Hannah says "faces out" when she wants her mother to take the "happy faces" biscuits out of a drawer. Rachel says "on" when she wants her mother to put on her shoes.

Contexts 3 : Accidental Movement

7 children used these expressions 59 times when an object moved but that movement was not the result of an action. Anna says "off" when a block falls off a tower of bricks. Harriet says "down" when water drips on to the floor from a watering

pot she is carrying. Occasionally, these expressions were used when children looked at pictures of moving objects. Jonathan says "fall down" pointing to a picture of a waterfall. Harriet says "down" pointing to a picture of goats falling off a bridge.

Contexts 4 : Object Position

Finally, 6 children used these expressions 48 times to refer to the position of stationary objects. Henry says "monster up dere" pointing to a toy on a high shelf. Paul says "in" looking at a block inside a box. Rachel says "pictures on walls" pointing to a picture hanging on the wall. Jonathan says "hat on" pointing to a picture of a man with a hat on.

While all the expressions were used in these sorts of contexts, each particular expression referred to a movement in a different direction, or to a different kind of position.

Down

All nine children said "down" 182 times. Children said "down" most frequently (89 times) when objects moved under the influence of gravity. They tended to say "down" when objects fell or when they dropped or threw objects, when vertical objects fell over, or when objects slid down an incline. Jonathan says "down" when he removes a block from a tower, in order to make the tower fall. Rachel says "down" when the observer blows on a lego piece which makes it fall over. Christian says "down" as he drops a toy airplane on to the floor. It is interesting that "fall" was also a common expression in the one-word period (see Chapter 10).

Children also used "down" frequently (56 times) when they themselves moved or tried to move downwards, in particular when they tried to get down from a chair or a lap, or when they sat

down on the floor.

In addition, children said "down" when they carefully moved an object towards the ground. Rachel says "down" as she places toy animals in a line on the floor. Children also said "down" when objects moved downwards in other ways. Christian says "down" as he closes the roof of a dollhouse. Jonathan says "down" as he pushes open the seat of a folding chair. Anna says "down" when she picks up a doll in order to make the doll's eyes close. In all these contexts an object moves towards the ground though we might not think of these as typical cases of downward movement.

Rachel uses "down" to refer to upward as well as downward movement. It may be significant that Rachel never used "up". Henry uses "down" once to indicate the position of his mother who is at the bottom of a flight of stairs. Jonathan says "down" pointing to his socks which have slid down.

Up

Six children said "up" 97 times. "Up" and "down" were used in similar contexts but the direction of the movement was reversed. Most frequently (54 times) children said "up" when an object was placed on top of another object. Often children had some difficulty getting the object to balance on the supporting object. Jonathan says "up" when he places a block on a tower of blocks, and when he hangs a toy lion on the top bar of a cage. Harriet says "up" when she carefully places a doll on top of the canopy of a toy bed. Another expression, "top", was frequently used in similar contexts in the one-word period (see Chapter 10).

Children also said "up" when they placed a fallen object upright. Harriet says "up" when she straightens a mailbox that has fallen on its side. They said "up" when they themselves climbed up on to a chair or a lap or a table, or when they stood up. They said "up" when they simply moved an object away from the ground. Harriet says "up" as she picks up a bunch of keys from the floor. Finally, children said "up" when they made an object move away from the ground in some other way. Jonathan says "up" as he presses down on a cash register key that makes a tag pop up.

Children used "up" four times to refer to the position of an object. Henry says "up" pointing to a picture hanging on the wall above him, and "monster up dere", pointing to a toy monster on a high shelf. Harriet says "up" pointing to a picture of three goats balanced on a bridge. Jonathan says "balloon up dere" discussing a party at which he played with balloons.

In

Seven children said "in" 93 times. Children said "in" most frequently when objects moved into containers. Sometimes the containers were open and the object was visible. Children said "in" when a peg was placed in a hole, and when a bean fell into the gutter of a bib. Sometimes the containers were closed and the object was not visible. Children said "in" when they pushed blocks into the puzzle post-box. Children occasionally said "in" when they moved into containers or enclosures. Jonathan says "in" as he climbs into a toy car. Two children, Rachel and Henry, consistently used "in" when they tried to take objects out of containers as well as when they tried to

put them in containers. Henry says "in" when he sees the observer's handbag and tries to open it and remove the contents.

Four children said "in" 20 times when they commented on the fact that an object was inside a container. The container could be open or closed. Jonathan says "indere" pointing to a picture of a car surrounded by water, Henry says "indere" pointing to a closed basket which holds his brother's violin. Paul says "in" pointing to a closed box which has beakers in it. In one interesting context Henry says "indere" when he picks up an empty paper bag which usually contains biscuits, and then says "gone" when he opens it.

Out

Five children said "out" 60 times. Most frequently, children said "out" when objects moved out of containers. Again these containers could be either open or closed. Jonathan says "out" as he takes a toy out of a closed toy box, and as he goes to take some dolls out of an open toy schoolhouse. Rachel says "out" when letters fall out of an open toy dumptruck, and when she tries to open a closed drawer in order to get a box out. Henry says "out" when he himself tries to move out of an enclosing object. He says "out", for example, when he tries to break out of his mother's encircling arms.

Rachel says "out" once to indicate the fact that an object is outside of a containing object. She says "Simon out dere" pointing through the window at Simon who is in the garden.

On

Six children said "on" 84 times. Children said "on" most frequently when pieces of clothing were placed on bodies.

Rachel says "on" and "tights on" when she pulls her tights on. Henry says "on" when he tries to put on a watch and a necklace. Children said "on" occasionally when they put clothes on other people.

Children also said "on" when objects other than clothes became attached to other objects. Jonathan says "on" as he couples two cars of a toy train. Finally, children said "on" when two objects became contiguous but were not actually attached. Jonathan says "on" when he places one jigsaw puzzle piece on top of another. Christian says "on" as he climbs on to his bike. Rachel and Henry occasionally used "on" when objects became detached from each other as well as when they became attached. Henry says "want it on" as he asks the observer to take a watch off his wrist.

Four children said "on" 14 times when they commented on the fact that a piece of clothing was worn, that two objects were attached or that two objects were contiguous. Rachel says "Paddington Bear a boots on" pointing to a picture of Paddington Bear wearing boots, "pictures on walls" pointing to the picture that hangs on the wall, and "coat on chair" pointing to the coat lying on a chair.

Off

Six children said "off" 82 times. Children used "off" in the same sorts of contexts in which they used "on" but the direction of the movement was reversed. Children said "off" when pieces of clothing were removed. Rachel says "clothes off" removing a doll's dress. They said "off" when one object was detached from another. Henry says "off" as he pulls two cars of a train apart. Anna says "off" when she screws off

the top of a Russian doll and when she tries to take the lid off a closed box. Children also said "off" when two contiguous objects were separated. Jonathan says "off" when the observer takes a block off a tower of blocks. Harriet says "off" twice when she makes objects become attached or contiguous.

Jonathan uses "off" once to indicate the position of an object. He says "hat off no" pointing to a picture of a man with a hat on.

Developmental Trends

There are two ways to examine the development of the various functions of direction expressions I have outlined. First, we can treat all direction expressions as a single class and see when the child first uses any direction expression in a particular kind of context. When we use this analysis we assume that if a child uses one direction expression in a particular kind of context, he should be able to use other direction expressions in similar ways.

Alternatively, we can look at the development of each direction expression separately. We can chart the first appearance of "down" or "out" in various contexts. Here, we assume that each direction expression could develop in a different way. A child might use "down" in a certain kind of context without being able to use "out" in that kind of context.

These two analyses might give us very different results. Suppose "down" and "in" occur in the ~~first~~ five sessions in context A and ^{then occurs in the sixth session in} context B. "Out" appears for the first time in the ninth session in context B and then appears in the tenth session in contexts A and B. If we apply the first analysis to this data, we would conclude that direction expressions occur in context A before they appear in context B. Since "out" only appeared once context B was well-established, it is not surprising

that it is first used in this context. On the other hand, if we apply the second kind of analysis, we would have to say that "down" and "in" first appeared in context A and then in context B, while "out" first appeared in context B and then occurred in context A. We could not make any generalisation about the order in which these functions appeared.

There does not seem to be any principled way to decide between these two analyses. The first analysis has the practical advantage that the number of utterances involved is much greater. When only two or three utterances of a particular expression have been recorded it is difficult to draw firm conclusions about it's development. If we look at all the utterances of direction expressions by a particular child, our sample is that much greater and our conclusions are more reliable. Furthermore, direction expressions do seem to occur in very similar contexts and to behave in similar ways. It does not seem implausible to treat them as a class.

I have analysed the data in both these ways. In this case the results of both analyses are generally similar.

The clearest developmental trend is the early appearance of direction expressions in contexts in which the child himself initiates the movement of an object. If we use the first analysis and look at the occurrence of all direction expressions in these contexts, we see that the expressions never occurred in other-initiated, accidental or position-indicating contexts before they occurred in self-initiated contexts (see Tables 19 & 20).

Seven children first used direction expressions exclusively in self-initiated contexts. One child first used these expressions in self-initiated and accidental contexts, and one child first

used the expressions in self-initiated and other-initiated contexts. These last two children both had been speaking for some time before recording began. It is possible that these children also initially used direction expressions exclusively in self-initiated contexts, but that by the time recording began they had come to use the expressions in other contexts as well. All the children used direction expressions exclusively in self-initiated contexts while only some of the children used them in each of the other contexts (see Table 19).

This picture is substantially similar to that obtained by the second analysis, in which the development of each expression is examined. This is particularly true of "down", "in" and "on". However, there are two cases, Jonathan's "off" and Rachel's "out", where an expression occurs in other-initiated contexts before it occurs in self-initiated contexts, and two cases, Harriet's "up" and Rachel's "out", where an expression is used in position-indicating contexts before it is used in self-initiated contexts (see Tables 20 & 21).

If we examine these counter-examples more closely, we discover that at least some of them are not very convincing. Rachel only uses "out" four times. It occurs first in the next to last session in a position-indicating context and in an other-initiated context and then occurs in the last session in a self-initiated context and an accidental one. Thus, "out" occurs very infrequently, and it occurs in a self-initiated context immediately after it occurs in the other contexts. Jonathan uses "off" in an other-initiated context once in session 20. His next use of "off", in session 22, is in a self-initiated context and he uses "off" in this way nine times before he again uses it in an other-initiated context. The most convincing,

counter-example is Harriet's initial use of "up", twice referring to a picture of goats on a bridge. Still, all her other utterances of "up" occur in self-initiated contexts, and such uses occur in the next session. In all, six utterances are involved in these counter-examples (see Table 18).

In any case, while these counter-examples should be kept in mind, there does seem to be a strong tendency for individual direction expressions, particularly "down", "in" and "on", to appear first in self-initiated contexts just as direction expressions in general first appear in these contexts.

The next developmental trend was the late appearance of direction expressions used in position-indicating contexts. Children seemed to use the expressions in these contexts only after they had used them in other contexts.

First, let's consider direction expressions as a class. Direction expressions were never used to indicate position before they were used in the other contexts. In the corpora of two children uses in position-indicating contexts were the last to appear. In two corpora uses in position-indicating contexts and uses in accidental contexts first appeared in the same session and were the last uses to appear. In one corpus uses in position-indicating, accidental and other-initiated contexts all first appeared in the same session, but they appeared after uses in self-initiated contexts. The other two children did not use direction expressions in position-indicating contexts (see Table 19, 21).

In addition, all but four of the utterances of direction expressions which were used to indicate position occurred in the second half of the period in which direction expressions

were recorded. (Henry uses "in" four times in the last session of the first half of the recording period.) Three of the seven children who used these expressions to indicate position did so only in their last session (see Table 18).

The same trend emerges if we look at the development of individual direction expressions. This is particularly true of "down" and "off" and, to a lesser extent, of "in".

However, there were some exceptions. In two cases, Jonathan's "on" and Hannah's "out", uses in self-initiated, other-initiated and position-indicating contexts first appeared in the same session, and uses in accidental contexts did not appear. In one case self-initiated and position-indicating contexts appeared in the same session, and other uses did not appear (see p.68). There were two cases, Rachel's "out" and Harriet's "up", in which an expression was used to indicate position before it was used in another context. These two cases have been discussed above (see Table 20,21).

Only 12 of the 49 utterances of expressions in position-indicating contexts occurred in the first half of the period in which the particular expression was recorded. These utterances occurred in 4 of the 15 cases in which direction expressions were used to indicate position. In 8 of the 15 cases, the direction expression was first used to indicate position in the last session (see Table 18).

Thus it seems that children tend to use particular direction expressions, particularly "down", "in" and "off", to indicate the position of objects at a relatively late stage of their development, and that they tend to use expressions in this way after they have used them in other kinds of contexts, just as

they use direction expressions in general to indicate position at a late stage, after they have used them in other contexts.

The position of accidental and other-initiated uses of direction expressions was more difficult to determine. In these contexts an event occurred but the child did not cause the event. Neither of these uses occurred before the other, and it seems fair to treat them as a single category.

If we look at direction expressions in general these uses clearly came after self-initiated uses, but before position-indicating uses (see Table 19,21).

The pattern for individual direction expressions is more complicated. "Event" uses clearly came after self-initiated uses especially for "down", "up", "in" and "on". There were two counter-examples, Rachels "out" and Jonathans "off", I have discussed these examples above (see Table 20,21).

"Down" and "off" clearly tended to be used to mark events before they were used to indicate positions. However, there were no clear trends for the other expressions. This was because some children were recorded as using these expressions in self-initiated and position-indicating contexts, but not in event contexts. It was not clear whether these children would eventually use these expressions in event contexts. It was also possible, given the fact that few utterances of each of these expressions were recorded, and given the gap between recording sessions, that children did use these expressions to mark events but that these uses were not recorded.

However, it is worth noting that event uses of these

expressions were never first recorded after the child used the expressions to indicate position, while position uses were first recorded after the child had begun to use the expressions to mark events. Given this evidence, the evidence of "down" and "off", and the evidence of direction expressions in general, it seems fair to conclude that children generally tended to use direction expressions to mark events before they used them to mark positions.

On the basis of this evidence we may propose the following developmental hypothesis. Direction expressions are first used to comment on movements initiated by the child himself, they are then used to comment on movements initiated by other people or accidental movements and, finally, they are used to comment on the position of stationary objects. We may need to add the proviso that a child may not use the expressions in other-initiated or accidental contexts but, if he does, he will do so before he uses them to indicate position and after he uses them in self-initiated contexts.

If we look at direction expressions as a class, no utterance violates this order. If we look at individual direction expressions, five utterances violate this order. These counter-examples have been discussed above.

Also, two uses sometimes appear simultaneously when the hypothesis would predict that they appear in a particular order. These cases may be explained by the gap between recording sessions, or they may require a weaker version of the developmental hypothesis.

So far we have looked at the order of appearance of direction expressions in various types of contexts. The

different direction expressions also appeared in a particular developmental order.

First, "up" never appeared before "down" and "out" never appeared before "in" (see Table 23,24). Five children first said "down" and later said "up", one child said "down" and "up" for the first time in the same session, and the remaining three children said "down" but never said "up". Similarly, three children first said "in" and later said "out", two children said "in" and "out" for the first time in the same session, two children said "in" but never said "out", and the remaining two children never said "in" or "out".

However, "on" and "off" did not occur in any particular order. Three children first said "on" and later said "off", two children first said "off" and later said "on", one child only said "on", one child only said "off", and one child said neither "on" nor "off" (see Table 23,24).

This developmental pattern may be related to the fact that some children used some expressions to indicate movement in two opposite directions. Rachel used "down" to refer to upward and downward movement, Rachel and Henry used "in" to refer to outward and inward movement, Rachel and Henry used "on" to refer to detachment as well as attachment, and Harriet used "off" to refer to attachment as well as detachment.

The fact that children never used "up" or "out" to refer to movement in two directions, but did use "down" and "in" in this way suggests that "down" and "in" have some special status. Similar suggestions have been made about other expressions that occur in pairs. For example, Donaldson and Balfour (1968) and Clark (1970) have suggested that children use "more" to mean

both "less" and "more", and that they use "more" before they use "less". However, we should note that only one of the nine children who used "down" confused "up" and "down", and only two of the seven children who used "in" confused "in" and "out". The developmental pattern was more widespread.

It may also be significant that most of the counter examples to the overall developmental order proposed in the previous section involved "up" and "out". "Down" and "in" displayed this developmental order most clearly, and "on" and "off" displayed the order fairly clearly. This may not be surprising if "up" and "out" are later variants of "down" and "in" (see Table 20).

In addition to the order within pairs of antonyms, the different pairs of antonyms developed in a particular order (see Table 23,24). Eight of the nine children said "down" before they said "in", "out", "on" or "off". One child said "off" in her first session and "down" in her second session. However, she had been speaking for some time before recording began. There didn't appear to be any tendency for "in" to occur before "on/off" or vice versa. In fact three children used "in" and "on" for the first time in the same session (see Table 23). I will discuss this pattern in Chapter 14.

Direction Expressions in Multi-Word Strings

Children combined direction expressions with names and with other expressions including "there", "fall", "come", "get", "no", "sit" and "jump". Children used both Name + Direction strings and, less frequently, Direction + Name strings. The two orders appeared to encode different relationships.

Children chose a Name + "Down" string if the named object moved downward or had moved downward in the past. Henry says "water down dere" when water drips on the floor and "mommy down dere" pointing to his mother who is at the bottom of the stairs. Similarly, they chose a Name + "Up" string if the named object moved upward or was supported by another object away from the ground. Jonathan says "top up" as he puts the top on top of the cookie jar, Henry says "monster up dere" pointing to the monster on the high shelf. However, children chose an "Up" + Name string if the named object supported another object. Henry says "Up chair" and "monkey up chair" when he places a toy monkey on top of a chair. Children did not use "Down" + Name strings.

Similarly children chose a Name + "In", or a Name + "Out" string when the named object moved inside or outside a container, or was inside or outside a container. Jonathan says "patient in" putting a doll in a toy ambulance, Henry says "milk in it" pointing to a mug full of milk. Hannah says "hammy out" asking her mother to take the hamster out of the cage, Rachel says "Simon out dere" pointing to Simon who is out in the garden. However, children chose an "In" + Name or "Out" + Name string if the named object was the container. Henry says "in hand" when he puts a ring in his closed fist, and "out shoe" when he tries to push past a row of shoes that are blocking a doorway.

Finally, children chose a Name + "On" or Name + "Off" string if the named object was a piece of clothing, a moving object, or a potentially mobile object. Henry says "shoes on" pulling on his shoes, Jonathan says "John John on bike"

climbing on to his bike, Rachel says "pictures on walls" pointing to the picture attached to the wall. They chose a Name + "Off" string if the named object was a piece of clothing. Jonathan says "scarf off" taking a scarf off and "hat off no" pointing to a man with a hat on. However, they chose an "On" + Name string if the named object was part of the body, a stationary object, or a fixed object. Henry says "on finger" placing a ring on his finger, Christian says "on bike" climbing on to his bike, Rachel says "pictures on walls" pointing to the pictures attached to the wall. Children did not use "Off" + Name strings.

The next most frequent string combined direction expressions and "there". Children used Direction + "There" strings in all contexts in which they used single direction expressions. The addition of "there" did not seem to add anything to the meaning of the direction expression.

Other Reports of Direction Expressions

A number of writers have noted the early appearance of "down", "up", "in", "out" and "on" and "off" (Brown 1973, Bloom 1973, Nelson 1973 and Bowerman 1978). Bloom (1973) reports that at twenty months Allison used "down", "up", "on" and "out". At about the same age Halliday's son, Nigel, used "down", "up", "on" and "off" (Halliday 1975). Farwell (1977) describes a twenty month-old child, Joshua, who used "down", "up", "on", "off" and "in". All three of these children used "up" before they used "down", the opposite of the pattern reported here. However, all three of them used "up" before they used "in", "out", "on" or "off".

Bloom, Halliday and Farwell all report that children used

direction expressions to refer to their own movements. Bloom also reports that Allison occasionally used "up" to comment on the position of objects, but she points out that these uses were very infrequent. Parwell has emphasised the way children use direction expressions to encode the goals of their actions. The contexts she describes are similar to the self-initiated contexts I have described here. Bloom's corpus suggests that Allison also used direction expressions initially when she made objects move in a particular direction. In her first session, Allison says "up" repeatedly when she tries to stand toy animals upright. Several sessions later she also uses direction expressions to indicate the position of objects, and occasionally uses them to indicate movements she has not caused. Allison also used the various direction expressions in contexts that involved the same types of spatial relationships I have described here.

The Meaning of Direction Expressions

I will argue that direction expressions in general initially encode changes in the spatial relationship of objects, and later encode these spatial relationships themselves. Each expression encodes a concept that involves a different type of spatial relationship. In addition, there appear to be some more general differences between the concepts encoded by "down" and "up", and those encoded by "in", "out", "on" and "off".

"Down" encodes the least relational of the spatial relationships. Children use "down" to refer to the downward movement of objects towards the ground or floor, rather than to the relative position of objects.

than to their relationships to other objects. Children said "down" when an object that was further from the ground became nearer to the ground. Children only used "down" twice to refer to the position of objects. In both these cases the children had seen the object in a higher position, and commented on the fact that it was now closer to the ground. The general concept of movement towards the ground is related to the child's understanding of the effects of gravity. I will discuss this fact further in Chapter 14.

"Up" encoded movement in the opposite direction. An object that was nearer to the ground became further from the ground. However, since objects don't fall up, children also used "up" in many contexts involving relationships of balance or support. If we want an object to move towards the ground and stay that way, all we have to do is let go of it. If we want an object to move away from the ground and to stay that way, we have to use another object to support it. As a result in the late sessions "up" was used to comment on the fact that one object supported another object, even if the child had never seen the object in a lower position.

"Down" and "up" did not simply encode downward and upward trajectories. The actual movements that elicited "down" and "up" varied widely, and sometimes these movements were quite complex. The sequence of movements that occurs when the child removes the bottom brick from a tower and the tower falls, is quite different from the sequence that occurs when the child rolls an object on to the edge of a table until it falls off, or when he places an object at the top of an incline and it rolls to the bottom, or when he himself

climbs down from a chair. Moreover, as we have seen, children said "down" and "up" when they caused a movement, when someone else caused a movement, or when a movement simply happened. The common factor in all these contexts is that the relationship between the object and the ground changes no matter how that change comes about.

The concepts encoded by "in" and "out" do involve relationships between two objects, particularly between an object and a container. The containers varied widely, in fact, "container" may be too narrow a word. A container could be a fence, a cage, a hole, a closed box, a drawer or a room. Similarly, the kinds of movements that led to an object becoming inside or outside of a container varied widely. An object could be placed inside a fence, inserted in a hole, or it could move through a slit into a closed box. An object could be smashed through a barrier, shaken out of a box or fished through an opening, or the child could open a box and remove the object. The movement could be the result of the child's actions or of the actions of another, or it could simply happen.

There were two mutually exclusive states, either the object was inside the container or it was outside the container. "In" and "out" encoded the fact that an object was in one of these states and was then in the other state, no matter how this change came about. In this respect "in" and "out" were not entirely like "down" and "up". There were no mutually exclusive "down" and "up" states. An object could be in the same position but could be marked by "down" or "up"

depending on its previous position. "Down" and "up" encoded the fact that an object was nearer to the ground or further from the ground than it had been before. In both cases, however, the fact that the change took place was more important than the manner in which the change took place.

Like "in" and "out", "on" and "off" encoded changes in the relationships between objects. Two slightly different relationships were involved.

Contexts in which objects became physically attached and contexts in which pieces of clothing were placed on bodies both involve the same sort of spatial relationship. In both these types of contexts two objects become attached to one another. In addition, it seems likely that the most common instances of physical attachment in the child's environment involve pieces of clothing. There aren't that many objects other than clothes that become physically attached to other objects. This would explain the fact that children said "on" and "off" most frequently in contexts that involved clothing, even though the underlying meaning of "on" and "off" involves the more general concept of physical attachment.

We might want to argue that "on" and "off" encode concepts that involve the more general spatial relationship of contiguity. After all, children do occasionally use "on" and "off" when objects become contiguous or cease to be contiguous, but are not attached or detached, and objects also become contiguous or cease to be contiguous when they are attached or detached. However, it seems highly unlikely

that the most common instances of contiguity in the child's environment also involve attachment. Surely, there are far more cases of contiguous objects that are not physically attached than there are of physically attached objects. We would need to find some other explanation for the fact that children used "on" and "off" much more frequently when objects became physically attached than when they became contiguous. For this reason, I would argue that "on" and "off" encode concepts that involve attachment, and also encode concepts that involve contiguity. I will discuss this problem more fully in Chapter 14.

The nature of contiguity and attachment relationships varied, just as containment relationships varied. An object could be on top of a contiguous object or beside it, or the two objects could have a more complex relationship. When, for example, a child is riding on his bike the spatial relationship between his body and the bike is rather complex, even though the two objects are clearly contiguous. An object could be physically attached to another object if it fitted into it, if it was tied to it, if it was screwed into it or if the objects were connected by a third object. Pieces of clothing could be attached to bodies by means of snaps, buttons, buckles or ties, or they could simply fit onto a limb. As a result the kinds of movement that led to the attachment, detachment, contiguity or separation of two objects also varied.

Like "in" and "out", "on" and "off" encoded that involved two mutually exclusive states. Either an object is contiguous with another object or it is not, etc.

an object is physically attached to another object or it is not. "On" and "off" encoded the transition from one state to another, or, later, encoded the fact that objects were in one state or another, rather than encoding a type of movement.

I have suggested then that in the early period direction expressions encode changes in the spatial relationships an object enters into. "Down" and "up" encode changes in the relationship of an object to the ground. "In" and "out" encode changes in the relationship of an object to a container. "On" and "off" encode changes in the relationship of an object to a contiguous or attached object. The events that bring about these changes are unimportant. What is important is that the object is in one relationship and then is in another.

Towards the end of the one-word period even the fact that the relationship changes becomes unimportant. The child simply comments on the relationship the object is in now, without considering the relationships it has entered into in the past or the relationships it will enter into in the future.

Direction Expressions and Other Non-Nominal Expression

Direction expressions are similar to other non-nominal expressions, particularly, "that", "gone" and locative "there", in many general respects. However, in some respects direction expressions are unique.

Like other non-nominal expressions direction expressions did not encode features of objects or types of actions. Nor did they encode socially or emotionally significant concepts. Like "no", "more" and "there", these expressions only encoded

relationships between objects at the end of the one-word period.

Like "that", "gone", and locative "there", direction expressions do not encode abstract aspects of plans. Instead, the concepts encoded by these expressions involve abstract aspects of objects. Just as all objects may be perceived or may not be perceived and all objects may move, so all objects may fall or may be supported by other objects, all objects may be inside containers, and all objects may be contiguous to other objects or may be attached to other objects. Moreover, we will see in Chapter 14 that the particular spatial concepts encoded by direction expressions, the concepts associated with an understanding of gravity and, especially, the concepts of containment, contiguity and attachment, are particularly significant for the 12-24 month-old.

While direction expressions don't actually encode plans or aspects of plans, plans do play an important role in the contexts in which children use direction expressions. Just as children were particularly likely to use "gone" when they brought about a disappearance, and were particularly likely to use "there" when they changed an object's location, so they were particularly likely to use direction expressions when they changed the spatial relationships of objects. The fact that children used the expressions before they actually acted on the objects, and that they used the expressions when they unsuccessfully tried to change the spatial relationships of objects also suggests that these changes were the goals of plans.

However, direction expressions were not like "gone" and

"that" in that they encoded changes in relationships between objects rather than encoding relationships between the child and the objects. Direction expressions were also not entirely like locative "there". "There" initially encoded changes in the location of an object that were the goals of plans. Later, "there" also encoded static spatial relationships. However, "there" never encoded changes in the relationships between objects that were not goals of plans. While some children initially used some direction expressions when they planned to change the spatial relationships of objects, all the children rapidly extended their use of these expressions to include changes they did not bring about.

Direction expressions were correspondingly less egocentric than "that" and "gone", which encoded relationships between the child and objects, "no", "more" and success and failure expressions, which encoded aspects of the child's plans, and even locative "there", which encoded changes in the location of an object brought about by the child. Nevertheless, there are two respects in which the concepts encoded by direct expressions are egocentric. First, in the earliest period at least some children only used direction expressions when they tried to change the relationships of objects. They only began to comment on changes that other people caused at the same time that they began to comment on accidental changes. Second, while children frequently commented on their own movements they did not use direction expressions to describe the movements of other people.

Changes in the Meaning of Direction Expressions

The development of direction expressions was similar to the development of other non-nominal expressions. Like "gone" and "there", direction expressions were initially used when the children tried to change the relationships objects entered into. Like "gone", the expressions came to be used when changes simply took place, whether or not these changes were the result of the child's actions. Like "there", "no" and "more", these expressions eventually encoded static relationships. However, direction expressions were the only expressions to go through all three of these stages.

TABLE 18
Direction Expressions in Different Contexts

GROUP 1

Jonathan

Down

Sess. No.	Self Initiated	Other Initiated	Accidental	Position	Other
1	1				
2	1				
3	7				
5	1				
8	2				
13	2				
15					
16	2		2		
17	2	4	10		
19			1		
20			1		
21			2		
23			3		
24	1		4		
25	1		1		
26	2		2		
27	1		1		
28			4		
29	1		2		
				1	1
	24	4	33	1	1

Up

Sess. No.	Self Initiated	Other Initiated	Accidental	Position	Other
16	12	2			
17	6				
18	1				
19	4				
20	12				
21	7				
24	6				
26	6				
27	6		6		
29	1			1	

On

Sess. No.	Self Initiated	Other Initiated	Accidental	Position	Other
23	7	2		1	
26	1			2	
27	5			3	
28					1
29	1			6	1
	14	2			

Jonathan (continued)

Off

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
20		1			
22	3				
24	6				
26			1		
27		1			
29		14	3	1	
	9	16	4	1	

In

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
24	1				
26	2				
27	1			1	
29	2			1	

Out

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
26	6				
27	11				2
28	4				
29	11				

Henry

Down

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
19	1				
20	1				
22	2		1	1	1
23	5				1
24	3				
	12		1	1	2

Up

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
				5	
23	3				
24	3				
	6			5	

Henry (continued)

In

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
19	1				
20	2				
21	1				
22	16		1	4	
23				3	
24	1			1	
				5	
	21				
			1	13	

Out

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
19	1				
20	5				
21	3				
22	1				
	10				

On

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
19	3				
20		14			2
22	8	5			
24		5		2	

Off

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
23	3				
24	7				

Rachel

Down

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
3	5				
4	4				
	1				
6	4				
8	1			2	
9	1				
10	1			2	
12	4	1			
				4	
	21	1			

Rachel (continued)

In

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
8	4				1
12		1			
13	1			2	
	5	1		2	1

Out

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
12		1		2	
13	1		1		

On

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
6	7				
7	1				
12	1	4		5	
	8	4	5		

Off

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
10	1				
12	1	1			
	2	1			

GROUP II

John

Down

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
1	3				
3	2				
4	10				
	15				

Up

Sess. No.	Self Initiated	Other Initiated	Accidental	Position	Other
1	2				

John (continued)

In
 Sess.No. Self Initiated Other Initiated Accidental Position Other
 3 2

On
 Sess.No. Self Initiated Other Initiated Accidental Position Other
 3 1
 4

Off
 Sess.No. Self Initiated Other Initiated Accidental Position Other
 4 19 1 3

Christian

Down

Sess.No. Self Initiated Other Initiated Accidental Position Other
 2
 3 4 1
 4 2
 5 9 2

On

Sess.No. Self Initiated Other Initiated Accidental Position Other
 5 1

Harriet

Down

Sess.No. Self Initiated Other Initiated Accidental Position Other
 1 8
 3 2
 4 1
 5 7 1
 6 1

Up

Sess.No. Self Initiated Other Initiated Accidental Position Other
 4 2 2
 5 2 1
 6 6

Off

Sess.No. Self Initiated Other Initiated Accidental Position Other
 3 1 2
 6

GROUP III

Paul

Down

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
3	1	1			
5					
6	1				1

In (Inside)

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
4	1				
5	12				
6	8			3	8

Out

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
5	3				

Hannah

Down

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
1	1				
5	1				

Up

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
6	1				

In

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
6	4				1

Out

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
6	1	4		1	2

Anna

Down

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
2	2	1			1
4	3				
5	2		1		
6	8				

Anna (continued)

Up

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
5	1				

In

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
2	2				

On

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
2	1				

Off

Sess.No.	Self Initiated	Other Initiated	Accidental	Position	Other
1	7		1		
3					2
6	2	1			

TABLE 19
Order of Appearance of all Direction Expressions
in Different Contexts

GROUP I

Jonathan

- 1 Self Initiated
- 15 Accidental
- 16 Other Initiated
- 23 Position

Henry

- 19 Self Initiated
- 20 Other Initiated
- 21 Accidental Position

Rachel

- 3 Self Initiated
- 9 Accidental
- 12 Other Initiated Position

GROUP II

John

- 1 Self Initiated
- 4 Other Initiated
Accidental Position

Christian

- 2 Self Initiated
- 5 Accidental

Harriet

- 1 Self Initiated
- 4 Accidental Position

GROUP III

Paul

- 3 Self Initiated
Other Initiated
- 6 Position

Anna

- 1 Self Initiated
Accidental
- 4 Other Initiated

Hannah

- 1 Self Initiated
- 6 Other Initiated
Position

TABLE 20
Order of Appearance of Each Direction Expression in Contexts

Down

Jonathan

1 Self Initiated
5 Accidental
16 Other Initiated
29 Position

Henry

19 Self Initiated
23 Accidental Position

Rachel

3 Self Initiated
9 Accidental
12 Other Initiated

John

1 Self Initiated

Christian

3 Self Initiated
5 Accidental

Harriet

1 Self Initiated
4 Accidental

Paul

3 Self Initiated
Other Initiated

Hannah

1 Self Initiated

Anna

2 Self Initiated
4 Other Initiated
6 Accident

Up

Jonathan

16 Self Initiated
Other Initiated
27 Accidental
29 Position

Henry

23 Self Initiated Position

John

1 Self Initiated

Christian

Harriet

4 Position
5 Self Initiated

Paul

Hannah

6 Self Initiated

Anna

5 Self Initiated

In

Jonathan

24 Self Initiated
27 Position

Henry

19 Self Initiated
21 Accidental Position

Rachel

8 Self Initiated
12 Other Initiated

TABLE 20 (continued)

John

3 Self Initiated

Paul

4 Self Initiated

6 Position

Hannah

6 Self Initiated

Anna

2 Self Initiated

Jonathan

26 Self Initiated

Out

Henry

19 Self Initiated

Rachel

12 Other Initiated
Position,

13 Self Initiated
Accidental

Paul

5 Self Initiated

Hannah

6 Self Initiated
Other Initiated Position

On

Jonathan

23 Self Initiated
Other Initiated
Position

Henry

19 Self Initiated
20 Other Initiated
24 Position

Rachel

6 Self Initiated
12 Other Initiated
Position

John

3 Self Initiated

4 Position

Christian

5 Self Initiated

Paul

Anna

2 Self Initiated

TABLE 20 (continued)

Off

Jonathan

20 Other Initiated
22 Self Initiated
24 Accidental
27 Position

Henry

23 Self Initiated

Rachel

10 Self Initiated
12 Other Initiated

John

4 Self Initiated
Other Initiated Accidental

Harriet

3 Self Initiated

Anna

1 Self Initiated
Accidental

TABLE 21

Numbers of Children Using Different Orders at Use of
Direction Expressions

Direction Expressions in General

Self Initiated < Event	Event < Self Initiated	
7	0	$\chi^2 = 7$ sig at .01 level
Self Initiated < Position	Position < Self Initiated	
9	0	$\chi^2 = 9$ sig at .01 level
Event < Position	Position < Event	
6	0	$\chi^2 = 6$ sig at .02 level

Individual Direction Expressions

Down	Self < Event	Event < Self	
	8	0	$\chi^2 = 8$ sig at .01 level
	Self < Position	Position < Self	
	9	0	$\chi^2 = 9$ sig at .01 level
	Event < Position	Position < Event	
	6	0	$\chi^2 = 6$ sig at .02 level
Up	Self < Event	Event < Self	
	6	0	$\chi^2 = 6$ sig at .02 level
	Self < Position	Position < Self	
	4	1	$\chi^2 = 1.8$ not sig
	Event < Position	Position < Event	
	1	2	$\chi^2 = .02$ not sig
In	Self < Event	Event < Self	
	7	0	$\chi^2 = 7$ sig at .01 level

TABLE 21 (continued)

In (cont)	Self < Position 7	Position < Self 0	$\chi^2 = 7$ sig at .01 level
	Event < Position 1	Position < Event 2	$\chi^2 = .02$ not sig
Out	Self < Event 3	Event < Self 1	$\chi^2 = 2$ not sig
	Self < Position 3	Position < Self 1	$\chi^2 = 2$ not sig
	Event < Position 0	Position < Event 0	$\chi^2 = 0$ not sig
On	Self < Event 5	Event < Self 0	$\chi^2 = 5$ sig at .05 level
	Self < Position 5	Position < Self 0	$\chi^2 = 5$ sig at .05 level
	Event < Position 1	Position < Event 1	$\chi^2 = 0$ not sig
Off	Self < Event 3	Event < Self 1	$\chi^2 = 2$ not sig
	Self < Position 6	Position < Self 0	$\chi^2 = 6$ sig at .02 level
	Event < Position 4	Position < Event 0	$\chi^2 = 4$ sig at .05 level

TABLE 22

Order of Appearance of Direction Expressions

GROUP I

Jonathan

1 Down
16 Up
20 Off
23 On
24 In
26 Out

Henry

19 Down In Out On
23 Up Off

Rachel

3 Down
6 On
8 In
10 Off
12 Out

GROUP II

John

1 Down Up
3 In On
4 Off

Christian

2 Down
5 On

Harriet

1 Down
3 Off
4 Up

GROUP III

Paul

3 Down
4 In
5 Out

Hannah

1 Down
6 Up In Out

Anna

1 Off
2 In On Down
5 Up

TABLE 23

Numbers of Children Using Different Orders of Direction Expressions

Down < Up

8

Up < Down

0

$\chi^2 = 8$ sig at .01 level

In < Out

5

Out < In

0

$\chi^2 = 5$ sig at .05 level

On < Off

5

Off < On

3

$\chi^2 = 2$ not sig

Down/Up < In/Out

7

In/Out < Down/Up

0

$\chi^2 = 7$ sig at .01 level

In/Out < On/Off

2

On/Off < In/Out

4

$\chi^2 = 2$ not sig

Down/Up < On/Off

7

On/Off < Down/Up

1

$\chi^2 = 4.5$ sig at .05 level

CHAPTER 10

THE DEVELOPMENT OF OTHER NON-NOMINAL EXPRESSIONS

So far I have examined the development of six kinds of non-nominal expressions encoding concepts of notice, location rejection, repetition, success and failure, disappearance and direction. These expressions were used in similar ways. Moreover, they were among the earliest non-nominal expressions, they were among the most frequently used expressions, and they were among the commonest expressions (see Tables 24, 25 and 26). It seems fair to say that these six kinds of non-nominals play a particularly important role in early language. However, 114 other non-nominal expressions were used, though these expressions were generally used later, less frequently and by fewer children. In the remainder of this section I will briefly describe the functions of these expressions.

The expressions may be divided into nine groups: expressions related to the non-nominals I have already discussed, expressions encoding additional abstract features of actions or plans, expressions encoding actions, expressions encoding states of objects, numbers, social expressions, formal expressions and a variety of idiosyncratic expressions (see Table 27).

Group 1 : Expressions Related to the First Six Kinds of Non-Nominals

13 expressions are best described in terms of their relationship to the expressions I have already described.

"Here", "this", "these" and "look" were variants of indicative expressions. "Here" was usually used in combination with names.

"This" was used to point out one object among a number of similar

objects and was also used as a simple indicative expression. "These" was used once in the string "these fit". "Look" was especially likely to be used when the child showed an object to someone else, though it was also used non-socially.

"Where's", "see" and "empty" were related to disappearance expressions. "Where's" was specifically used when children searched for an object. It was often, though not always, used in combination with other expressions. "See" was used when children tried to make a hidden object visible. "Empty" was used staring into an empty box.

"Another" and "sames" were related to repetition expressions. Jonathan used "another" to refer to the presence of two similar objects. It was always used in combination with a name or "one". Similarly, Rachel used "sames" to refer to the presence of two similar objects.

"Open", "close", "shut" and "top" were used like direction expressions. However, they referred to movements that changed a closed object into an open one or vice-versa, or that led to one object being placed on top of another object.

All these expressions appeared at a rather late stage, after the first six kinds of non-nominals were well-established.

Group 2 : Expressions Encoding Possession

Eight children used "me", "my" or "mine" and these expressions were among the most frequently used non-nominal expressions. However, the expressions did not appear particularly early.

These expressions were usually used when the child claimed an object. Often the object belonged to the child. Children said "mine" pointing to parts of their bodies, their toys or

their clothes. But sometimes the object clearly belonged to someone else or didn't belong to anyone at all. Rachel says "my book" picking up a book that belongs to her brother. Henry says "my painting" picking up his brother's paint brush and "my watch" when he puts on my watch. Several children say "mine" when they play with the toys I brought. Children also said "mine" when they wanted to eat things.

In many of these cases the children were repeatedly informed by adults that the objects did not belong to them. Siblings tried to discourage children from making inappropriate claims in more practical ways. In some cases, the children had had no contact with the objects in the past that might lead them to believe that they belonged to them.

Sometimes, children used "mine" or "my" to refer to actions rather than objects. Henry says "my do it" when I go to close the tape-recorder lid and he pushes me away and closes it himself. Rachel says "mine sit dere" when her brother tries to push her off a chair.

These facts suggest that the concept encoded by "me", "my" and "mine" is not entirely like the adult concept of possession. That is, possession is not seen as a fairly stable relationship between a person and an object. Instead, these children seem to use possession expressions to indicate their intention or ability to act on an object or simply to act. It is interesting that children did not use any other possessive pronouns.

Group 3 : Expressions Encoding Abstract Features of Actions or Plans

14 expressions referred to abstract features of all actions or classified actions in terms of their aims or consequences.

"Ready", "finish" and "end" marked the initiation or completion of an action. Children said "ready" when they were about to perform an action. A child would say "end" or "finish" as he closed a book, after he got down from the table after a meal, or when he completed a picture.

"Do it" was used to refer to any kind of action. It was almost always used in combination with other expressions. Henry says "do it more" when he tries to shut the tape-recorder lid again. Hannah says "Mommy do it" when she wants her mother to read a book.

Other expressions specified the aim of an action in a fairly general way. "Make" was used when an action resulted in the construction of an object. "Go", "that way", "which way" and "fit" were used when the child tried to fit an object into a space. "Get it" was used when the child tried to retrieve an object. "Lost" and "find" were used when the child searched for a missing object. "Back" and "away" were used when they returned a displaced object to its original position.

All of these expressions were applied to a wide variety of actions. For example, "make" was applied to the construction of a lego building, a pipe-cleaner doll and a picture. "Fit" was used when the child placed a piece in a jigsaw puzzle and placed a doll in a carriage. The expressions referred to the intended consequence of an action rather than to the action itself. These expressions seemed to encode types of plans.

These first three groups of non-nominal expressions are similar to the six types of non-nominal expressions I have already discussed. The first group of expressions are specifically related to these six kinds of expressions. Possession expressions

like "that" and "gone" specify an egocentric relationship between the child and his world. This relationship may involve any object. "Mine" encodes the fact that a child intends to, or is able to act on an object, as "that" encodes the fact that he notices an object and "gone" encodes the fact that he does not perceive an object.

"Ready", "finish", "end" and "do it" could refer to any action. In this respect they are similar to "no" and "more". Expressions like "make" and "fit" are especially similar to direction expressions but they are also similar to "gone" and locative "there". Children used all these expressions when they acted to change the relationships of objects.

However, children used other types of expressions. These expressions did not refer to objects but they were not like the six kinds of expressions I have previously discussed.

Group 4 : Expressions Encoding Actions

34 expressions referred to people's actions. "Drink", "eat", "push", "jump", "kick" and "sit" were among the most common of these expressions. 80% of the utterances of these expressions referred to the child's own actions. It was rather surprising that these expressions encoding simple concrete actions were not particularly prominent in the child's earliest speech. In fact, seven of the nine children used these expressions after they used expressions that referred to more abstract features of actions or plans (the other two children used expressions of both kinds in their first session)(see Table 24).

Group 5 : Expressions Encoding States of Objects.

14 expressions referred to transient states of objects or changes in states of objects. The most common of these expressions

was "fall". A number of different expressions, such as "bang", "boom" and "bump" were used when objects banged into each other. These expressions were not frequently used and they tended to appear at a rather late stage.

Group 6 : Numbers

Several children used numbers from "two" to "eight". However, these expressions were not used to indicate how many objects were present. Instead, they were used when actions on objects were repeated. For example, numbers were used when children lined up beakers in a row, put blocks into a box, or put one arm and then another into the sleeves of a shirt. Jonathan makes a row of blocks and says "two" each time he adds a new block to the row. John says "five", "six" and "eight" as he stacks blocks into a tower. Children seemed to have an idea of the sorts of activities that are accompanied by counting although they didn't understand the value of specific numbers.

Group 7 : Social Expressions

12 expressions did not seem to encode concepts but instead established social relationships (see Chap.2, Chap.5). That is, the common feature of the contexts in which these expressions occurred was a social or conversational fact. "Hello" and "bye-bye" were used to greet or take leave of other people. "Hereyare", "thereyare" and "thank you" accompanied exchanges of objects. "Please" accompanied requests. "Night-night" was used when the child or other people went to sleep. "Yes", "eh" and "why" were used as all-purpose replies to statements, questions or demands. "Shh" and "shut up" were used to silence other speakers.

While these expressions were usually used in social or conversational contexts, some of them were also used in non-social ways. "Hello" and "bye-bye" were sometimes used as indicative or disappearance expressions. Children said "hello" when they noticed an interesting object and "bye-bye" when an object disappeared. Similarly, "yes" was sometimes used to indicate the fact that the child was pursuing the correct course of action or that he intended to pursue a course of action, despite the objections of other people or the recalcitrance of objects.

In a way "yes" was used as the opposite of "no". However, while "no" was usually used in non-conversational ways and was only occasionally used as a question-answering device, "yes" was usually a stock reply to other people's utterances and was only occasionally used in other contexts.

Social expressions, particularly "hello", "bye-bye", "yes" and "hereyare" were among the earliest expressions to appear and were used by large numbers of children, although they were less commonly used than expressions of the first six types. However, they were not used particularly frequently, especially in the later period. They were rarely combined with other expressions.

Group 8 : Formal Expressions

Another group of expressions, including "one", "now", "a" and "it" was rather puzzling. These expressions were always used in combination with other expressions. "One" was combined with "that", "this" and "another". "Now" and "it" were combined with non-nominals. "A" was combined with names. However, these expressions didn't seem to alter or add to the meaning of the

other expressions in the string. Children used "a"+name strings or non-nominal +"it" strings in exactly the same contexts in which they used the names or non-nominals by themselves. If we examine the contexts in which these expressions are used, we can find no common factor that could not be accounted for by the presence of the other expressions in the string.

In adult English, the meaning of these expressions largely depends on the way they interact and contrast with other expressions. "One" and "now" are involved in a whole system of number and tense. Similarly, "a" and "it" play an important role in a complex anaphoric system. Even for adults it is difficult to specify the meaning of these expressions in isolation from these systems.

However, the children in this study had not acquired systems of number, tense or anaphora. They did not contrast "now", "a" or "it" with "then", "the" or "he". Although they had acquired some other numbers they usually used "one" in contexts that were totally unlike the counting games that accompanied "two" or "five" (see above). Because of this, and because the expressions never occurred in isolation, it was extremely difficult to tell what the meaning of these expressions was or even whether these expressions were meaningful at all.

We might be able to explain the early appearance of these expressions by arguing that they don't have a meaning. Instead, these expressions serve a purely formal function. They transform a single-word string into a two-word string without increasing the semantic content of the string. Bloom (1973) has described how Allison used a mysterious nonsense word "wida" at a similar stage in her linguistic development. Bloom concluded that "wida"

had no meaning but simply changed one-word strings into two-word strings. She hypothesised that such expressions might ease the transition from the one-word stage to the two-word stage. Dore et al (1976) have described similar devices. I would suggest that "one", "now", "a" and "it" serve a similar function.

It is interesting to note that some other expressions like "here" and "do it" were exclusively used in multi-word strings. "Here" was semantically identical to "that" but only occurred in two-word strings. This fact also suggests that formal considerations affect the child's language even at this early stage.

Group 9 : Other Expressions

16 other expressions were used infrequently, late and in rather idiosyncratic ways. 12 of these expressions were used by single children and many of them were only used a few times. Some, like "come" and "undone" were used in different ways at different times.

Since I originally defined the class of non-nominals to include all expressions that did not refer to objects or object properties it is not surprising that this class turns out to be rather heterogenous. Some expressions are social devices, some seem to play a purely formal role, some refer to specific actions.

However a large number of non-nominal expressions, including "that", "there", "no", "more", "oh dear", "gone" and direction expressions, and expressions like "mine" and "make", seem to be used in similar ways. They encode concepts that involve important, abstract aspects of plans and objects. Most of these concepts also involve relationships between the child,

his actions and objects. Expressions encoding these concepts appeared early, were frequently used and were used by most of the children studied.

TABLE 24

First Non-Nominal Expressions

Note: The first ten expressions are recorded, if the tenth expression occurred in the middle of a session the other expressions appearing in that session are recorded:

GROUP I

<u>Johathan</u>		<u>Henry</u>		<u>Rachel</u>	
Sess.No.	Expressions	Sess.No.	Expressions	Sess.No.	Expressions
1	Down	1	No	1	There
3	There	7	Gone	3	Down
	Hello		Hereyare		Bye
5	Hereyare		Wasat	4	No
9	This	8	Thank you		Fall
11	Ah	9	Oh No		Mine
16	Up		More	5	More
17	Oh Dear	12	Tickle	6	On
18	No	13	See		Thank you
	Yes	14	Hello	7	Hereyare
	Dress		Yes		Look
			Night-Night		
			Wheres		
			Kick		

GROUP II

<u>John</u>		<u>Christian</u>		<u>Harriet</u>	
Sess.No.	Expressions	Sess.No.	Expressions	Sess.No.	Expressions
1	That	1	That	1	That
	Gone		Gotit		Gone
	Bye Bye	2	Down		Hello
	Up		Drink		Push
	Down	3	Gone		Down
	Eight	4	Kick	2	No
2	Push		Yeah		Drink
	Woops		Birm		Bye Bye
	Two		Read	3	Look
	Three				Off

TABLE 24 (continued)

(Group II continued)

Stuck
More
Oh Dear

GROUP III

<u>Paul</u>		<u>Hannah</u>		<u>Anna</u>	
Sess.No.	Expressions	Sess.No.	Expressions	Sess.No.	Expressions
1	That	1	That/There	1	Whatsat
	There		Gone		There
	Gone		No		Gone
	No		Me		No
	Yes		On		More
2	Hereyare		Yucch		Off
	Look		Yes		Broke
3	Oh		Down		Two
	Down		Heave		Hello
	Yee		Hello		Door
			Again		Oh
			Brmm		Yes
			Hereyare		A
			Cuddle		

TABLE 25

Ten Most Frequently Used Non-Nominal
Expressions (in order of frequency)

Rachel

Dere
My
No
Gone
Down
Come Off
On
Hereyare
Made it
More

Henry

Wazat
Gone
No
More
Tosee
Mine
Dere
Wheres
On
In

Jonathan

Dere
No
Oh Dear
Up
Hereyare
Down
Dat
Yes
Out
Hello

John

That

Gone
Bye Bye
Off
Down
Oh Dear
Three
Four
Up
Push
Woops
Empty

Christian

That
Gone
Where
Down
Got it
Drink
There
Fall
Bang
Find

Harriet

That

Oh Dear
Top
Push
Gone
Down
No
Up
Stuck

Paul

That
Yes
Eh
Oh
Look
No
There
Gone
Inside
Shh

Hannah

That
There
One
No
Yes
Fit
This
Do it
Gone
Me

Anna

That
Yes
No
There
Oh
More
Two
My
Hello

TABLE 26

Number of Children Using Each Non-Nominal Expression

Expressions used by nine children:

Down
Gone
That

Expressions used by eight children:

There
No
In

Expressions used by seven children:

Up
Yes
On
Bye Bye
More
Oh Dear (Oh No-Oh)
Me (My) (Mine)

Expressions used by six children:

Hereyare
Off
Fall

Expressions used by five children:

Hello
Out
Go
Again
Look

Expressions used by four children:

Two
Do It (Do)
Get it
Wheres
Drink

Expressions used by three children:

Open
Find Night-Night
Read
Jump
Come
Now

TABLE 26 (continued)

See
Kick
Push
Back
Sit
Eat Done it (Did it)
Top

Expressions used by two children:

Ah
Here
Crying
Wee
Draw
Press
Painting
Cuddle
Want Why
Please
Finish
Make (Made)
Wrong
Fit
Burn
Five
Bang
Ready
One
This
Eh
Poo

Expressions used by one child:

Dress	Cough
Bum	Drop it
Stop	Kiss
Hold	Sleep
Close	Over
Undone	Tidied
Swimming	Outside
Knock	Upsy Daisy
Pull	Shut Up
Put away	Lost it
End	Away
Build	Ironing
Another	Sames
Rub out	Yee
Up side down	Shh
Ringin	Right
Tickle	Boom
Stick	Yeh
Shut	Quick
Bite	
Bump	Eight
Ride	Three
Show	Four
Thank you	Six

Heave
Roll
Round
Beep
Woops
Empty
Yucch
Good
Can't
Which Way
Room
Called
These
Stroking
Stuck
Thereyard
Broke
Poor
Wa
Ow
Horray
Yere
That Way
Good girl

Sing
Come off
A

TABLE 27

Other Non-Nominal Expressions

GROUP IExpressions Related to First
Six Non-nominal Types

Look
Wheres
Open
Top
Here
This
Close
Another
Shut
These
Empty
See
Sames

GROUP II

Possession

Me
Mine
My

GROUP IIIExpressions Encoding Abstract
Features of Actions

Go
Do it
Get it
Find
Finish
Make
Fit
Ready
End
Lost it
Away
Which Way
That Way
Back

GROUP IV

Expressions Encoding Action

Drink	Tickle
Read	Bite
Jump	Ride
Kick	Show
Push	Cough
Sit	Kiss
Eat	Sleep
Crying	Tidied
Draw	Ironing
Press	Heave
Painting	Stroking
Cuddle	Sing
Dress	Rub Out
Swimming	Drop
Knock	Poo
Put Away	Hold
Build	Pull
	Wee

GROUP V

Expressions encoding Object States Numbers

Burn
Stop
Stick
Bump
Bam
Boom
Roll
Round
Called
Stuck
Broke, Ringing, Bang, Fall

GROUP VI

Two
Three
Four
Five
Six
Eight

TABLE 27 (continued)

GROUP VII

Social Expressions

Yes
Bye Bye
Hello
Hereyare
Please
Thank you
Eh
Why
Shh
Shut Up
Nigh-Night
Thereyare

GROUP IX Other Expressions

✓Want	Quick
Up Side Down	Beep
Over	Yucch
Outside	Room
Upsy daisy	Poor

GROUP VIII

Formal Expressions

One
Now
A
It

Wa	Borm
Yere	
Ah	
Come	
Undone	

CHAPTER 11

NON-NOMINAL EXPRESSIONS AND NAMES

I defined names as those expressions that refer to objects or properties of objects. These expressions were used throughout the one-word period. However, there were a number of differences between names and non-nominal expressions. Children used more names than non-nominal expressions but names were used less frequently, later, less consistently and by fewer children.

333 different names were recorded, while only 138 different non-nominal expressions were recorded. All the children used more names than non-nominal expressions (see Table 28). However, only 4252 utterances of names were recorded, while 6504 utterances of non-nominal expressions were recorded. All but one of the children used non-nominal expressions more frequently than names (see Table 29). There was a large group of relatively infrequently used names and a smaller group of more frequently used non-nominals.

Five children did not use any expressions when they were first visited. Non-nominal expressions appeared before names in the recordings of three of these children, the three who were recorded at fortnightly rather than monthly intervals. The other six children first used both kinds of expressions in the same recording.

However, non-nominal expressions were particularly prominent in the early speech of all the children. If we look at lists of the first ten or so expressions each child produced, non-nominal expressions predominate (see Table 30). 78 of the 122 expressions in these lists are non-nominal. This is despite the fact that

more names were used over all.

Furthermore, non-nominal expressions were particularly frequent in the early period. Children used names more frequently as they grew older. In the corpora of eight children, including the five children whose first language was recorded, the percentage of nominal utterances increased in the second half of the period in which utterances were recorded (see Table 31, Fig.1).

Several children would suddenly use names very frequently for a session or two and would then use them less frequently (see Fig.1). Often these nominal peaks were associated with the introduction of many new names. It was as if the child suddenly became interested in naming. It is interesting that these naming explosions occurred after the child had several well-established non-nominal expressions.

Names were more likely to appear in only one session than non-nominals. In groups II and III, on average, 72% of the names occurred in only one session while only 54% of the non-nominals did (see Table 32). (The corpora of group I could not be analysed in this way). If we just look at non-nominals of the first six types, the figures are even stronger. Only 15 of the 59 such expressions (or 25%) occurred in only one session, and 13 of these were direction expressions. It seemed that once a non-nominal expression appeared it was more likely to continue to be used than a name. Names were more likely to appear briefly and then apparently drop out of the child's language, at least temporarily.

Non-nominal expressions were more likely to be used by several children. 11.5% of all the non-nominal expressions were

used by more than 5 of the children, while only 4.5% of the names were used by more than 5 children (see Table 26 and Table 34). Again, the figures are even more striking if we just consider non-nominals encoding notice, disappearance, etc., that is, non-nominals of the first six kinds. All these expressions except "out" were used by more than five children.

Finally, there was more individual variation in the number of names children used than in the number of non-nominal expressions they used. All the children in each group used about the same number of non-nominal expressions, but some children in each group used many more names than others. Some children used about the same number of names and non-nominals, while other children used more than twice as many names as non-nominals. However, there was no sharp distinction between nominal children and less nominal children. Instead, there was a kind of continuum between less nominal, more nominal and moderately nominal children (see Table 28 & 35, Fig.2).

This pattern is similar in some ways to the pattern of individual variation reported by Nelson (1975 a). Nelson claims that children in the one-word period can be divided into two groups, a referential group, who use large numbers of names and are concerned with the referential and descriptive functions of language, and an expressive group, who use large numbers of social and expressive expressions and are concerned with the manipulative, affective, social functions of language.

The data from these children support Nelson's claim that some children use more names than other children. However, there are three respects in which the pattern of individual variation I have described is not like the pattern described by Nelson.

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First, there was no trade off between names and non-nominal expressions. The children who used more names did not use fewer non-nominal expressions. Instead, all the children used about the same number of non-nominal expressions, and, in addition, some children used more names than others. Second, the children could not be divided into two groups. Instead, there was a continuum of more and less nominal children. Third, non-nominal expressions were not usually social or expressive. On the contrary, they were as descriptive and, in a sense, as referential as names. They simply described aspects of the world other than objects and object properties. Some non-nominal expressions, such as "bye-bye" and "yes", were social or expressive, but there was no relationship between the use of such expressions and the use of names. Some children used large numbers of names and used many social expressions, and some children used few names and used many social expressions (see Table 35).

Of course, it is difficult to gauge the importance of any particular class of expressions in the one-word period. But we might plausibly look at how many expressions are in the class, how frequently the expressions are used, how early they appear, how consistently they are used throughout the period and how likely they are to be used by several children. If we consider all but the first of these measures, non-nominal expressions play a more important role in the child's early language than names. At least, we must accept that there are two equally important classes of early expressions, a small class of non-nominal expressions that are frequently, commonly and consistently used and a larger class of less frequently, commonly and

consistently used names. The most important of these non-nominal expressions seem to encode notice, location, rejection, repetition, success and failure, disappearance and direction.

The different properties of names and non-nominal expressions may help to explain the relative neglect of non-nominals in the literature. As we have seen, there is one respect in which names are particularly prominent; there are more different names than there are non-nominals. In a classical diary study of early language this is exactly the aspect of language most likely to be recorded. Diaries typically record the appearance of a new word. The recurrence of an old word or the frequency with which a word is used are not typically recorded. Nor are comparisons made between different children. If we simply list the new words a child produces, names may seem disproportionately significant.

If the findings reported here are correct and are typical of children in general, a number of common assumptions about early language will need revision. Children's first words aren't necessarily names. Instead, naming is only one of many functions of early language, it is neither the earliest nor the most important function. Instead of being the fons et origo of meaning, naming is only one language game among many.

In this respect the development of expressions such as "that" is particularly interesting. These are among the earliest expressions to emerge and are among the most frequently used expressions. These expressions seem to reflect a general principle that interesting or significant objects may be marked linguistically, although specific objects or classes of objects are not marked. We might argue that indicative expressions

establish the ostensive function of language, they establish the fact that there is a naming game to be played. Later, this function is elaborated in the development of actual names, particularly in the naming explosions. I will discuss this relationship in more detail in Chap.15.

Ostensive definition can't be the only or the most important route by which meaning is established. While ostensive definition might establish the meaning of names, it could not be used to establish the meaning of non-nominals. You can't point to a no or a more.

The notion that expressions initially refer to concrete objects and are then used in progressively more abstract ways is not applicable to the development of non-nominal expressions. Children use non-nominal expressions in highly abstract ways in their earliest speech. That is, they can apply these expressions appropriately to a wide variety of situations that do not involve similar objects or actions.

Also, intrinsically relational concepts are not encoded after concepts of objects or properties. The concepts encoded by the most important non-nominal expressions all involve relationships, often quite complex relationships, between the child, objects and actions.

These claims about the origin and development of meaning and many other similar claims depend on the belief that the child's first words are names. At best, it is claimed that early non-nominals are social, pragmatic or expressive, and are therefore not particularly relevant to the development of meaning. At least as far as these nine children are concerned this belief is simply false. Many of the most important of these children's

early words encoded facts about the world, but did not name objects.

TABLE 28

Number of Names and Non-Nominal Expressions Used

	<u>Names</u>	<u>Non-Nominal</u>	<u>Percent of Names</u>
Jonathan	120	53	71
Henry	74	49	60
Rachel	110	53	68
John	32	22	60
Christian	37	19	67
Harriet	43	22	66
Paul	36	35	51
Hannah	86	52	63
Anna	55	45	55
	<u>593</u>	<u>350</u>	

TABLE 29
Number of Nominal and Non-Nominal Utterances

	Nominal Utterances	Non-Nominal Utterances
Jonathan	780	1556
Henry	861	1241
Rachel	991	501
John	159	283
Christian	220	276
Harriet	399	551
Paul	180	614
Hannah	290	663
Anna	372	819
	4252	6504

TABLE 30

First Words

* The first ten words used were recorded. If the tenth word occurred in the middle of a session the other words in that session were recorded.

GROUP I

Jonathan

1 Down
3 There
Hello
5 Hereyare
9 This
11 Ah h
Duck
16 Up
Bird
17 Oh Dear
Mama
Dada
Trousers

Henry

1 No
7 Gone
Hereyare
Wasat
8 Thak kew
9 Oh No
More
Mommy
12 Tickle
Hot

Rachel

1 There
Push Chair
Mommy
Simon
2 Down
Bye
4 No
Fall
Mine
Car

GROUP II

John

1 That
Gone
Bye Bye
Up
Down
Eight
Lorry
Daddy
Baby
Potato
Flower

Christian

1 That
Got it
Keys
Bird
Daddy
Baby
2 Down
Drink
Garden
Car
Mother
Clock
Glasses

Harriet

1 That/There
Gone
No
Push
Down
Quack
2 No
Drink
Bye Bye
Bear
Car
Brmr Brmr
Book
Toohoo

GROUP III

Paul

1 That
There
Gone
No
Yes
Car
Mommy
2 Hereyare
Look
Rupert
3 Oh
Down
Yeh

Hannah

1 That/There
Gone
No
Me
On
Yucch
Yes
Down
Heave
Hello
Again
Brrm
Hereyare
Cuddle
Guy
Cup

Anna

1 Whatsat
Dere
Gone
No
More
Off
Broke
Two
Hello
Poor
Oh
Yes
Book
Chair
Ball
Baby
Mommy
Teddy
Looloo
Bubble
Cat
A

TABLE 31

Percentage of Nominal Utterances in 1st and 2nd halves of the recording period

	1st half			2nd half		
	Total Utterances	Nominal Utterances	Percent	Total Utterances	Nominal Utterances	Percent
Jonathon	364	13	3.6	1972	767	38.9
Henry	278	98	35.3	1824	763	41.8
Rachel	140	60	42.9	1352	931	68.9
John	263	89	33.8	179	70	39.1
Christian	208	68	32.7	288	152	52.8
Harriet	274	95	34.7	676	304	45.0
Paul	150	9	6.0	644	171	26.6
Hannah	232	56	24.1	721	234	32.5
Anna	428	153	35.7	763	219	28.7

TABLE 32

Percentage of Names and Non-Nominal Expressions Used in Only One Session

	Nominal			Non-Nominal		
	Number	Total	Percent	Number	Total	Percent
John	24	32	75	12	22	55
Christian	27	37	72	12	19	63
Harriet	24	43	56	9	22	41
Paul	30	36	83	18	35	51
Hannah	72	86	84	28	52	54
Anna	34	55	62	26	45	58

TABLE 34

Number of Children Using Each Name

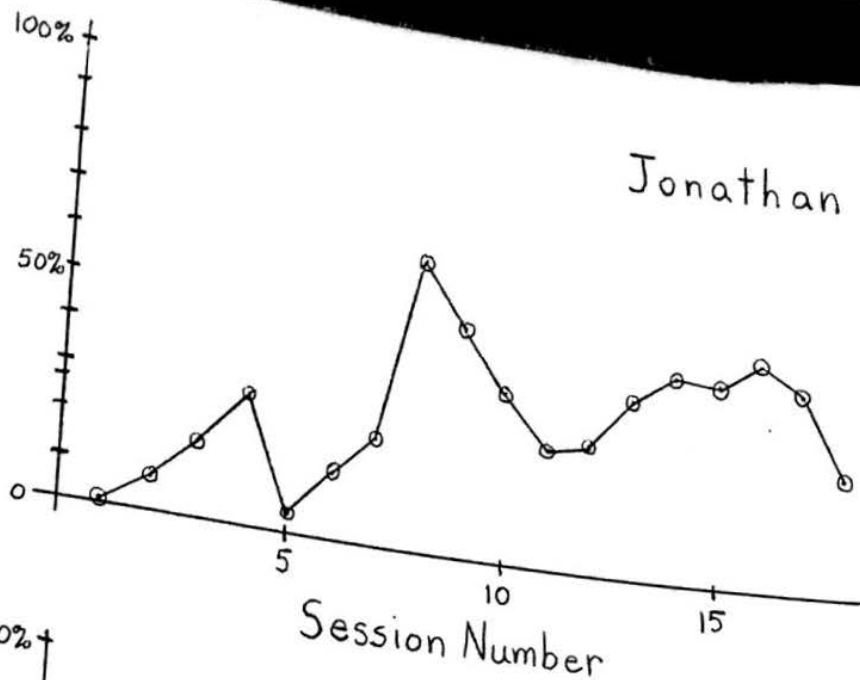
<u>9 Children</u>			
Mommy	Box	Letter	Socks
<u>8 Children</u>	Green	Garden	Clothes
Daddy	Train	Weeble	Ears
Book	House	Mouse	Milk
Baby	Head	Lion	Coffee
Car	Chair	Feet	Egg
Boy	Hand	Gun	Bag
	Red	Kangaroo	Lego
<u>6 Children</u>	Button	Dinner	Chin
Clock	<u>3 Children</u>	Lid	Face
Eyes	Bird	Big	Picture
Noise	Door	White	Camper
Ball	Lorry	Brrm Brrm	Boat
Spoon	Hat	Hone	Watch
Teddy	Window	Toohoo	James
Cat	Key	Airplane	Hannier
Dog	Bike	Mouth	+ 223 expressions
Water	Donkey	Tea	used by only 1
<u>5 Children</u>	Kermit	Block	child
Duck	Toy	Knee	
Nose	Blue	Cake	Total = 333
Man	Bed	Dress	
Shoes	Nana	Soap	
Doll	Fish		
Yellow	Bubble		
Hoise	Wet		
Water	Apple	Pram	
<u>4 Children</u>	Boots	Finger	
Hot	Alison	Lady	
Dirty	<u>2 Children</u>	Monkey	
Coat	Trousers	Table	
Bear	Elephant	Painting	
Piggy	Tractor	Giraffe	
Cow	Phone	Round	
Cup	Light	Balloon	

Pragmatic
TABLE 35
 Number of Names, Expressions and Other Non-Nominal Expressions

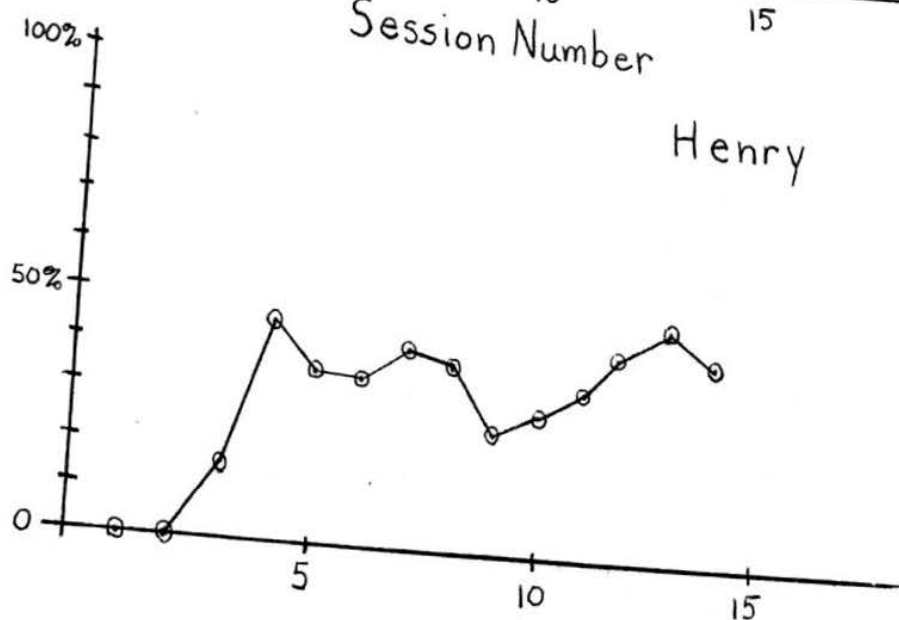
	No. of Pragmatic Expressions	No. of Names	No. of other Non-Nominals
Jonathan	5	120	48
Henry	8	74	41
Rachel	6	110	46
John	2	32	20
Christian	1	37	18
Harriet	4	43	18
Paul	4	36	31
Hannah	5	86	47
Anna	3	55	42

Nominal
Utterances
(% of total)

Jonathan



Henry



Rachel

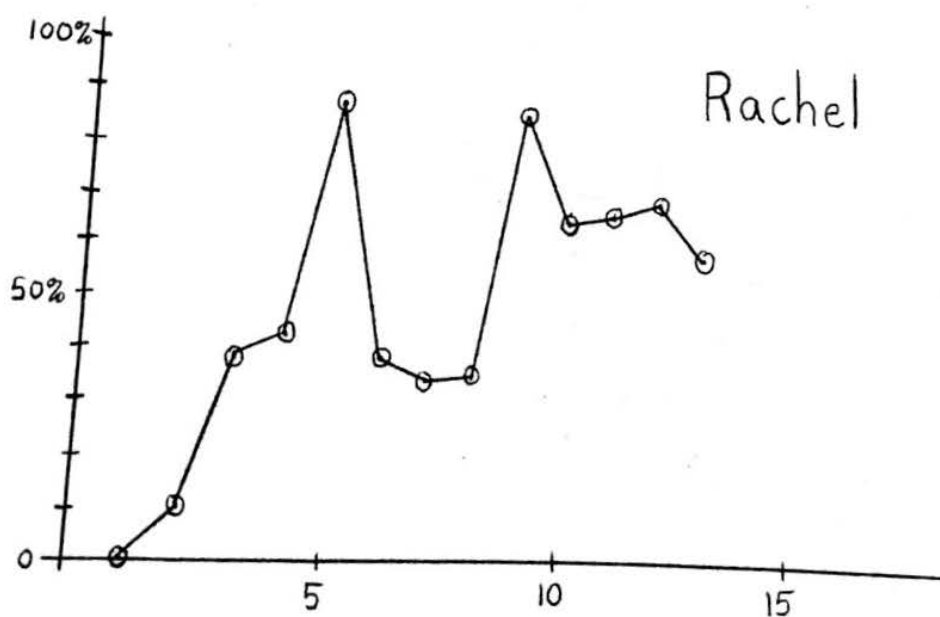


Figure 1. Changes in frequency of nominal utterances over the observation period. a) Group I.

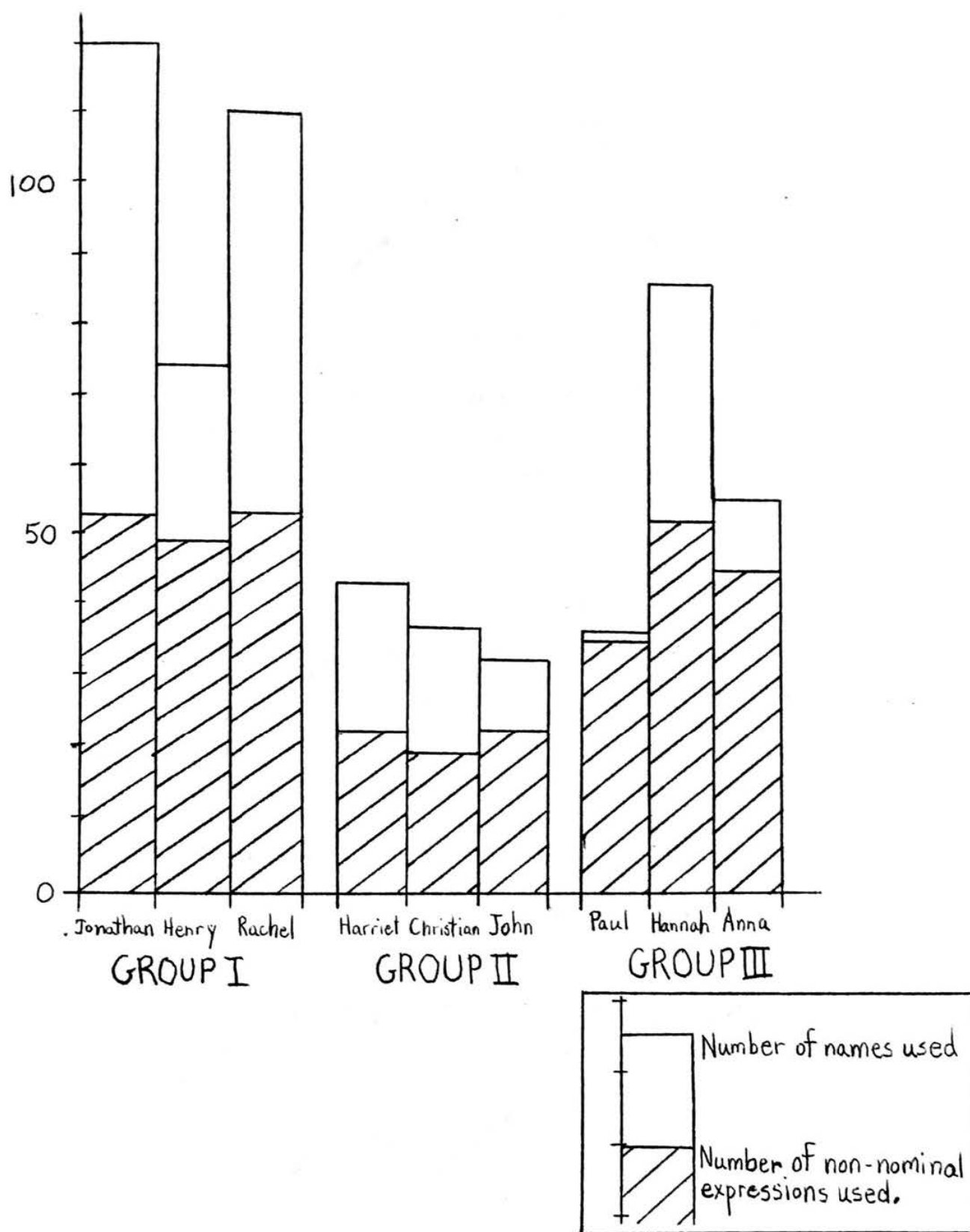
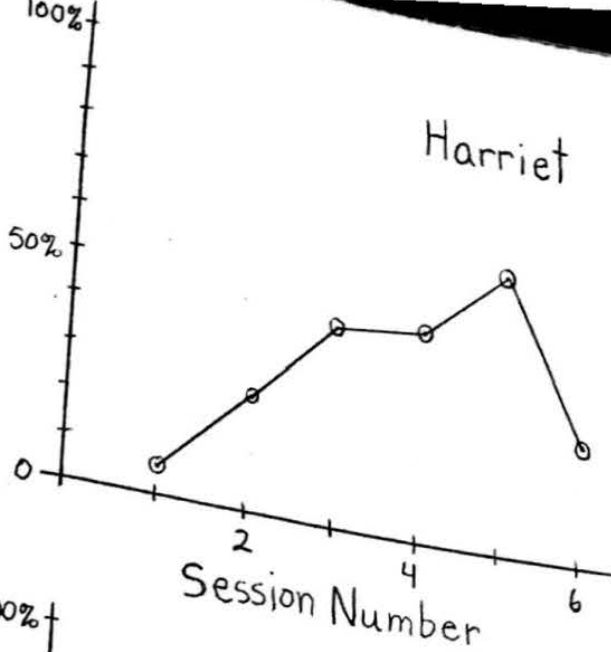


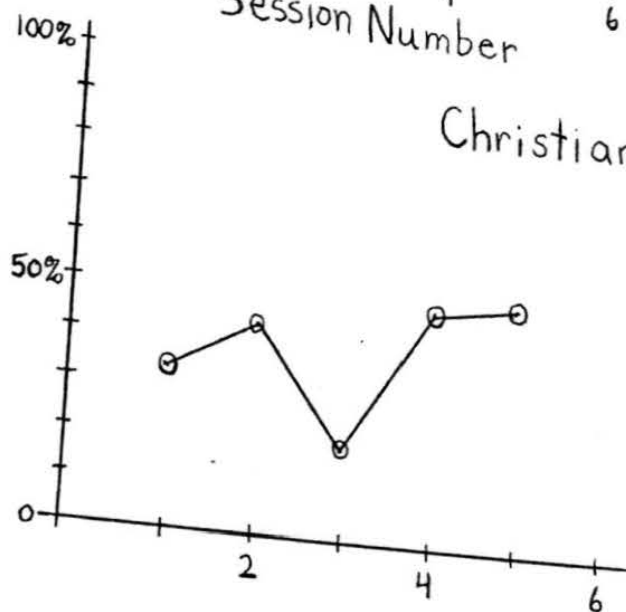
Figure 2. Relative use of names and non-nominal expressions in nine children.

Nominal
Utterances
(% of total)

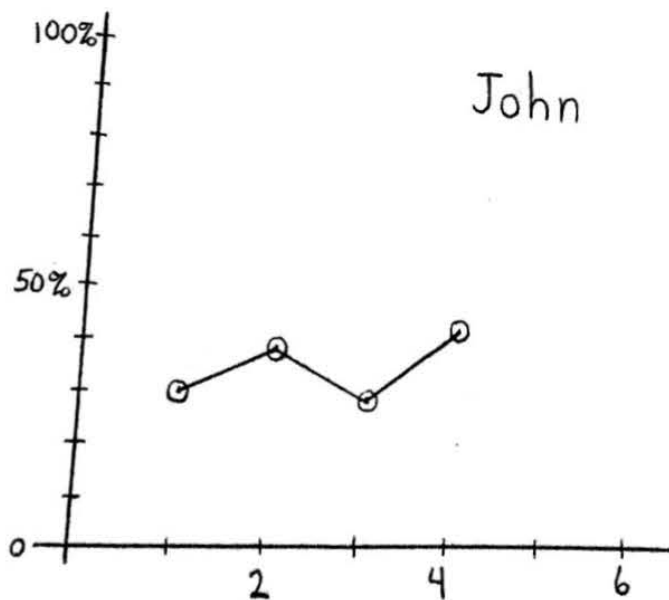
Harriet



Christian

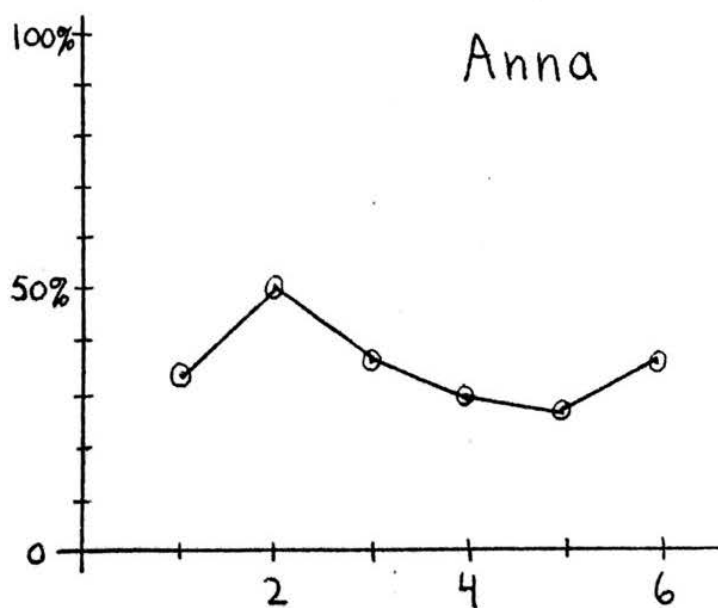
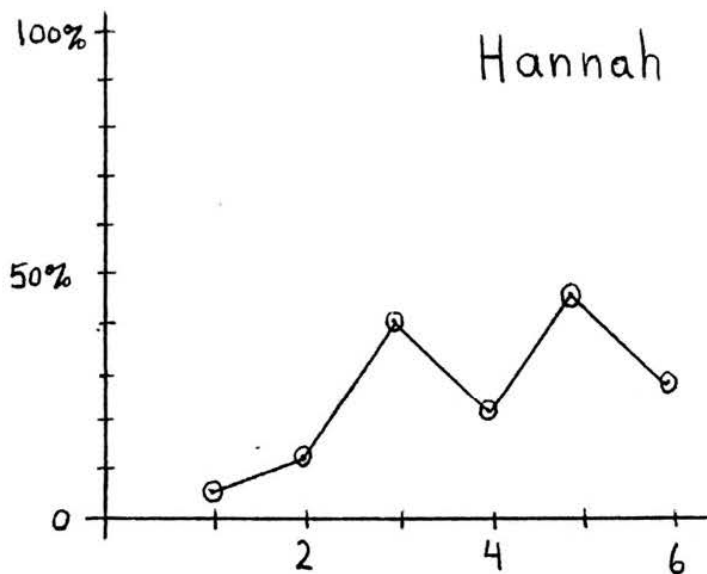
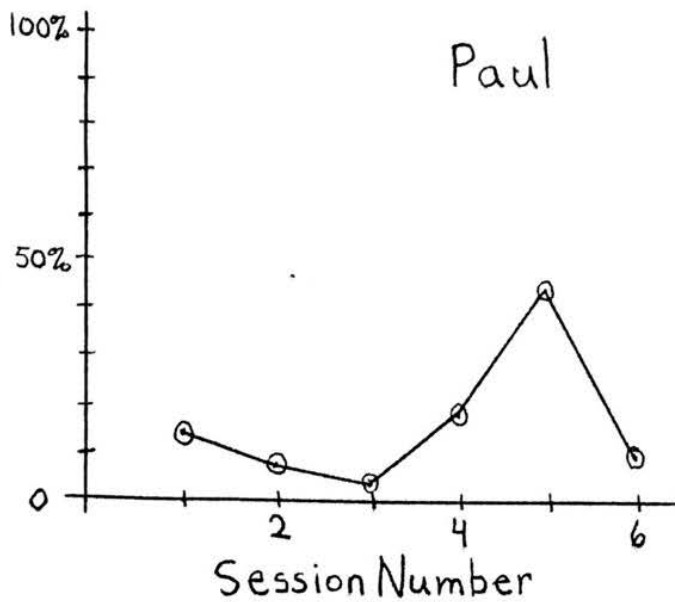


John



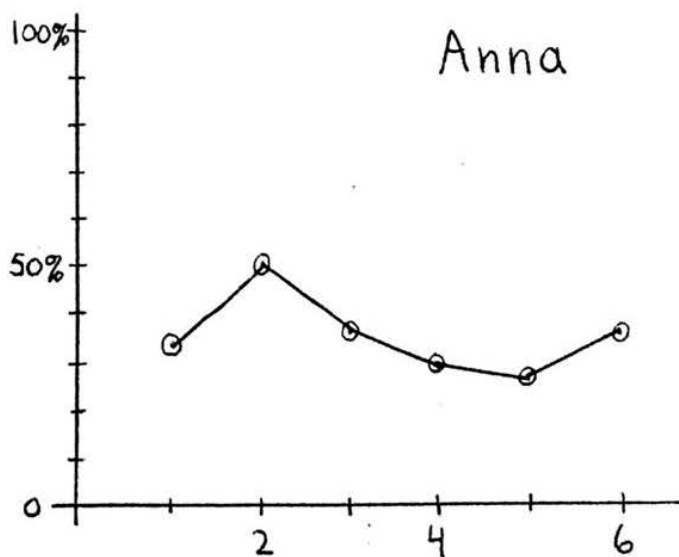
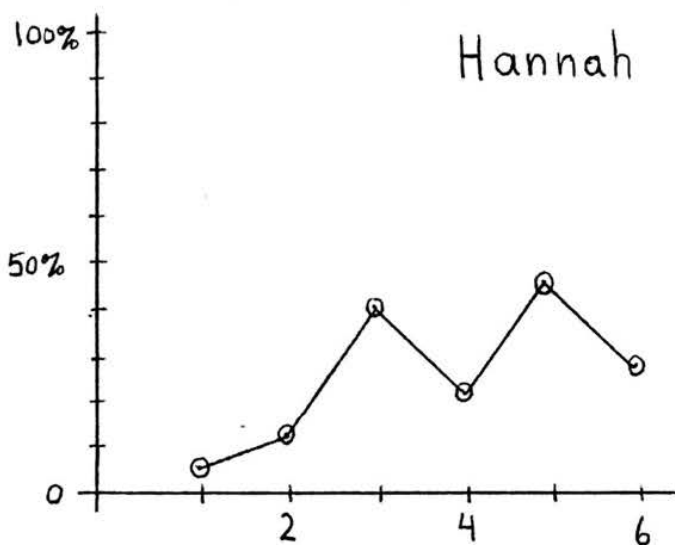
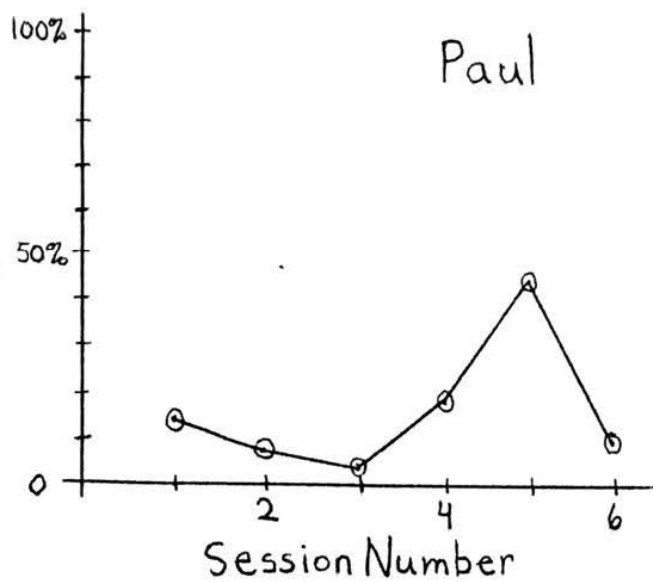
b) Group II.

Nominal
Utterances
(% of total)



c) Group III.

Nominal
Utterances
(% of total)



c) Group III.

CHAPTER 12

WORDS AND PLANS

I have claimed that a number of important early expressions encode aspects of plans. In this chapter I will briefly summarize the evidence for this claim and will then consider what this claim suggests about the relationship between linguistic and cognitive development. I will consider the development of plans, I will claim that at least some of the concepts encoded by non-nominal expressions appear after 18 months. I will then argue that the acquisition of non-nominal expressions could facilitate the development of the concepts those expressions encode. Finally, I will consider the implications of this argument for the later development of language.

Plans and Non-nominal Expressions

When we have a plan, we recognise that the present state of affairs may be transformed into a non-existent, possible, future state of affairs, by means of an action, if objects behave in the expected way. If we call the non-existent, possible, future state of affairs a goal, we might say that a plan involves an action that is performed in order to achieve a goal (see chap.5). I needed to invoke the concept of a plan in order to explain a number of features of early linguistic behavior. The meaning of many expressions could only be defined in these terms. Direction expressions like "down", "up", and "there", and other expressions like "make", "get" and "find", and to a certain extent, "gone", seemed to encode features of the states of affairs brought about by actions, rather than

features of the actions themselves. However, in the early period, the expressions were only used when these states of affairs were the goals of actions. So "there" was used when children tried to shift the location of objects, and "gone" was used when they tried to make objects disappear.

Other expressions encoded more abstract aspects of plans. "There" and "Oh dear" marked the fact that an action did or did not bring about a goal. "No" marked the fact that the child refused to act to bring about a goal suggested by someone else, that his goals were incompatible with the consequences of someone else's actions, that his action failed to bring about a goal, or that he simply decided not to act to bring about a goal. "More" marked the fact that an action, with a particular goal, was repeated.

The common factor in the contexts in which these expressions were used was neither an action nor a state of affairs. Instead, I had to specify an action, and a state of affairs that was the goal of that action, a state of affairs that action was intended to bring about, in order to explain the way these expressions were used. In other words I had to specify a plan.

I also had to claim that these expressions encoded aspects of plans in order to explain some more general features of the contexts in which they were used. I had to explain why expressions like "more", "down", "there" and "gone" were used both before and after actions were performed or states of affairs ensued. These two contexts involve different actions and states of affairs, but involve the same plan, since we have a plan before we actually implement it. Similarly, I had to explain why some expressions were used when actions failed to

achieve a goal, as well as when they succeeded. Again, while the events in these two contexts are different, the plan is the same. Finally, I had to explain why expressions were used when the child requested that someone else perform an action that would lead to a certain result, as well as when they tried to achieve that result directly.

This suggests that the expressions don't encode actions, but are concerned with goals that might be achieved by influencing the actions of others.

The Development of Plans

I have argued that we need to postulate plans in order to explain the child's early language. But we might also infer the existence of plans from the child's non-linguistic behavior. When a child solves a jig-saw puzzle, for instance, turning pieces that don't fit, trying new pieces in different spaces, and searching for missing pieces, we feel that he is acting in order to bring about a particular state of affairs, we feel that he has a plan. We might trace the pre-linguistic development of plans by examining the child's behavior.

Unfortunately, research into the development of intelligent action in infancy is still in its own infancy. Piaget's pioneering work in The Origins of Intelligence (Piaget, 1953), has been supplemented and altered by the work of writers like Bower (1974, 1978), Bruner (1971, 1973) and Papousek (1967, 1969). Still, there is no established consensus about the development of plans.

In the following section I will outline an account of the development of intelligent action that is necessarily simplified, but is at least plausible and is consistent with

the empirical findings. I will distinguish four types of action, action based on innate co-ordinations, action based on learned contingencies, action based on plans, and action based on insight. I will argue that these types of action emerge in a particular developmental order.

Innate Actions

At birth, infants can co-ordinate their actions and their environment. These co-ordinations are innately determined, certain experiences will elicit appropriate actions even if the infant has never had those experiences or performed those actions before. Reflexes are the most obvious innate co-ordinations. Infants turn their heads when they are touched on the cheek, they suck when they are touched on the mouth.

Recent research suggests that these innate co-ordinations go beyond simple reflexes. One of the most striking examples of such a co-ordination is early reaching. Infants will reach appropriately for an object long before they can successfully grasp it (Bruner & Koslowski, 1972). Bower, Broughton and Moore (1970) have even reported that infants less than two weeks old will reach for objects. Another striking innate co-ordination is early imitation. Ten day-old infants will appropriately imitate a range of facial gestures (Meltzoff & Moore 1977). Other social behaviors such as smiling also seem to be innately related to certain kinds of experiences.

Early reaching and imitation are more sophisticated and flexible than simple reflexes. Infants adjust the extension of their arms to the distance of the object, and even make "hand shaping" movements appropriate to the size of the object. They can accurately reproduce a wide range of gestures. Never-

theless, like reflexes these co-ordinations of action and perception appear to be innately determined rather than learned.

Learned Actions

Sometime after birth, the infant notices that particular actions are followed by particular events. The infant can then reproduce an action in order to reproduce the event that followed that action. Conditioning experiments provide examples of this kind of action. Infants can learn to suck at a particular rate (Lipsitt & Kaye, 1964), or to turn their heads (Papousek, 1967), or to vocalise (Rheingold et al, 1959) if these actions are followed by reinforcement.

However, this kind of operant conditioning is only a special case of a more general process. Infants don't seem to care particularly what the event is that follows their action. They will act in order to reproduce almost any event. For example, six to ten week old infants can learn to produce a sequence of head movements in order to activate a display of flashing lights. However, after they learn the appropriate response they typically pay almost no attention to the lights except for a brief glance to confirm that their action has had the appropriate effect (Papousek, 1969). More generally, infants will learn to produce events that are not obviously reinforcing. They will learn to suck in order to see a picture, (Sigueland & De Lucia 1969), they will learn to pull a string in order to move a mobile (Piaget, Monnier, 1977).

Clearly, these co-ordinations of action and perception are more powerful than the innate co-ordinations. They allow the child to learn new connections between action and experience and even to create new combinations of actions. We might even

want to argue that the child's actions are intelligent and goal-directed at this stage. After all, the infant does seem to act in order to bring about a certain result.

However, there are several respects in which the child's actions at this stage are severely limited. First, the infant can apparently only reproduce actions that he has already produced spontaneously, like sucking and head-turning. At best he can combine these actions so that he can, for example, produce a sequence of head-turns in different directions. But he can't create new actions that are appropriate to a particular goal. If an action is ineffective all the infant can do is to reproduce it less and less enthusiastically until he eventually gives up. As we shall see, older infants and adults can investigate alternative forms of action.

Another limitation of early learned action is that the infant doesn't understand the connection between his action and the event that follows it. He behaves in the same way when the link between the action and the event is arbitrary, and when there is some logical connection between the action and the event.

As a result of this lack of understanding, the young infant inappropriately generalises successful responses. Piaget (1953) describes how infants develop what he calls "magical procedures". An action which gave rise to a particular event is used to reproduce other events that are quite unrelated to that action.

For example, at seven months Jacqueline learns how to pull a string on her carriage which makes the hood of the carriage move. When Piaget then swings a watch in front of her, or moves a book, she pulls on the string, looking at the watch or the

book, as if that action would also make those objects move. Similarly, at a slightly later stage, infants learn how to pull on a support to get an object. If the object is placed on one side of the support, the infants will still pull the support. We will see how the infant develops similar magical procedures in search tasks in chap.13. Older infants don't make these kinds of errors.

Planned Actions

We don't know how these limited forms of action are eventually transformed into highly-structured, goal-directed, intelligent action. However, there appear to be three important changes that take place between about three months and twelve months, and that allow the infant to overcome the limitations of his early actions.

First, the child learns how to hierarchically order the various action-event sequences he has discovered. When the child can't perform an action that will lead to an event directly, he can perform another action that will bring about another event that will allow him to perform the action that will achieve his original goal. For example, at a certain point infants discover that grasping an object and pulling it moves it towards them. They also discover that striking an object displaces it sideways. According to Piaget (1953), sometime after the infant has learned these two sequences he learns how to co-ordinate them. After about seven months he can move an obstacle out of the way in order to grasp an object.

Bruner (1971,1973) has argued that this development reflects an increase in the infant's information-processing capacity. As he becomes familiar with a sequence, as it becomes "modularised",

it can become a constituent sub-routine of a longer sequence. Miller, Galanter and Pribram (1960) have also emphasised the fact that in order to plan effectively we must be able to execute sub-routines, and even sub-sub-routines, and still keep our ultimate goal in mind.

The second important advance concerns the child's ability to generate new actions on new objects. This ability can be seen most clearly in what Bruner (1973) has called "mastery play". Bruner, Piaget (1953), Bower (1974) and even Dr. Spock (1966) have all described the way seven-month-olds systematically apply all the actions in their repertoire to a new object. This is one of the most typical and striking features of the infant's behavior at this stage.

By exploring new objects in this way the infant greatly increases his chance of discovering new connections between actions and events. At least some of the actions he performs on each new object are likely to lead to interesting new consequences. The infant doesn't simply have to rely on the world or developmental psychologists to provide him with interesting contingencies. As Bower (1979) puts it, the infant begins to experiment rather than merely being experimented on.

Piaget (1953) has distinguished two types of early mastery play. According to Piaget, infants tend to apply familiar actions to new objects between about eight months and twelve months. After twelve months they begin to vary the actions they perform on new objects. If you give a nine-month-old a new toy he will hit it, drop it, suck it, and so on. A thirteen-month-old will hit it hard and then hit it gently, or drop it close to the ground and then drop it from a height. The

older infant can create new actions as well as acting on new objects (see chap.15).

Monnier (1977) has also described changes in the way infants experiment. In her study the infants could pull on cuffs attached to strings which activated a mobile. The apparatus could be arranged so that different kinds of movements of different limbs were effective. Nine-month-olds initially produced a burst of activity of all their limbs until they discovered the effective one. Later, this was refined into separate movements of each limb until the controlling limb was discovered. Older babies systematically altered both the limbs they used and the movements they made. They would first try an upward movement of their arm and then try a downward movement. Moreover, they continued to systematically experiment even after they found an effective movement. If they successfully tried an upward arm movement they would then try a downward movement or a leg movement.

It seems that by about twelve months the infant can, and will, systematically generate an unlimited number of new action-event sequences. Unlike the two-month-old, he is no longer limited to reproducing the action-event sequences that happen to take place around him.

At the same time that the infant is learning how to generate new actions he is also learning more and more about the nature of objects. This is an extremely complex process. We will explore some aspects of the infant's changing understanding of the world in later chapters. For the moment, the important point is that the infant's changing theories of the world modify his actions.

In particular, the infant begins to accept only action-event sequences that fit his theory of the world. After nine months the infant will only pull on a support to get an object if he actually sees that the object is on the support (Piaget, 1953 , Bower, 1979). Similarly, as we shall see in chap.13, after about a year the infant will only raise a cup to find an object if he has seen the object disappear under the cup. In general, "magical procedures" are employed less and less.

This change can actually make certain tasks more difficult for older infants than for younger ones. Bower (1979) reports that infants below the age of nine months can easily learn how to kick in order to break a light beam in order to make a picture pop up. Obviously, from the child's point of view, the connection between the action of kicking and the event that follows it is quite arbitrary. Infants older than nine months find it much more difficult to learn this connection, some infants can't learn the connection at all.

Similarly, young infants can easily learn a new contingency. Infants can learn to turn their heads in response to a buzzer and do nothing in response to a bell. When the experimenter reverses these contingencies so that the infants have to do nothing in response to a buzzer and turn their heads in response to a bell, very young infants can learn the new response (Lipsitt 1969). Similarly, in the Monnier experiment described above, the nine-month-old infants could first learn that their right arm activated the mobile, and then, when the experimenter changed the contingency, they could learn that their left foot and not their right arm controlled the mobile. Older infants found such tasks much more difficult. Once the infants had

thoroughly experimented with the apparatus, and had discovered the connection between a particular action and a particular event, they refused to accept a new contingency. They simply gave up when the action was no longer effective. These infants seemed to assume that they had discovered some real connection between the movement of their limb and the movement of the mobile, and that this explained the efficacy of their action. Once they had developed this theory they would not even try an action-event sequence that seemed to violate it.

These three developments, the development of the ability to hierarchically order action-event sequences, to generate new action-event sequences, and to limit acceptable action-event sequences to those that conform to a theory of the world, work together to allow the infant to solve problems intelligently. The young infant who wants to produce an event can only do so if some action has produced that event in the past. The older infant can experiment to see which actions might produce the event. By itself, however, this experimental ability would not get him very far. If he had to try out all the possible action-event sequences before he found the correct one, he would not be likely to solve the problem. However, his theory of the world restricts the number of possible solutions. He will only try actions that are connected in some way to the event he wants to produce.

For example, suppose we present an infant with a rotary lever which has a toy placed on one end, as Koslowski and Bruner (1972) did. In order to get the toy the infant has to swivel the lever so that the far end moves towards him. In this task he has to discover an appropriate action-event

sequence that he has not experienced before. Koslowski and Bruner found that infants younger than about a year could not solve this problem. They either tried to grab the toy directly or to pull the lever directly towards them. That is, they applied strategies that had been successful in the past. Older infants between about twelve and eighteen months could solve this problem. They did so by experimenting with the lever, pushing it in various ways to various positions, swivelling it back and forth and so on. Some infants became so involved in this experimentation that they ignored the toy. Most of them, however, eventually learned how to get the toy by swivelling the lever.

Piaget (1953) describes similar forms of problem-solving at a similar age. At 1;0, Lucienne cannot use a stick to draw a distant object towards her. She is restricted to familiar actions like reaching for the object or pulling the support it rests on. In the next few months, in the course of play, Lucienne discovers that the stick can displace objects. At 1;4,0 she sees a distant object. She takes a stick and begins to experiment with it to see its effect on the object. She moves the stick so that it touches the object, she pushes the object from side to side, she wiggles the stick, and eventually she uses it to draw the object towards her.

In both these cases the infant solves the problem by generating new actions which give rise to new events, among them the event they want to bring about. However, they only try actions that are related to the desired event. Lucienne, for example, only begins to experiment when the stick is actually touching the object. Moreover, they manage to keep the ultimate goal

in mind while they pursue the experimental sub-routine.

These developments allow the child to formulate and implement a genuine plan. The infant's actions are shaped by a particular goal. The infant can respond to a new problem with a new and appropriate action.

Insightful Actions

Even at this point the development of intelligent action is not complete. When the infant uses experimentation to solve a problem he still has to actually see the action-event sequence he is looking for before he can use that sequence, even though the sequence is one he has generated himself. However, as adults we can often discover the solution to a problem directly. We immediately act appropriately even if we have never performed that action before or seen that action lead to a particular event. Kohler (1925) has beautifully described this kind of insightful behavior in men and apes.

Infants seem to develop this ability sometime after they learn to solve problems by means of experimentation. In the Koslowski and Bruner experiment infants over eighteen months could solve the problem immediately, as an adult would, without a period of experimentation. Similarly, Piaget (1953) reports that Laurent, like Lucienne, learned how to use a stick to fetch an object. However, Laurent, who was sixteen months old, immediately used the stick appropriately as soon as he saw the stick and the object together.

We don't understand how the child moves from solving problems by trial and error to solving them by insight. The most plausible explanation is that the child reflects on his own experimental behavior and in some way constructs a model of the

way his actions and objects interact. Using this model he can run through hypothetical courses of action and predict what consequences will follow from them. This mental experimentation replaces the actual experimentation of the previous period. When the eighteen-month-old or the adult is presented with a problem he can consider a number of alternative courses of action and can pick the one that is most likely to lead to a particular goal.

To sum up, I have argued that the development of intelligent action proceeds in the following way. The infant begins with a store of innate connections between experiences and actions. Then he learns fairly specific connections between actions and events. In particular, he learns that he can reproduce an event by reproducing the action that preceded that event. Three developments modify these forms of action. First, the child learns how to heirarchiacally order action-event sequences. Second, he learns how to generate new action-event sequences, he learns how to experiment. Finally, he learns to only accept action-event sequences if they fit his theory of the world. These three devleopments allow the infant to produce really intelligent goal-directed action. After he he is about a year old, the infant who is faced with a new situation can construct a new action designed to bring about a new event. Finally, at about eighteen months, the infant begins to reflect on his own problem-solving behavior and he learns how to construct a model of actions and objects that allows him to consider hypothetical action-event sequences. This model allows him to do experiments in his head instead of with his hands.

The Development of Plans and the Development of Non-nominal Expressions.

How is this pattern of cognitive development related to the development of early language, particularly the development of non-nominal expressions? The plans I described in chap.5 appear to be most like the structures that appear at about twelve months. They do not just involve the repetition of familiar action-event sequences. Instead, the children's actions were usually new and were clearly constructed with an eye to a particular goal. Also, the children seemed to recognise the connection between their actions and the events that followed them.

Children typically used these expressions when they were involved in solving new and difficult tasks. They said "there", "no", "more" and "oh dear" in the course of solving jig-saw puzzles, pushing blocks into the puzzle mailbox, nesting beakers or constructing towers of beakers. Typically, children experimented with a variety of actions in order to achieve a goal, and they tried new actions if an action was ineffective. These activities appear to require a relatively high level of intelligent action. They are like the activities children engage in after twelve months.

In order to use non-nominal expressions to encode aspects of plans children must have developed plans. I have suggested that plans in the full sense, that is, plans in which a new action is genuinely adapted to a goal, do not begin to emerge until about a year.

Are plans all that is needed in order to use these expressions or do non-nominal meanings presuppose even more

advanced structures? Some expressions such as locative "there", direction expressions, "gone" and expressions like "make" and "fit" encode particular types of plans. At about a year, when the child can formulate plans, he should be able to mark the fact that a plan involves a particular goal.

However, the concepts encoded by "no", "more" and success and failure expressions are considerably more abstract. They presuppose an ability to reflect on plans as well as to formulate them. In order to use "no", "more", "there" and "oh dear" in the way they do, children must be able to compare plans and to relate them to planners and to reality.

Suppose we consider the kind of representational capacity the child requires at each stage of his development. At the one-year-old stage the child must be able to represent particular actions and particular events. He must be able to classify together the actions that have led to a particular type of action. He must be able to compare the present state of affairs with past states of affairs and note whether or not they match. Similarly, he must be able to compare present actions and past actions and decide whether or not to perform a particular action. These abilities allow the child to produce actions that are designed to lead to a particular consequence.

By themselves, however, these abilities are not sufficient to develop concepts of success, failure, refusal and repetition. In order to plan effectively the child needs to compare the state of affairs that follows an action to the state of affairs he wanted to bring about. But in order to develop concepts of success and failure he needs to compare these comparisons and to sort them into matches and mismatches. Similarly, in order

to plan effectively he needs to be able to compare particular actions and events, and say whether they are the same or different. In order to develop a concept of repetition, like the concept encoded by "more", he has to be able to compare these comparisons. He needs to say that two action-event sequences that are similar are like two other action-event sequences that are similar (see chap. 6 above). Finally, in order to plan effectively, and particularly in order to experiment, he needs to decide whether or not to perform an action that is likely to lead to a particular consequence. In order to develop a concept of refusal or rejection, like the concept encoded by "no", he needs to compare these decisions and sort them into negative and positive ones.

In short, while the one-year-old has to be able to generalise about actions and events, compare them and make decisions about them in order to act intelligently, he doesn't have to generalise about his own generalisations, comparisons and decisions. Yet expressions like "no", "more", "there" and "oh dear" seem to encode just these sorts of generalisations. These expressions seem to require an ability to step back and consider the workings of one's own planning system.

The distinction between the concept of a particular type of plan, the sort of concept encoded by "make" or direction expressions, and the more abstract concepts encoded by "no" and "more" may be clarified by considering an analogous distinction in the realm of objects. We need to distinguish between concepts of the properties of objects, like redness or roundness, and concepts like existence, non-existence or possibility. The latter concepts don't divide up objects in the

way that property concepts do. They may be applied to objects with any combination of properties. It is significant that in formal logical systems these two sorts of concepts are represented in different ways. Concepts like existence and possibility are treated as higher order concepts. Concepts of success, failure, refusal and repetition seem to apply to plans in the same way that concepts of existence or possibility apply to states of affairs.

Nevertheless, these higher-level concepts depend on lower-level concepts. We can't have a concept of existence without first having concepts of particular states of affairs. Similarly, we can't consider the relationships between plans and planners and reality unless we can formulate plans. We can't step back and consider the workings of our planning system unless we have developed such a system already. In order to develop the abstract concepts encoded by "no", "more", "there" and "oh dear" the child must at least be able to formulate plans, and he must also have developed higher-level concepts.

It seems plausible to suppose that abstract concepts pertaining to plans are developed sometime after the child develops plans, that is, some time after a year. The development of these concepts seems to depend on some of the same underlying changes that allow the child to develop insight at about 18 months.

In both cases, the child has to be able to reflect on his planning behavior and to operate on a model of that behavior. In one case, this allows the child to construct hypothetical courses of action and to make predictions. In the other case, it allows him to make generalisations about his planning system. Moreover, we shall see that similar changes take place at

about eighteen months in other areas of cognition. There seems to be a general eighteen-month-old shift from a cognitive system that is firmly rooted in perception and action to a more conceptual and reflective system. Piaget (1953) tried to capture this shift by saying that the child moves from the sensory-motor period into the pre-operational period. Bruner (1966) has described it in terms of a shift from enactive to ikonic representational systems. Bower (1977) has described it in terms of a shift from perceptual to a conceptual view of the world. Whatever we call it, such a shift might reasonably be associated with the development of an ability to reflect on plans, and to develop abstract concepts pertaining to plans.

What conclusions can we draw about the concepts encoded by early non-nominal expressions like "there", "oh dear", "no", "more", "gone", "down" and "make"? All these concepts seem to involve plans. These plans are apparently developed sometime between the ages of twelve and eighteen months. However, some of the earliest and most important of these expressions, namely "there", "oh dear", "no" and "more" encode abstract aspects of plans rather than properties of plans. These concepts seem to require not only the ability to formulate plans, but also the ability to act on representations of plans. I have argued that such concepts are characteristic of a higher stage of cognitive development. Some of the concepts encoded by non-nominal expressions seem to be developed in Piaget's stage 6, (Piaget 1953), that is, between the ages of eighteen and twenty-four months.

The Development of Plans and the Emergence of "No",
"More" and Success and Failure Expressions

The arguments of the last section lead us to a striking and apparently paradoxical conclusion. Words encoding concepts seem to appear at about the same time that the concepts are being developed (see Table 3 6). Around eighteen months the child is simultaneously developing abstract concepts pertaining to plans, and using words to encode those concepts. Moreover, the child uses words to encode these concepts at the same time, or even before, he uses words to encode much simpler and more well-established concepts, like concepts of perceptual features or specific types of action.

This claim contradicts the Piagetian assumption that linguistic development follows conceptual development. This assumption is also prevalent in the literature, it is assumed that conceptual distinctions are made first, and that some time later these distinctions are encoded linguistically. However, the evidence of non-nominal expressions suggest that concepts and their encodings might develop at the same time. This suggests a model more like those suggested by Vygotsky (1962), Bruner (1966) and Bower (1979) in which language development actually facilitates conceptual development. In the following section I will try to describe how this sort of development might take place. If we picture linguistic development in this way, a number of other puzzling features of non-nominal expressions also become clearer.

Imagine the world of the eighteen-month-old child. He has developed and established plans, and he'll spend much of his time exploiting this new achievement. He'll be fascinated by tasks that require plans, and he'll even construct such tasks himself. Under these circumstances it seems likely that adults

would comment on aspects of plans when they address the child.

In fact there is evidence that adults frequently provide running commentaries on the child's actions (Trevvarthen, 1978, Newson, 1978, Bruner, 1976). These "play-by-plays" are rather puzzling. They don't have an obvious communicative intent since the adult is, in a sense, telling the child what he already knows, and unlike other forms of caretaker speech they don't require a response from the child. However, as we shall see, adult commentaries could help the child to make generalisations about his activities. Between twelve and twenty-four months these activities are likely to involve the formulation and implementation of plans.

Commentaries could be an important source of non-nominal expressions. Consider for example the following commentary reported by Trevvarthen (1978). "Put it in there. Take it out. There it is. Shake, shake, shake. Put it on there. That's it! In again. Out, put it in. No? That's it. Out again". At the same time adults will also use non-nominal expressions in other contexts.

Now suppose that the child is ready to develop higher level concepts of success, failure, rejection and repetition, and suppose that in some sense the dynamics of his cognitive system are pushing him to develop such concepts. The child's attention would be drawn to contexts that involve these concepts. These contexts would be divided up by linguistic markers. Successful plans would be marked by "there", repeated plans would be marked by "more" and so on. This labelling could help the child to make the appropriate conceptual distinctions and generalisations. At the same time, the fact

that the child was trying to make these generalisations for independent reasons would lead him to hypothesise that these markers encoded such generalisations.

This process becomes clearer if we consider an analogous adult situation. Suppose an adult was given a pack of cards with different numbers of shapes in different colours on them. He was told to sort the blue cards into three groups according to some predetermined principle, but he wasn't told what that principle was. Now suppose he noticed that there were letters on the back of some of the cards. Just considering the blue cards, A only appeared on cards with a triangle on them, B only appeared on cards with a square and C only appeared on cards with a circle, and triangles, squares and circles were the only blue shapes. A, B, and C appeared on the back of cards of different colours, and other letters appeared on the back of blue cards.

What sort of behavior might we expect in this situation? We would expect that the presence of the symbols which classified the cards would help the subject to discover the correct generalisations. At the same time, in order to understand the meaning of A, B, and C, he would also need to make this generalisation. Thus the construction of the conceptual categories encoded by the symbols, and the decoding of the symbols would take place simultaneously and would facilitate each other. The generalisation about triangles, circles and squares would simultaneously be a solution to the conceptual problem, and be a hypothesis about the meaning of the letters.

We might also expect that the subject would initially ignore aspects of the code that weren't relevant to the task. He would ignore the letters on cards that weren't blue, and he

would ignore the letters on blue cards that didn't divide them into three groups. His hypotheses about the meaning of A, B, and C might be wrong, or at least limited, as a result, he wouldn't know whether these symbols encoded the concepts of blue triangle, blue square, blue circle, or three-sided, four-sided and curved shape. Moreover, he might miss other aspects of the code that were in some sense more obvious or simpler than the aspect he solved. For example, he might not notice that the colour of the letter indicated the colour of the shape, or that the number of letters indicated the number of shapes, since these relationships didn't help him to solve the conceptual problem.

Of course, once the original problem was solved he might become interested in the code as a problem in its own right, and would decode these aspects of it as well. Also, he could use the code to solve other problems, and extend his understanding of it appropriately.

The eighteen-month-old's acquisition of non-nominal expressions could be analogous to the adult's acquisition of the letter code. However, the task would be set by the requirements of the developing cognitive system, rather than by a set of instructions. Cognitive constraints would affect the child's language learning in two ways. First, they would draw the child's attention to some contexts rather than others, and consequently to some linguistic markers rather than others. It seems reasonable to suppose that the child's attention is likely to be focused on situations he is trying to understand. Familiar and well-established situations, like the child's performance of a simple action, or his perception of a certain colour, would

not be attended to because they present no cognitive challenge, while situations that are way beyond the child's understanding will simply be ignored. At eighteen months the child would pay particular attention to situations that involved relationships between plans and reality, or between plans and planners, and to expressions that were used in these situations. The leading edge of the child's cognitive development would act like the instruction to classify only the blue cards in the adult situation.

Once his attention was focused on contexts involving abstract aspects of plans and on the expressions occurring in those contexts he would notice that different expressions occur in different contexts. He could group together all the contexts accompanied by a particular expression.

This classification in turn could be used as the basis for a generalisation. For example, suppose the child noticed that adults said "oh dear" when he knocked over a pile of bricks he was building, and when he couldn't fit a piece into a jig-saw. Both these events would be particularly likely to engage a twelve to eighteen-month-old child's attention. The occurrence of the expression would focus the child's attention on the similarities between these two contexts. He could, in turn, construct a general concept of failure to explain these similarities. This generalisation would simultaneously constitute a new and significant concept, and a hypothesis about the meaning of "oh dear".

This process of classification and generalisation would be subject to the same kinds of cognitive constraints that affected the child's original decision to pay attention to some

contexts rather than others. The child couldn't make generalisations that were beyond his cognitive competence. For example, if he couldn't understand the concept of propositional negation, he obviously couldn't hypothesise that "no" encoded that concept. But, more significantly, the child would also be biased against making easy generalisations.

This idea isn't as easy to capture as the idea that the child wouldn't pay attention to unproblematic situations. But it seems plausible to suppose that the child is motivated to develop new concepts, rather than to simply operate with the concepts he already has. There seems to be a sort of epistemological drive that leads us to explore cognitive frontiers. This drive might lead the child to use linguistic clues to construct new generalisation, instead of just mapping linguistic markers on to well-established concepts. At least, when he constructed a new generalisation on the basis of the occurrence of a linguistic expression, he would be particularly likely to store information about that expression, and to use the expression productively. In this way the developing cognitive system could act like the instruction to develop a three-fold classification in the adult task. Even if we noticed that other classifications or generalisations were possible, we would only store three-fold classifications in the adult task, or new classifications in the child's task.

If children acquire expressions like "there", "no", "more" and "oh dear" in this way we can explain why these expressions appear at the same time as the concepts they encode. Also, we can explain why these abstract expressions appear at such an early stage, even before expressions that encode simpler concepts

such as simple concrete verbs, and before expressions that are more central from the point of view of the adult language. We will also be able to explain the over-extensions and under-extensions of these expressions.

The child's decision about which expressions to decode first, and his hypotheses about the meaning of these expressions would be determined by the cognitive problems he is trying to solve. He will pay particular attention to expressions like "no", "there", "gone" and "more" because they occur in problematic contexts, and he will be particularly likely to hypothesise that these expressions encode concepts of the success, failure, rejection or repetition of plans, because these are new concepts.

I am suggesting that the acquisition of some early expressions is not motivated by the child's attempts to improve his communicative competence, or to establish social relationships, nor is it the result of an innate language acquisition device. (Of course, these factors may play a role in the acquisition of other expressions.) But the child's early language is also not just an epiphenomenon of his cognitive development. It doesn't just mirror well-established cognitive structures. Instead, the acquisition of "there", "oh dear", "no" and "more" is the result of the child's attempt to use language as a cognitive tool, to use linguistic clues to develop new and more powerful concepts.

Later Linguistic and Cognitive Developments

The model developed in the previous section can also explain changes in the child's hypotheses about the meanings of expressions. "There", "no", "more", "gone" and "down" continue to play an important role in the child's language when he reaches

the two-word stage. They are among the most important of the "pivot class" of expressions. Five of Brown's eleven categories of semantic relations in the two word-stage are formed by combining these expressions with names. However, by the time they appear in two-word strings the meaning of these expressions has changed.

Brown describes some of these expressions as "operations of reference" marking abstract concepts of existence, non-existence and recurrence that are applicable to objects as well as to plans. Direction expressions mark locative relationships between objects. We have seen these developments taking place in the corpora presented here. Direction expressions eventually mark static locative relationships, "no" is eventually used to negate propositions, and "more" comes to mark the similarity of objects.

It is interesting that these expressions marking operations of reference and locative relations originally mark aspects of plans. This suggests a parallel cognitive development in which these concepts are the outcome of the development of intelligent action. The changes in the meaning of these expressions might reflect the same interaction between cognitive and linguistic development that led to the acquisition of these expressions in the first place.

The fact that, in adult language, these expressions are used in contexts involving plans and in contexts involving objects could help the child to make the appropriate generalisations. On the other hand, the fact that the child has already developed concepts of negation, success, repetition and location, in relation to his own plans, and used these expressions to encode

them, would make it easier for him to understand utterances of these expressions that were applied to objects. At an earlier stage these utterances would just have been incomprehensible.

Another example of this sort of development might be the acquisition of agent-action-object structures. These relationships play an important role in early syntax. Three more of Brown's eleven relations encoded by two-word strings involve relations of this kind. Children don't explicitly mark these relationships in the one-word period. However, it is interesting that these relationships are implicit in plans. A plan involves an agent who carries out an action in order to effect an object in some way. Perhaps after the child develops representations of plans he can begin to analyse the internal structure of plans. He would focus on linguistic phenomena that were relevant to this analysis (in this case the phenomena would be syntactic rather than lexical) and the fact that this internal structure is linguistically marked would facilitate his analysis.

It would be interesting to see if later linguistic developments are also motivated by cognitive problems, and if the acquisition of new linguistic structures helps to solve these problems. Certainly, the adult acquisition of new lexical items or new meanings for lexical items, often seems to work in this way. Learning a new word or learning that a word may be used in new contexts often seems to involve a restructuring of our conceptual system as well as our linguistic system. For example, learning the vocabulary of a science and understanding the concepts of the science seem to go hand in hand. Moreover,

this fact often seems to motivate our acquisition of new lexical items. We pay attention to the vocabulary of a science precisely because we think that acquiring this vocabulary will facilitate our understanding of the science.

Carey (1978) has suggested that three and four-year-olds restructure their conceptual system when they acquire a new lexical item. In her experiments, children were introduced to a new colour term "chromium" which meant olive. Children who had previously classified olive objects as "green" refused to do so after they were exposed to the new term, even when they couldn't remember what the new term was. These children would use some other term for this colour, or would simply say that they did not know what the name of that colour was.

This interaction between linguistic and cognitive development could also affect the acquisition of syntactic structures. The early acquisition of agent-action-object structures is one example. Just as the fact that two contexts are marked by the same expression may help us to make a generalisation about these contexts, so the fact that two contexts are marked by the same syntactic structure, or that two expressions play the same syntactic role, may help us to make conceptual generalisations. At the same time the attempt to gain a greater understanding of these contexts or expressions might motivate us to pay attention to these syntactic structures, and might influence our hypotheses about their semantic significance.

TABLE 36

Age of Children in Months When "no", "more", failure and success expressions were first Recorded

	GROUP I			GROUP II			GROUP III		
	Jonathan	Henry	Rachel	John	Christian	Harriet	Paul	Hannah	Anna
No	22	13	19	20		16	18	18	18
More	22	20	20			17	23	21	18
Failure Expressions*	21	21	22	19		17	20	19	18
Success Expressions*	19		17	20	19	16	18	19	19

* Failure Expressions include "Come Off", "Oh Dear", "Oh No" (see Chapter 7)

* Success Expressions include "There" used to mark success, "Done it", "Did it" (see Chapter 7)

CHAPTER 13

"GONE" AND THE CONCEPT OF DISAPPEARANCE

We discovered that we could understand the development of words that encode aspects of plans by examining the development of plans themselves. Similarly, we may learn more about the development of "gone" if we examine the development of the concept of the disappearance of objects that "gone" seems to encode. Fortunately, this area of cognitive development has been studied in some detail. Unfortunately, both the experimental results and the interpretations of those results are often confusing and contradictory. In the first part of this chapter I will try to present an outline of the development of the concept of disappearance that is logical and that accounts for as much of the data as possible. I will argue that from birth until around 18 months the infant builds up a set of predictions about disappearances and reappearances. After 18 months this set of predictions is replaced by a general theory of objects. I will argue that the concept encoded by "gone" is not developed until the child is around 18 months old. Finally, I will suggest that the acquisition of "gone" could facilitate the development of the 18-month-old theory of objects.

The Development of the Concept of Disappearance

There are essentially three kinds of experiments that help us understand how the child deals with the disappearance of an object. In Piaget's original experiments (Piaget, 1954) and in most experiments since then, the experimenter hides the object in various ways. Then he observes whether the infant searches for the object that has disappeared, where he searches

for it and whether he eventually finds it. More recently, a number of experimenters, notably Bower, Broughton and Moore (1971), have observed the infant's eye movements when an object disappears. Finally, Bower (1971), Gratch (1976), Charlesworth (1966) and Saal (1975) have created unusual or unexpected sequences of disappearance and reappearance and have studied the infant's reactions to these events.

There have been a number of methodological criticisms of these studies, particularly of the first type of study where the infant has to search for an object. It has been argued that these studies actually reveal the infant's lack of motor skills or his memory limitations, rather than revealing conceptual difficulties. I will not consider these methodological criticisms here. First, I believe these criticisms can be answered (see Bower 1974). But, more important, they are not really relevant to the purpose of this chapter. It is clear that "gone" encodes a concept that involves the disappearance of objects. If search tasks have nothing to do with this concept the question of how the concept does develop is still open. The hypothesis I will present here is at least as good an alternative as any other. If, as is more probable, search tasks do reflect changes in the child's understanding of disappearance, then the hypothesis simply becomes stronger.

Another set of debates is more relevant to the problem of constructing a hypothesis about the concept of disappearance. Even writers who agree that search tasks genuinely measure cognitive development disagree about the proper way to describe that development. The classical Piagetian view is that the infant develops a notion of object permanence. He initially

believes that the object ceases to exist when it disappears. In fact, he cannot even represent an object that is out of sight. Moore (1975) has argued that the infant develops object-identity rules. Initially, he believes that an object that reappears is not the same object as the object that disappeared. Bower (1979) has argued that the infant develops a more sophisticated concept of space. Initially, the infant doesn't believe that one object can be inside or under another.

I suspect that these difficulties are at least partly terminological. Not surprisingly, the adult language presupposes the concepts that the infant develops. Terms like "object", "existence", "permanence", "disappearance", "identity", "location" and even "a" and "the" carry with them all the adult's ontological baggage. This makes it extremely difficult to describe the infant's concepts. When we say that an adult believes that an object continues to exist or ceases to exist we interpret that claim in terms of the adult theory of objects. The developmental evidence suggests that the infant doesn't have this theoretical background. It's not that he mistakenly believes that the object ceases to exist, but that he hasn't developed the concepts of object and existence.

Clearly there is some sense in which an infant believes that an object exists, or, at least, represents an object, whenever he predicts that an object that has disappeared will reappear. However, an infant who believes that an object changes its identity when it disappears and reappears, or who believes that an object can exist at two locations at once, or who believes that an object can exist without being at a location doesn't have the same concept of the object than an adult does.

We might describe this difference in terms of object permanence, in terms of object identity, or in terms of space.

I have chosen to describe this difference in terms of predictions about the disappearance and reappearance of configuration. By "configuration" I mean what an adult might call the appearance of an object, that is, a three-dimensional, palpable, bounded, relatively stable percept. By "disappearance" I mean that such a percept is present and then absent. It may be absent because it has been replaced by another configuration. By "reappearance" I mean that the configuration is present, and then absent, and then present again. I have chosen this terminology because it seems to be most neutral, it makes few ontological assumptions.

Suppose, then, that we look at the development of "object permanence" in terms of a set of predictions about perceptual configurations. The infant predicts that if an event of a certain sort occurs, and a configuration disappears, then if an event of another sort occurs, the configuration will reappear. We will see that as the infant grows older he accumulates more and more of these predictions. Eventually, at about eighteen months, he will make a generalisation about these predictions, and he will assume that any perceptual configuration that disappears will reappear except under extraordinary circumstances.

The Object from Birth to Nine Months

Even very young infants make some predictions about the disappearances and reappearances of configurations. Piaget (1954) claims that by three months the infant can deal with disappearances that are the result of his own movements. For example, he can turn back to see an object he had turned away

from. This suggests that he has a rule like "if you make a movement and a configuration disappears, then if you reverse the movement the configuration will reappear".

Similarly, young infants can apparently deal with disappearances that affect their entire visual field. Piaget (1954) reports that a five-month-old will push away a cloth that is held in front of him in order to see an object. Bower and Wishart (1972) report that five-month-olds will reach for an object after the room has been plunged into darkness. The five-month-old may have a rule like "If a configuration disappears and everything else disappears too, the the configuration will reappear when everything else does".

Bower (1974, 1979) has claimed that infants younger than nine months can also deal with disappearances that are the result of one object moving behind another object. Bower claims that under certain circumstances, particularly if the hidden object is a good distance behind the screen, six-month-olds will remove a screen to obtain an object that is hidden behind it. Moreover, even very young infants are surprised when a screen comes down in front of an object, and the object does not reappear when the screen moves back up (Bower, 1971, Charlesworth, 1966). Similarly, if a moving object disappears behind a screen six-month-olds will look towards the far edge of the screen as if they expect the object to emerge there (Bower, Broughton & Moore, 1979).

Despite the fact that the six-month-old can make predictions about all these kinds of disappearances he does not make similar predictions when an object moves under another object or inside another object. If a six-month-old sees an

object hidden under a cloth he doesn't even attempt to raise the cloth or to search for the object elsewhere. If he is in the middle of reaching for the object he drops his hand as soon as the object disappears and loses interest completely. In every respect, he behaves as if the object has disappeared for good and there is no chance of it's reappearance (Piaget, 1954, Bower, 1974). Similarly, if an object is placed under a cup, and is then surreptitiously removed or replaced by another object, infants under nine months show no surprise or interest when the cup is removed (Gratch, 1976, Saal, 1975).

Clearly, the infant does not apply his predictions about "behind" disappearances to "inside" disappearances. There are a number of possible explanations for this discrepancy. Bower (1979) has argued that it reflects the young infant's incomplete understanding of spatial relationships. According to Bower, the six-month-old has developed a rule that says "two objects cannot be in the same place at the same time". Because the six-month-old understands distance he can assign the missing object a location when it moves behind the screen. However, because he does not yet understand the "inside" relationship he cannot assign the missing object a location when it is placed inside another object.

This discrepancy might also stem from the fact that objects move independently when one object is behind another, but move together when one object is inside another. In "behind" cases the infant could construct a rule that says "a configuration that disappears behind another configuration will reappear if it was moving when it disappeared or if the other configuration moves". This rule could not be applied to "inside"

disappearances.

The Object From Nine to Eighteen Months

After he is nine months old the infant will remove a cloth or a cup in order to get an object. He appears to develop a rule that says "If a configuration disappears the configuration will reappear where it disappeared". However, while this rule allows the infant to deal with the specific case in which an object moves under a cup, the infant still doesn't completely understand the disappearance of objects.

First, the infant can't apply this rule to more complicated types of disappearance. For example, if the object is placed under one cup and that cup is placed next to another cup and the two cups are transposed, he cannot find the object. Similarly, if the object is placed in a cup and the cup is placed under a screen and the object is left under the screen, the infant cannot find the object (Piaget 1954, Bower 1974). He can only solve these particular problems at about eighteen months.

Moore and Meltzoff (1978) have proposed a series of seven sub-stages between nine months and eighteen months. At each of these stages the infant can successfully retrieve an object if it disappears in certain ways but can't retrieve it if it disappears in other ways. The infant can only retrieve the object in all the situations in which an adult would be able to retrieve it after he is eighteen months old. This suggests that he is gradually building up more predictions about the conditions under which a perceptual configuration that had disappeared will reappear.

The fact that the infant doesn't make certain predictions indicated that his understanding of the object is still incomplete.

This is also indicated by the fact that he does make bizzare predictions. For example, nine-month-olds seem to predict that a configuration that disappears will reappear at a place where it appeared before. This incorrect prediction leads to the A not B error. If the infant finds an object several times under cup A and the object is then hidden under cup B, the infant will search for the object under cup A. In fact, he will continue to search under cup A even if cup B is removed so that he can see that the object is there. Infants stop making this particular error at about a year, but they continue to make similar errors in more complicated tasks. However, like other magical rules (see chap.12) this rule becomes less acceptable as the infant grows older (Piaget 1954, Bower 1974).

Other experiments indicate that infants gradually develop more powerful predictions between nine and eighteen months. Older infants are more surprised by violations of their predictions than younger ones. We saw that six-month-olds were not at all surprised when an object was placed under a cup and was no longer there when the cup was removed. Nine-month-olds were moderately surprised and interested. Twelve-month-olds were even more surprised. However, even twelve-month-olds did not search for the missing object (Gratch 1976, Saal 1975).

There seem to be three advances, then, between nine and eighteen months. The infant makes more and more predictions that disappearances will lead to reappearances. He restricts the kinds of predictions he will accept, he becomes less willing to employ magical rules. Finally, his predictions become stronger and he is more surprised by violations.

However, throughout this period the infant still seems to

have a heterogenous set of different predictions, rather than a general concept of disappearance. He can't apply his rules to new types of disappearance. For example, the one-year-old can't find the object in the transposed cups task. Also, he can entertain contradictory rules. For example, the nine-month-old seems to believe both that the object will reappear where it disappeared, and that it will reappear where it appeared before.

The Object after Eighteen Months

The eighteen-month-old seems to have a very different understanding of objects. First, he can deduce the location of objects that are invisibly displaced. When the object is hidden under a cup placed beside an empty cup, and the cups are transposed, the eighteen-month-old will be able to retrieve the object. Similarly, if the object is hidden in a cup and the cup is placed under a cloth, and the cup is brought out empty, the infant deduces that the object is under the cloth. Alternately, if the object is placed in a box, next to a cup, inside another box, covered by a cloth, the infant will be able to complete the sequence of actions necessary to retrieve the object (Piaget 1954, Bower 1974).

Moreover, the eighteen-month-old will be able to make an intelligent guess about the location of the object even if he can't actually deduce it with certainty, and he will be willing to try several hypotheses if his original guess is wrong. Although he does not make much of it, Piaget (1954) reports that when a deductive task is too complex the infant will try several possible locations even if these locations are not predicted by his specific rules. Similarly, Gratch (1976) and

Saal (1975) report that when the eighteen-month-old is tricked, when he discovers that the object in the box has been removed or replaced, he is intensely surprised, much more so than the twelve-month-old, he searches for the original object on the floor, under a washcloth, on the table and in other parts of the room, and he gives the experimenter quizzical looks.

How can we explain these advances? Piaget and Bower both suggest, in different ways, that a general model replaces the infant's specific rules. From birth up until eighteen months the infant has been building up more and more specific predictions. Eventually, he will be able to deal with almost all the disappearances he comes across. He will be able to use one of his rules to predict that the object will reappear in a particular place. However, although all these predictions have the same form they are the result of separate, unrelated rules. At around eighteen months the infant might think "Do all these disappearances and reappearances involve the same underlying process?"

The infant's developing concept of space allows him to answer this question. At the same time that he is developing more predictions about disappearances and reappearances he is also developing a more sophisticated model of the way objects move in space. In particular, at about eighteen months, he begins to recognise the analogies between his own movements and the movements of objects (see chap.14). In addition, he develops a concept of movement that is independent of his perception of movement; he can hypothesise types of movement that he has never seen. Finally, he can predict the effect

that his own movements or object movements will have on his perception of objects (see chap.14).

He develops a model in which objects, including his own body, move from location to location, whether or not he perceives that movement. With this model he can understand that the disappearances and reappearances of configurations are due to his changing spatial relationship to objects. He can say "Yes, all these disappearances and reappearances are the same. In each case the relationship between my body and other objects had changed".

This general model, in which objects move from location to location, and observers move from location to location, and the disappearances and reappearances of objects are due to the interaction between these two phenomena, subsumes all the specific rules the infant has developed previously. A configuration disappears when you turn away from it because your movement creates a new spatial relationship between you and the object. A configuration disappears when you are covered by a cloth or when the light goes off, because you can no longer perceive the object. The configuration disappears when it moves behind a screen or under a cup, because the screen or cup is between you and the object.

This conceptual leap also allows the infant to deal with disappearances that were incomprehensible before. As Bower puts it "Deduction becomes possible after all the information gathered during the course of development is organised into a coherent whole, with general principles which can be co-ordinated and applied in specific situations" (Bower, 1974, p.230). The eighteen-month-old's deductions, like the deduction that the

object that is not in the cup was left behind under the rug, require this kind of generalisation across the specific rules that have been developed. These deductions require a general model of objects, space and observers, built out of the information that allowed specific predictions.

Even more significantly, if the infant is faced with a disappearance that he cannot solve either by his specific rules or by deduction, he still seems to believe that the configuration will appear somewhere, even if he is not sure exactly where. Thus, when he is faced with a complex displacement or with a trick disappearance his reaction is to try to guess the location of the object. Before, the infant's attitude seemed to be "A configuration that disappears is gone for good unless proven otherwise, that is, unless one of my specific rules applies". Now, his attitude seems to be "Assume that a configuration that disappears will reappear unless proven otherwise".

Finally, the eighteen-month-old's advance allows him to progress in other areas. As we have seen it allows him to hypothesise that an object is in a location, even if he has never perceived it in that location. But it also allows him to hypothesise the existence of objects he has never seen at all. If an object which has been perceived in the past may exist without being perceived, then an object might exist without being perceived at all. This ability to hypothesise the existence of objects that have not been perceived is reflected in the eighteen-month-old's play (Piaget 1962).

We might compare the infant's construction of a theory of objects to the construction of a scientific theory. The young infant seems to be like Tycho Brahe or a celestial navigator.

He collects a series of interesting observations about the disappearances and reappearances of certain configurations. These observations allow him to make predictions about the future appearances of these configurations, just as the celestial navigator makes predictions about the appearances of the stars and planets. These predictions, however, are largely limited to the infant's or the navigator's past experiences. If a phenomenon has occurred often enough in the past, they can predict that it will occur again. However, these empirical rules will not allow deductions or new predictions.

Once we have a model or theory two advances are possible. First, all the empirical observations of the previous stage become special cases of more general laws. They can be deduced from the theory. Secondly, the theory allows new predictions in a wide range of situations. Galileo's theory of planetary movement makes sense of the navigator's empirical rules, and also allows us to make new predictions. The infant's theory of object movement, involving the relationship between a moving observer and a moving object located in the same space, allows him to make sense of all his specific perceptual predictions, and also allows him to make new predictions. However, both the scientist and the infant need to base their theory on a corpus of empirical observations.

The eighteen-month-old's understanding of appearance and disappearance is still limited in one respect. Infants seem to assume that they are unique observers. They don't recognise that an object may be invisible to them, but visible to others or vice versa (Piaget & Inhelder, 1956). The development of this concept does not occur until much later.

The Linguistic Evidence

We may now return to the linguistic evidence and consider how the concepts encoded by "gone" are related to the development of the object concept.

"Gone" was applied to all the different types of disappearance which should lead to reappearances according to the child's specific rules. Thus, children said "gone" when they moved away from objects, when they moved objects behind them or when objects moved out of the immediate field of vision. They also said "gone" when objects moved behind screens. In all these cases even a six-month-old would predict the reappearance of the object.

"Gone" was also applied to more sophisticated forms of disappearance involving the covering of objects. Children said "gone" when they covered an object with a cloth, or when they placed an object inside a container, or under a cushion or cup, or when they simply saw these transformations take place. Again, if the infant even has the nine-month-old rules he should expect the object to reappear in these cases.

But these children also used "gone" in ways that suggest that they had developed the eighteen-month-old rule. Children used "gone" as they conducted general searches for objects that had disappeared. Often, these objects were invisibly displaced (if they had been visibly displaced the searches would not have been necessary). For example, Jonathan says "gone" searching for a puzzle piece I have surreptitiously removed and placed under me. Henry says "gone" searching for a biscuit his mother has taken away from him and has surreptitiously hidden.

In these and similar cases, the children tried several alternate

locations, they were apparently not limited to the twelve-month-old rules. Thus, Jonathan eventually searches under my skirt, after he has tried several other locations, and retrieves the piece, although it has not appeared there before, and although he didn't see it disappear there (see chap.8).

An even more striking set of contexts concerned searches for objects whose existence was deduced by the child. For example, Harriet plays with a set of nesting beakers. When she has nested some of the beakers there is still a space left in the inside beaker. She begins to search for a beaker that fits in this space saying "gone". She rejects several beakers that are too large after she tries them in the hole. In fact, there is no smaller beaker. Similarly, Rachel gets a jig-saw puzzle almost finished, there is one space left. She begins to search for the missing piece, saying "gone". Jonathan puts a set of dolls in a truck, one by one. When he finishes there is room left in the truck, he searches for another doll saying "gone", finds one, and then, seeing that there is still space left, searches for another doll, but he is unsuccessful, there are no more dolls (see chap.8). In these contexts the children seem to have deduced the existence of an object (there must be a beaker to fit the hole, a piece to fit the space, or a doll to fill up the truck) and then to assume that this object is in some location. This is despite the fact that they have never seen the object in the location and in two of these cases have never seen the object at all.

These kinds of behavior, conducting general searches for invisibly displaced objects and for objects whose existence is deduced, require an eighteen-month-old conception of the world.

They presuppose a theory of the world in which objects exist at locations and may not be perceived there.

Thus, the child uses the same word, "gone", to encode all the different disappearances that, according to his specific rules, will lead to reappearances. This suggests that he perceives some underlying similarity in all these contexts. But I have argued that before eighteen months the child does not perceive the underlying similarity between all his rules, first because he doesn't apply the rules to new situations and also because he is willing to entertain contradictory rules.

In fact, I have argued that in order to develop the eighteen-month-old concept of disappearance the infant must first recognise the similarity between all the different types of disappearances and reappearances covered by his specific rules. The concept that disappearances that are due to the child's own movements, "behind" disappearances and different types of "inside" disappearances, are all somehow the same, that there is a "gone" category that includes all these different events, is a concept that does not appear to be developed until about eighteen months.

More profoundly, the infant also uses the same word, "gone", to encode disappearances that are not covered by specific rules. He says "gone" and searches for objects even when he has not seen the objects disappear. This suggests that he perceives some underlying similarity between these types of disappearance and the types of disappearance that are covered by his specific rules. But I have argued that this general concept, which includes both types of disappearance, is not developed until after 18 months. Before 18 months children

treat these two types of disappearance differently. They only search for objects if their specific rules predict that the object will reappear. After 18 months they search for objects that have disappeared in ways that are not covered by specific rules.

I have argued that the eighteen-month believes that almost all disappearances are the result of similar underlying events, events that involve the movement of objects and observers. Moreover, he believes that all these disappearances will eventually be followed by reappearances. This includes all the disappearances that were covered by his specific rules previously, and also includes some disappearances that were not dealt with by specific rules. The fact that the infant behaves in the same way in all these contexts, that he also behaves in the same way in new contexts, and that he does not make A not B errors, all indicate that he has developed this general concept.

At the same time the fact that the infant uses the same word, "gone", in all these contexts also suggests that he has developed this general concept, and that he encodes that concept linguistically. Thus, "gone" encodes a concept that is characteristic of the eighteen-month-old stage of cognitive development.

The Development of the Concept of Disappearance and the Emergence of Gone.

Unfortunately, we don't know whether the children in this study had acquired the eighteen-month-old concept of the object when they began to use "gone". Our only clue is their chronological age.

However, it is interesting that "gone" was first recorded between 15 and 23 months (see Table 31). We should also remember that the children probably acquired "gone" before "gone" was first recorded (see chap.3). This suggests that the children were acquiring "gone" at about the same time that they acquired the concept "gone" encodes.

This is the same pattern we saw with "no", "more", "there" and "oh dear". These expressions first appeared at around eighteen months and they encoded concepts involving abstract aspects of plans that also appear at around eighteen months. I speculated that the acquisition of these non-nominal expressions could actually facilitate the development of the concepts they encode. Similarly, "gone" might help the child to develop the eighteen-month-old concept of the object.

The sixteen-month-old or seventeen-month-old is likely to be interested in disappearances and reappearances, they are a fascinating and important problem. His attention will be focused on situations that involve disappearances. Adults will be especially likely to use the word "gone" in these contexts, although they will also use "gone" in other contexts.

Suppose the infant notices that adults use the same word, "gone", when objects disappear behind things, when they disappear inside things in various ways, and when he turns away from objects. He also notices that they use "gone" when objects disappear in ways that are not covered by his specific rules. For the 16-month-old these are all disparate events. However, the fact that adults apply the same word to these events could lead the infant to consider possible similarities between them.

This would be particularly likely if the child was already

on the verge of making a generalisation about these events, if in some sense his cognitive system was pushing him towards such a generalisation (see chap.12). The linguistic facts could facilitate the development of the general concept of disappearance in the same way that the fact that successful plans are marked by "there" could facilitate the development of a general concept of success. In turn, the fact that "gone" encodes a new and significant concept could make the child particularly likely to store "gone" and to use it in his productive speech.

However, the child's hypotheses about the meaning of "gone" would also be constrained by his cognitive limitations. He could not use "gone" to encode a concept that was way beyond his cognitive competence. For example, in this study, children only used "gone" to refer to the fact that an object had disappeared from their view. They used "gone" when objects were clearly visible to other people, and they did not use "gone" when objects could not be seen by other people but were visible to them. This limitation parallels the cognitive limitations of this period.

The child might use "gone" productively as a kind of mnemonic device. When he is faced with a mysterious disappearance he might use "gone" to remind himself that this is a "gone" event. As in other, simpler, "gone" events the object will eventually be found.

Piaget (1954) makes an interesting observation along these lines. He describes the very first cases where Jacqueline successfully deduced the location of an object. At this point the object concept is far from well-established. Jacqueline

makes several unsuccessful attempts to find the invisibly displaced object, and she reverts back to her earlier rules. During these attempts, as soon as she sees the object disappear she says "Ou il est? Ou il est?" She eventually finds the object. It is just possible that Jacqueline's utterance of "Ou il est?" in this obviously problematic situation actually helped her to find the solution.

The fact that children used "gone" most often in the early period when they themselves caused objects to disappear and reappear is also suggestive. There is a great deal of evidence which suggests that children experiment with difficult problems and that this helps them to find appropriate solutions (see chap.12). If disappearance is a problem for sixteen or seventeen-month-olds they would be likely to create disappearances and reappearances. At the same time that they used this technique to solve the problem they could also use their newly discovered word.

The infant's behavior would be analogous to the behavior of an adult who is faced with a difficult problem. The adult is likely to experiment with various components of the problem and also to use appropriate language. He fiddles, and he talks to himself. Both the experimentation and the language seem to help him to find a solution. Vygotsky (1962, 1978) has described similar kinds of behavior in older children.

Later Linguistic and Cognitive Developments

As the child grows older and the concept of disappearance becomes less problematic we would expect the experimental, problem-solving uses of "gone" to become less frequent. Instead, the child will simply use "gone" when he wants to comment on

the fact that a disappearance has taken place. The fact that "gone" initially encodes a new, exciting, problematic, concept could explain why, initially, children use "gone" so frequently in experimental contexts. The fact that this concept becomes well-established as the infant grows older could explain why these experimental uses of "gone" become less frequent.

TABLE 37

Age in Months of Children When "Gone" was First Recorded

Jonathan	Henry	Rachel	John	Christian	Harriet	Paul	Hannah	Anna
24	20	22	17	18	15	18	18	18

CHAPTER 14

DIRECTION EXPRESSIONS AND SPATIAL CONCEPTS

We may now consider the development of the concepts encoded by direction expressions, "down", "up", "in", "out", "on" and "off", and locative "there". These expressions encoded types of movement and spatial relationships. "Down" and "up" were used when objects moved upwards or downwards, particularly when objects were above or below other objects. "In" and "out" were used when objects moved into or out of containers. "On" and "off" were used when objects became or ceased to be, or were contiguous, when they became, or were, attached to or detached from other objects and when articles of clothing were put on or taken off, or were on or off. "There" was applied to all types of object movement and spatial relationships. How does the infant's understanding of these types of movement and spatial relationships develop?

We know less about this aspect of cognitive development than about the development of the object theory. However, there are some relevant experiments and observations, particularly those reported by Piaget (1954) and Bower (1974, 1979). These concepts are also logically related to the infant's theory of objects and to the development of plans. Our knowledge of these areas of development can at least give us some clues about the development of spatial concepts. The evidence suggests that the concepts encoded by "up" and "down" develop at about sixteen months, while those encoded by "in" and "out" and "on" and "off" only develop at about eighteen months. These expressions also encoded the infant's own movements, and hypothetical movements, as well as encoding the movement of objects. The evidence suggests that the infant

only comes to understand the analogies between these three types of movement at about eighteen months. I will argue that the development of direction expressions could facilitate the development of spatial concepts.

Downward and Upward Movement

At first glance, the concepts encoded by "up" and "down" appear to be relatively simple. However, most of the utterances of "up" and "down" occurred in contexts involving a special sort of movement. 85% of the utterances referring to object movement referred to movements that involved the effects of gravity. "Down" occurred when objects fell or were dropped, when an object fell off another object or when a vertical object tipped over on its side. "Up" was used when one object was balanced on top of another object or when a vertical object was placed upright (see chap.9).

There are formal reasons why these kinds of movement should be more difficult to understand than other types of movement. The principal problem is that the role of gravity makes it difficult to accurately predict the behavior of objects. When we move an object to the left of another object we can predict that it will remain at the left of that object, when we move an object further away than another object we can also predict that it will stay at that position. When gravity intervenes we can't make these predictions. We may perform exactly the same action on an object, say, placing it on top of another object, and the object may either remain on top of the object or move below it.

In the "build and bash" game, which was a favorite of the children in this study and elicited many "ups" and "downs",

the same action, placing a block on a tower, is repeated. The fun comes from the different and often unpredictable consequences of that action. Similarly, in the "bash" part of the game children try pushes of various strengths. Depending on the size and stability of the tower, these pushes may or may not result in the fall of the tower.

In order to understand equilibrium and balance the infant needs to take into account both his own actions and the independent properties of objects. He needs to calculate the consequences of the interaction between his own actions and objects. This kind of calculation is associated with the development of plans which occurs between twelve and eighteen months.

Piaget (1953, 1954) records several interesting observations relevant to the development of concepts of balance. He claims that during the twelve to eighteen month period infants explore these relationships. The earliest observations, at about twelve months, concern the infant's study of falling objects. At 0, 11, 19 and 0, 11, Jacqueline and Laurent begin to systematically drop objects and study their trajectory.

Some of the observations of Jacqueline suggest that at twelve months her understanding of movements involving gravity is incomplete. For example, at 1, 0, 26, she feels obliged to push objects downwards as she lets go of them in order to get them to move downward. On the other hand she places an object against the back of a sofa as if she believes it will simply stay there. At 1, 0, 3, she pushes an object so that it rolls down a slight incline. Then she places the object on the floor and watches it expectantly, as if she expected it to roll by itself.

I have observed similar behavior produced by a fourteen-month-old, Alexei, playing with a sliding board and a pencil. He places the pencil on top of the board, but it slides down. He picks it up and tries to place it on the board again, but this time he pushes forcefully on it and holds it on the board for several seconds. As soon as he lets go it slides down again. He does this repeatedly, pressing harder each time as if the pencil would stay if he only tried hard enough. Finally, he picks up the pencil and carefully and forcefully places it on the floor and then looks at it, as if making sure that it really will stay on the floor. Then he picks it up and tries again to make it stay on the sliding board.

These observations suggest that Jacqueline and Alexei at a year have developed a model of object movements that relies on the kind of predictions outlined above. The one-year-old seems to believe that there are two kinds of movement, either he brings about the movement of stationary objects, in which case the objects move as he moves and remain where he puts them, or else objects simply move independently. In order for an object to move downward he has to move it downward. If he places an object against another object it should stay there. On the other hand if an object does move independently of his action, as when it rolls down an incline, it should also be able to move independently on a flat surface. These principles work quite well when they are applied to horizontal or radial movement, the sort of movement that takes place when children move objects on the floor or on a flat table. But they don't apply to vertical movements involving the influence of gravity. When objects fall or are balanced on each other, they don't

move independently, but their movement does not follow the child's movements.

Between twelve and eighteen months the infant's experiments with falling objects and supporting objects allow him to correct his earlier concept of movement. At 1, 3, 21, Jacqueline begins to let objects fall without pushing them downwards. At 1, 4, 8, Lucienne systematically makes objects fall by pushing them to the edge of a supporting block. These behaviors suggest that the infants have come to understand something about the way objects fall. They understand that a variety of actions and events all can make an object move towards the floor.

At about the same time, children experiment with other events that involve the role of gravity. In particular, they learn how to balance objects on top of each other. At 1, 3, 4, Lucienne tries to place a bowl on top of a wooden pail, but the bowl is unsteady. Similarly at 1, 4, 25, she tries to place a cube on top of another cube balanced on her father's leg. By 1, 6, 27, however, she can stack up to six blocks and she chooses the correct blocks and puts them in the correct position. At 1, 1, 24, Laurent places pieces of wooden furniture on top of each other. By 1, 4, 6, he can stack three blocks. At 1, 6, he tries to make a block fall by shaking the support it rests on.

Finally, Laurent investigates the way objects can be made to stand upright or to topple over. At 1, 1, 24, and at 1, 4, 0, he tries to stand a long block upright and then pushes it to make it fall over.

These observations suggest that infants begin to take an interest in problems that involve gravity, such as the way

objects fall, the way they can be balanced on top of each other, and the way they stand upright, at about twelve months. The observations of Jacqueline and Alexei suggest that at twelve months the infant can't fully understand these movements. It is not until after a period of experimentation that infants can make accurate predictions about the behavior of objects under these circumstances, at about fifteen or sixteen months. Even then, the infants continue to explore these relationships.

Containment

Bower (1974, 1979) has suggested that it is particularly difficult for infants to understand that one object is inside another object. They only really develop the concept of containment at about eighteen months. The concept is difficult because, according to the infant's perceptual rules, an object inside another object is defined as a single object, rather than as two separate objects.

Bower (1974) argues that there are three criteria which an infant above the age of five months uses to define an object. One is the criterion of boundedness. In order to be an object a perceptual configuration must define a bounded volume of space. Another is "common fate", the contours of the configuration must move together. Finally, the infant uses information about the features of the objects, he defines an object in terms of its shape, size, colour, texture, etc. These rules allow the child to tell when a configuration is an object and to differentiate different objects.

For example, the display in Fig.3a contains two objects according to the boundedness and feature criteria. There are two separate bounded volumes of space, each having different

features. If the dark object moves, the infant's conviction that these are two separate objects is strengthened. The contours of the dark object moved together, and they moved independently from the contours of the light object. According to the common fate rule, these are still separate objects. However, suppose the dark object continues to move until it covers the light object (Fig.3b). Now the boundedness rule and the feature rule tell the infant that the display contains only one object, the dark object. Now suppose the dark object, with the light object inside it, moves (Fig.3c). The contours of the single object defined by the boundaries in Fig.3c move together. The common fate rule should reinforce the infant's conviction that the display contains a single object rather than two separate objects. An infant who uses these rules to define objects should perceive this sequence of events as one in which two separate objects are replaced by a single object.

There is evidence which suggests that, up to eighteen months, infants do perceive the movement of one object into another object in this way. We saw that, initially, infants won't search for an object that has been placed inside another object. Later, they develop a rule that allows them to find an object when it is placed in another object, but their errors suggest that they still don't understand the "inside" relation. Their rule simply says "The object will reappear where it disappeared".

For example, the one-year-old doesn't seem to understand that an object shares the movements of another object that contains it. If the container moves with the object inside it, so that the object is no longer where it disappeared, he

cannot find the object. This is what makes the transposed cups task difficult (see chap.13). Also, the fact that the infant accepts the magical rule that leads to the A not B error suggests that he does not understand the "inside" relation.

The infant can deal with other types of movement, even if they involve the disappearance of an object, if those movements don't violate his object identity rules. Thus, six-month-olds can search for objects that disappear behind a screen. When an object moves behind a screen the two objects don't occupy the same bounded volume of space, nor do they move together. This allows the infant to define this event as one involving two separate objects, and to retrieve the missing object.

Other evidence comes from experiments in which objects were placed under transparent cups. In this case the object inside the container is visible. Despite this, the infant with the object identity rules I have described above should perceive an object under a transparent cup as a single object with some features of the object and some features of the cup. At the very least, he should have conflicting hypotheses about whether this configuration contains one or two objects. If the transparent cup and the object under it move together, the hypothesis that the display contains a single object should be strengthened (see Fig.5).

The evidence from experiments with transparent cups is mixed, but generally it supports this picture. Bower and Wishart (1972) presented 16 infants with a toy hidden under a transparent or an opaque occluder. None of the infants could retrieve the toy from the opaque occluder. Half of the infants

could retrieve the toy from the transparent occluder. However, even these infants took up to three minutes to pick up the transparent cup, although they would normally pick up a cup that did not hide an object in less than one minute. This evidence suggests that some infants did treat the object under the cup as if it were a single object, and that even the infants who managed to retrieve the toy initially found the display puzzling.

Bower (1975) has found that older infants make the same kinds of errors in the A not B task and the transposed cups task, when transparent cups are used and when opaque cups are. In these more complex situations the infants behave as if the transparent cups with objects inside them are single objects. The difficulty of the transposed cups task is particularly interesting, since in that situation the common fate rule reinforces the hypothesis that a single object is involved.

There is also observational evidence which suggests that the containment relation is difficult for infants less than eighteen months old. Bower (1974) reports that if infants between twelve and eighteen months old find an object several times under the same cup and the object is then placed to one side of the cup in full view, they will continue to search in the empty cup. As Bower puts it "The cup is seen as a cornucopia rather than as a container - something that objects can emerge from without having to go into" (Bower, 1974 p.213). We have seen that the remnants of this belief are reflected in the child's use of "gone" in similar contexts (see chap.8).

Another set of observations which are relevant to the development of the concept of containment concern the child's

ability to place one object inside another. Piaget (1953, 1954) describes how infants first begin to place objects inside each other at about fifteen months. For example, from 1;2, 28, to 1;3, 6, Lucienne systematically puts grass and pebbles into hollow objects like buckets and bowls. Initially, however, the infant's understanding of these relationships is limited. Thus, Jacqueline, for example, at 1;3, 28, tries to place a larger beaker inside a smaller one, and Lucienne aged 1;4, 11, can't remove a beaker from inside another beaker. Eventually, as the infants continue to experiment with these relationships their understanding of the problem increases and their skill at these tasks develops.

These kinds of behavior described by Piaget are less difficult, from the point of view of object identity rules, than the behaviors involved in retrieving objects from closed containers. When the child places pebbles in an upright pail, for example, the pail doesn't define a single bounded volume of space in the way that an up-side down pail does. Moreover, the pebbles are visible and easily accessible. However, Bower (1974) argues that understanding how to place one object inside another is a prerequisite for understanding that an object be inside a closed container. The infant learns that the same relationship is involved when he places an object in an open container, and when he sees an object disappear into a closed container. The infant begins to put objects in containers at fifteen months, and during the next few months gradually learns the nature of the relationship between a container and its contents, in the same way that infants begin to drop objects and place objects on top of each other at twelve months and

gradually discover the principles that govern equilibrium and balance. At around eighteen months the infant generalises from these events to the events involved in the object permanence task.

Contiguity and Attachment

"On" and "off" referred to three kinds of movement. They were used when objects became attached to or detached from each other, when they became or ceased to be contiguous, and when clothing was put on or removed. While we know something about the infant's understanding of contiguity, there is no direct evidence about his understanding of the other two types of movement. However, if Bower's account of the infant's object identity rules is correct, these concepts should be at least as difficult as the concept of containment.

According to these perceptual rules Fig.4a should contain two separate objects. If the dark object moves the common fate rule should confirm the hypothesis that the array contains two separate objects. However, if the object continues to move so that we have Fig.4b, the boundedness rule should say that the array contains only one object.

There is evidence which suggests that up to ten or eleven months, the infant does interpret this configuration as a single object. Bower (1979), Piaget (1954) and Monnier (1977) report that infants younger than ten months will not attempt to retrieve an object that is placed on top of another object in this way. Instead, the infant will ignore the object if the support is too large to grasp, or will try to grasp both the object and the support. In either case he behaves as if the object and the support were a single object.

Note that when an object rests on a support the "common fate" rule is not involved. The objects don't generally move together. If the support is moved the object is likely to fall off, rather than to move with the support. When objects are physically attached, however, the contours of the new object move together as in Fig.4c. This fact should strengthen the hypothesis that this array contains a single new object. It should also make it more difficult for the infant to perceive the new configuration as two separate objects.

The containment experiments suggest that the addition of common fate information to a display does make it more difficult for the infant to understand that the display contains two separate objects. For example, we saw that an important difference between the easy "behind" disappearances and the difficult "inside" disappearances is that when an object moves behind a screen the two objects move independently, while when an object moves under a cup the two objects move together (see chap.13).

There is another formal reason why physical attachment might be more difficult to understand than support. The mechanisms that attach objects such as hooks, pegs and even magnets, are likely to be mysterious to an infant. While when one object is contiguous to another the infant can predict that certain actions will lead to the separation of the objects, this prediction is not possible when objects are physically attached. Sometimes, pulling on one lego brick will remove it from the other brick, but sometimes it won't.

The simpler concept of contiguity would appear to be a prerequisite for the concept of physical attachment. Since the

infant doesn't understand that two objects can be separate but contiguous until ten or eleven months, he must not be able to understand that two objects can be physically attached and contiguous, and be separate objects, until sometime after that period. We know that infants only understand the containment relationship at about eighteen months. From the point of view of object identity rules, this concept is as complex as the concept of attachment. It is at least a plausible hypothesis that the concept of containment and that of attachment develop at about the same time, that is, at about eighteen months. Of course, this hypothesis would need to be tested empirically.

The relationship between clothing and bodies is a peculiar amalgam of containment and attachment relationships. A glove, for example, is physically attached to a hand and also at least partially encloses the hand. If the infant has Bower's object identity rules the putting on and taking off of clothes should be at least as puzzling as containment or attachment.

Consider what happens when a child puts on a glove. Initially as in Fig.6a there are two clearly separate objects. Each has separate boundaries, one is firm, pink and moves independently, the other is black, woolly, floppy and stationary. After the glove is put on as in Fig.6b, there is only one bounded volume of space and hence one object. The contours of this configuration move together, they have a common fate (Fig.6c). The new object has some of the features of the glove, it is black and woolly, but it behaves as if it were an extension of the hand. Moreover, the transformation of these two objects into what looks like one object is associated with such mysterious

devices as buttons, zips and snaps.

If the infant of sixteen or seventeen months can't understand the spatial relationship between a container and its contents it is unlikely that he can understand the much more complex relationship between an article of clothing and a part of the body, a relationship that has been known to puzzle adults.

Containment, Attachment and the Concept of The Object

Most movements of objects don't violate the Bower object identity rules. When an object moves towards or away from another object, in front of it or behind it, or above or below it, even a very young infant can interpret that event as a change in the object's location rather than as a change in its identity. Movements that result in the enclosure of one object by another or that result in one object becoming physically attached to another object are exceptional in that they may be interpreted as object replacements rather than as object movements.

The development of the ability to understand that these events involve movement, rather than replacement, is bound up with the development of the general model of objects and observers discussed in the previous chapter. The cardinal tenet of that model was "if an object mysteriously disappears, assume that either the object, the observer or an intervening object has moved". The development of this model might be related to the development of the concepts of containment and attachment in two ways.

Given the infant's object identity rules, containment and attachment will be prime examples of mysterious disappearance. If the infant interprets these events as replacements, he is

left with the problem of what happened to the original objects. Once he discovers that these events involve movement there will be few examples of mysterious disappearance left. The other examples of disappearance, such as disappearances behind screens or disappearances due to head movements, have already been resolved in terms of movement. The fact that the movement hypothesis accounts for these disappearances may lead the child to apply the hypothesis to all disappearances.

On the other hand, the development of the general model of objects might lead the infant to hypothesise new kinds of movement and new spatial relationships in order to account for apparently mysterious disappearances. He might think "If all disappearances are the result of movement, then attachment and containment events, which are apparently mysterious disappearances, must also involve movement". Most probably, both these developments go hand in hand and reinforce each other.

The development of an understanding of containment and attachment also seems to be bound up with the shift towards a conceptually based understanding of the world. The boundedness rule, the common fate rule and the feature rule govern adults' perception of objects as well as infants' (see Michotte, 1962). However, adults can use other kinds of knowledge to override perceptual information. They can distinguish between the fact that an array looks like one object and the fact that it actually is two separate objects. In order to understand containment and attachment the infant must similarly override his perceptual rules. We have already seen how a shift from a perceptual to a conceptual framework was reflected in the

development of the concepts encoded by "no" and "gone". The infants' use of these expressions implies an ability to conceive of objects or plans that are not perceived, and that could not be predicted by perceptual rules. There are some suggestions in the literature that this general shift takes place at about eighteen months (see chap.12).

Thus, the concepts of containment and attachment are logically connected in a diffuse way with cognitive developments that take place during the second year, at about eighteen months. This provides indirect support for the hypothesis that these concepts develop at about that time.

Self-Movement and Hypothetical Movement

So far I have been concerned with the specific types of spatial relationships encoded by direction expressions; balance, containment and attachment. I have argued that these types of movement are more difficult to understand than other common types of movement. Specifically, I have suggested that problems of balance are difficult because of the unpredictable role of gravity. Piaget's observations suggest that infants come to understand the behavior of objects in these contexts at about sixteen months. Containment and attachment are difficult to understand because they violate object identity rules. There is good evidence that infants only understand containment at about eighteen months. It is at least plausible that infants come to understand physical attachment at about the same time.

There are also some aspects of all spatial concepts which should be particularly difficult for the infant to understand. In particular, Piaget (1954) and Bower (1979) argue that it is difficult for the young infant to understand that his own

movements are analogous to the movements of objects. Piaget and Bower also suggest that it is difficult for the child to hypothesise possible courses of movement which have no connection with the movements he actually perceives.

These two cognitive developments are logically related to the eighteen-month-old model of objects and space. An important aspect of that model is the fact that observers and objects are seen to be part of the same spatial framework. Thus a disappearance can equally be the effect of an observer's movement, an object's movement or a combination of the two. At the same time the model implies the possibility that an object can move without that movement being perceived by the observer. The observer has to imagine the course of the object.

There is some empirical evidence which suggests that the child begins to understand the analogies between his own movements and objects movements at the same time that he develops the object model, at about eighteen months. Piaget (1954) notes that from about 1, 4, to 1, 6, 15 Jacqueline apparently fails to realise that her own body has the same spatial properties as other objects. Thus, for example, she tries to grab a handkerchief that she is standing on or to open a box with one hand that she holds closed with the other hand. At this stage, Jacqueline could remove an intervening object in order to pick up the handkerchief or open the box. But she doesn't seem to realise that her own body is a similar object, and that moving a hand or foot would have the same effect as moving an intervening object. According to Piaget, Jacqueline stops making these errors at 1, 7.

Another example of this generalisation is the development

of the detour. Piaget (1954) claims that at about eighteen months the infant can calculate the correct path to reach a location even if the path is indirect and he has never taken it before. For example, at 1, 6, 8, Jacqueline rolls a ball under a sofa; she then turns her back to the sofa and navigates past a table until she gets behind the sofa and recovers the ball. In order to behave in this way, the infant must see that her own body, the object she is trying to reach, and the obstacles in her way, are all part of the same spatial framework.

There is also experimental evidence which supports this view. Bower (1979) reports an experiment in which infants were presented with two cups on a table and an object was hidden under one of the cups. By the time they are a year old, infants consistently remove the correct cup. However, if the infant is moved to the other side of the table, so that his view of the cups is reversed, the infant will choose the wrong cup. He can't take into account his own movements and their effects on his perception of objects. The infant can only retrieve the cup correctly at about eighteen months.

The other development is the ability to hypothesise possible movements. Piaget describes this as the ability to understand invisible displacements, but this is not an accurate characterisation. Even very young infants can extrapolate the future trajectory of a moving object (see Mundy-Castle and Anglin, 1969). However, young infants don't seem to be able to hypothesise or predict a totally new trajectory. Once the infant develops this ability he should be able to deduce the locations of missing objects since he can imagine the possible routes those objects might have taken. We have seen that infants

can only do this at about eighteen months. The development of the detour also reflects the ability to imagine alternative possible routes between objects.

The Linguistic Evidence

The infants in this study used direction expressions in ways which reflected the cognitive developments I have described in the first part of this chapter. The direction expressions were applied to simpler and more complex types of movement in a way that suggests that infants understood that the two types of movement were analogous. The expressions were also used to refer to static spatial relationships. All the expressions referred to the infant's own movements and to hypothetical movements as well as to the visible movements of objects.

"Down" and "Up"

"Down" and "up" were used when children simply moved an object upward or downward, when they placed an object down on the floor or picked it up. But they were also used in a variety of situations involving equilibrium and balance. "Down" was used when objects fell or when vertical objects fell on their sides. "Up" was used when objects were balanced on supports or were placed upright. In general "down" and "up" were applied to a wide variety of different actions with the same intended consequence, to move objects downward or upward. The children used "down" when they released objects, when they pushed them to the edge of other objects, when they pushed objects over and when they removed a support, as well as when they simply moved an object (see chap. 9). This implies that the infants understood that these actions would have the same effect as simple movement of the object. I have argued that

the infants only come to make these predictions at about sixteen months.

"In" and "Out"

"In" and "out" referred to the movement of objects into open containers. They were used when children placed blocks in a pail or placed one beaker into another. These contexts are similar to those Piaget describes during the fifteen to eighteen month period. But the infants also used "in" and "out" when they placed objects inside closed containers. "In" was used when children pushed blocks into a closed posting box, when a doll was pushed into a toy ambulance with closing doors, when a ring was placed in a closed fist (see chap.9). In all these cases an event took place which transformed a two-object display into a single-object display according to the infant's object identity rules.

Even more significantly, "in" and "out" were also used to refer to closed containers which contained objects, and were used when children tried to retrieve objects from closed containers. Paul says "in" pointing to a closed box which has beakers in it. Henry says "indere" pointing to a closed basket which contains his brother's violin. Rachel says "out" when she tries to open a closed drawer in order to take a box out of it. These contexts are similar to the "object permanence" tests (see chap.13). These uses of "in" and "out" imply that the infant had generalised from the contexts in which he placed objects in open containers, which do not violate the object identity rules, to those in which objects moved into closed containers or in which objects were in closed containers, which do. The fact that he uses the same expressions in all these

contexts suggests that he recognises that all these contexts involve the same spatial relationships. I have argued that this recognition only takes place at about eighteen months.

"On" and "Off"

Similarly, "on" and "off" were used when objects became or ceased to be contiguous, when a coat was placed on a chair or when a block was balanced on a chair. By eleven months the infant should interpret these events as the movement of two separate objects. But the expressions were most frequently used when objects became physically attached or detached, or when clothes were put on or removed. This suggests that the infant had come to understand that these events involved the same type of movement of two separate objects. Similarly, the use of "on" to refer to static objects that are physically attached to each other implies that the infant understands that these objects have the same spatial relationship as contiguous objects. In order to recognise that physically attached objects are separate but contiguous, the infant must override his object identity rules. I have suggested that infants become able to do this at about eighteen months.

"There"

"There" encoded all the difficult types of movement encoded by "down", "up", "in", "out", "on" and "off", but it also encoded simpler types of movement. Children also said "there" when they simply moved an object from one place to another. In addition, "there" referred to the child's own movements. Henry says "up dere" trying to climb up a chair. Anna says "in dere" putting her finger in to a bottle. Also, "there" frequently referred to hypothetical movements. In "destination"

contexts, for example, children said "there" as they pointed to the location an object was about to move to, before the object actually moved.

Thus, "there" in the early period referred to all kinds of movements, whether these movements did or did not involve gravity, whether they did or did not violate object identity rules, whether they were the child's own movements or object movements, and whether the child actually perceived the movements or they were hypothetical movements. This general concept of movement is characteristic of the eighteen-month-old model of objects and space. Similarly, "there" encoded all sorts of static spatial relationships whether or not these relationships violated object identity rules.

Self-Movement

All the direction expressions referred to the infant's own movements as well as to object movements. Children used "up" and "down" when they climbed up on, or down from, chairs. They used "in" and "out" when they crawled into a wendy house or tried to break out of the arms of someone holding them. They used "on" and "off" as they climbed on to or off bikes or cars, and when they put clothing on or took it off. Again the use of the same expression in these contexts and in contexts in which objects moved implies that the infant perceived the analogies between the two kinds of movement.

One incident is particularly striking, and strongly suggests that the infant perceives the analogy between her own movements and object movements but finds this analogy surprising and interesting. Rachel places a set of toys that are on a table down in a line on the floor. Each time she places a toy

in the line she says "down". Finally, she has placed all the toys on the floor and she pauses and looks at them. Then she says "down", sits down herself at the end of the line of toys and laughs.

Hypothetical Movement

All the expressions were also used when the infants hypothesised a movement that they did not actually perceive. The expressions were frequently used to predict future movements. Children said "up" just before they placed a block on a tower, or said "down" as they prepared to knock over a tower or when they saw that one object was precariously balanced on another. Children also used these expressions when they tried, unsuccessfully, to bring about a movement. Henry says "out" as he tries to take the tape out of the tape recorder. We might also interpret some of the children's references to static objects, as references to hypothetical past movements. When Henry says "monster up dere" pointing to the monster on the high shelf he may have deduced that the object had to have moved upwards in order to be in its present position.

So far, I have argued that the concepts of balance and equilibrium, particularly the ability to predict the movement of objects under the influence of gravity, develop at about sixteen months and are related to the development of plans. I have also argued that the concepts of attachment and containment, and particularly the ability to recognise that two separate objects may be attached or one may contain the other, and still be separate objects, develop at about eighteen months and are related to the development of the concept of the object.

In addition, I have claimed that the ability to recognise that ones own movements are analogous to object movements and the ability to hypothesise movements develop at about eighteen months, and are related to the development of the object concept. Finally, I have argued that these conceptual advances are reflected in the children's use of direction expressions. This account of conceptual development leads us to consider when the linguistic expressions encoding these concepts emerge.

The Development of Spatial Concepts and the Emergence of Direction Expressions

Table 38 indicates the age at which each of these expressions was first used. The figures are suggestive in two respects. First "in" and "on" were first used at the same time. Second, "in" and "on" never appeared before "down". Three of the six children in Groups I and II used "in" or "on" two months after they first used "down", and one child, who did not use "in" or "on", first used "off" two months after she first used "down" (see chap.9). This pattern reflects the pattern of conceptual development I have proposed in the first part of this chapter. According to this model, the concepts encoded by "on" and by "in" should develop at about the same time, and those encoded by "down" should be developed earlier, in fact, I hypothesised that they should develop around two months earlier. On the other hand, there was no special developmental sequence for uses of the expressions referring to self-movement or to hypothetical movement, although there were a great number of uses of "down" to refer to self-movement in the early sessions.

The actual ages at which the expressions appeared are also interesting. On average, the expressions appeared a few months after the concepts they encode are developed, according to the cognitive model I have presented here. However, we should remember that the age at which an expression was first recorded is probably later than the age at which it was first used (see chap. 3). This is particularly true of the children in Group III who were eighteen months old when they were first recorded.

This pattern suggests the same relationship between cognitive and linguistic development that is reflected in the infant's use of "no", "more", "there", "oh dear" and "gone". At the very least, early non-nominal expressions encode concepts that the child has just developed. The child's language captures generalisations that he has just made, or even that he is in the course of making.

Just as significantly, the child doesn't use expressions to encode simple and well-established concepts. The cognitive literature suggests that certain types of movement, such as radial movement or movement in depth, and certain spatial relationships like the relationship of an object to a flat support are understood by twelve months. And yet the infant doesn't use locative expressions such as "near", "far", "front", "behind", "between" or "under" which might appropriately encode such concepts. Furthermore, the infant could easily use "up", "down", "in", "out", "on" and "off" to encode simpler concepts. He could, for example, restrict his use of "down" to situations in which he moves objects downward or restrict his use of "in" to contexts in which objects were placed in open containers. We know that infants do under-extend expressions in this way

in general. But, in fact, infants use these expressions to capture similarities between events which they have just become capable of appreciating.

The child's use of "on" provides a particularly striking example of this phenomenon. The standard meaning of "on" in the adult language involves the relationship between an object and flat supporting surface. In fact, comprehension experiments always assume that this is the meaning of "on". There is no reason to suppose that caretaker language is unlike adult language in this respect. Certainly, there are plenty of situations involving objects and flat supports in the child's environment. We have seen that the relationship between an object and a flat support is understood at ten or eleven months. If the eighteen-month-old used "on" when he placed objects on flat supports he would match the adult usage, and he would encode a well-established concept. In fact, children never used "on" in this way, even in contiguity contexts.

Instead they latched on to a relatively marginal use of "on" in the adult language, its use to encode physical attachment. This concept is more difficult than the concept of an object resting on a flat support, and may not be developed until 18 months.

One interesting explanation of this relationship between linguistic and cognitive development is that the linguistic generalisation actually precedes the conceptual generalisation and facilitates its development. The infant notices that the same expression is applied to different situations and this leads him to consider the possible similarities between these situations. We have already seen how this model can be applied

to "no", "there", "oh dear", "more" and "gone". We might also consider how it can be applied to direction expressions.

The twelve-month-old infant will be concerned with the unpredictable movements of objects under the effect of gravity. He begins to explore these events. He drops objects and places them on top of each other. The adults around him comment on his activity, and say "up" and "down". He may notice that "down" occurs when he moves an object downward, and when he releases an object, leans on an unsteady object, moves a support, or places a heavy block on an insufficient support. The linguistic clue may help him to understand that all these preliminary actions lead to the same consequence.

Similarly, the somewhat older infant will be concerned with events in which one object moves inside another. These events appear to involve the mysterious replacement of two objects by a single object. He begins to put objects inside each other, and to retrieve objects from containers. He notices then that "in" occurs when he places objects in open containers, when he places them in closed containers, when they move into closed containers, when he is presented with a closed container that turns out to have an object inside it, and when he retrieves objects from containers. This might lead him to consider the similarities between these events, and to conclude that the same spatial relationship is involved in all of them. He might think "I know that when I put a pebble into a pail I've moved an object in a certain way and adults say 'in'. But they also say 'in' when the block disappears into the closed mailbox. Perhaps the second event is just like the first".

Similarly, the fifteen-month-old should find movements that lead to physical attachment, such as putting on clothes, intriguing and mysterious. He notices that caretakers say "on" in these contexts. They also say "on" when two separate objects become contiguous. This fact might lead the child to consider the possibility that physical attachment, like contiguity, involves a change in the spatial relationship between two objects, rather than a transformation of those objects.

Finally, the fact that adults use the same expression, "there", in contexts that involve all sorts of movements, including movements that do and do not violate object identity rules, object movements, movements of the child's own body and hypothetical movements, could help the child to consider the similarities between all these types of movement. In turn this could help the child to develop a general concept of movement that goes beyond his perception of moving objects.

The fact that adults use the same direction expressions when the child moves and when objects move might also draw the child's attention to the similarities between these two sorts of movement. Similarly, the fact that adults use the expressions before movements take place, when they take place, when the child tries to bring them about, and when movements have taken place in the past, may help the child to generalise across these cases.

In general, the fact that the eighteen-month-old child was ready to make these generalisations, and that his cognitive system was pushing him towards these generalisations might make him particularly sensitive to relevant linguistic clues

(see chap.12) The fact that these expressions encode new and significant concepts would lead the child to pay particular attention to them and to store them. At the same time his hypotheses about the meaning of these expressions would be affected by his cognitive limitations. The child might avoid easy hypotheses, but he could not hypothesise that an expression encoded a concept that was way beyond his cognitive competence (see chap. 12).

In his productive speech the child could use the expressions to remind himself of the nature of the events he is dealing with and to make predictions, as well as to communicate about those events. He could say "in" when confronted by a closed container as a way of reminding himself that this event involves the relationship between two separate objects, as other "in" events do. Similarly, he could use "down" to predict that bashing the tower would make it fall down.

There are some indications that children use these expressions in this way. One is that the expressions were most frequently used in difficult rather than easy contexts. For example, "on" was usually used to indicate physical attachment, although it occasionally referred to contiguity. Mnemonic and predictive uses of the expressions would be most appropriate in these difficult contexts.

Another indication is that, in the early period, children were particularly likely to use the expressions when they themselves brought about a movement. The expressions referred to movements when they were the goal of a plan. The work of Piaget, Bruner and others suggests that infants come to understand events largely by manipulating and controlling them

in a structured way. In other words, when they want to understand an event, they try to bring that event about themselves (see chap.12). We've seen how thirteen-month-olds investigate problems of balance by dropping objects themselves, and how fifteen-month-olds investigate the inside relation by placing objects inside other objects. Mnemonic and predictive uses of expressions would be appropriate in these experimental contexts. We saw that children use "gone" in similar contexts (see chap.13).

It is also striking that these expressions were frequently used before the movement actually took place. For example, a child would say "down" just before he knocked over a tower, or say "in" just before he pushed a block into the posting box. This pattern of behavior also suggests that these expressions serve a predictive function.

Later Linguistic and Cognitive Developments

The changes in the meaning of direction expressions may suggest parallel cognitive developments. There were two changes in the use of direction expressions. First, children initially used direction expressions when they caused movements, and later used the expressions when other people caused movements or objects accidentally moved. Second, they initially used direction expressions when objects moved, and only later used them to refer to static spatial relationships (see chap.9).

The first development is similar to the development of "gone". A similar explanation seems appropriate. I have suggested that in the early contexts the children are experimenting with different types of movement. Both these experiments and the language that accompanies them, seem to help the child

to develop concepts of gravity, containment and attachment, and, in general, help him to develop the concept of movement. As the child grows older and these concepts become less problematic the need to experiment becomes less pressing. Now the children will be more likely to use direction expressions to comment of particularly interesting cases of movement (see chap.13).

The other development is rather different. Bower (1979) has suggested that children learn how to deal with difficult spatial relationships by observing the movements of objects. The infant who simply sees an object inside another object or attached to another object, has no information that will override his perceptual object identity rules. The infant who sees an object become attached to or detached from another object at least knows that two perceptually distinct objects were present at some point. He can consider whether there weren't two separate objects there all the time. Bower argues that the infant first learns how to overcome his object identity rules in situations that involve moving objects and then extends that knowledge to situations that involve static objects.

A similar argument might apply to the static relationship of support that was marked by "up". In order to understand this relationship, we need to understand something about the effects of gravity, particularly the asymmetry of downward and upward movement (see chap.9). It is possible that the child comes to understand how one object can support another by observing objects move on to supports and fall off of them.

The child's linguistic development parallels these

cognitive developments. The child says "in" first when he sees an object move inside another object, and then extends the term to situations where an object is in another object. He initially says "up" when an object moves on top of another object, and then says "up" when he sees an object that is supported by another object.

It is possible that the adult language could facilitate the generalisation from movements to static relationships in the same way that it facilitates the generalisation from simple types of movement, movements that don't violate object-identity rules and don't involve the effects of gravity, to more complex types of movement. Once the child understands the analogies between simple and complex types of movement, he can begin to consider the relationship between movements and static spatial relationships. Now he can take advantage of the fact that adults use direction expressions to refer to static spatial relationships as well as to refer to simple and complex movements. Before he understands movement this generalisation will be beyond his cognitive competence and he will simply ignore adult references to static spatial relationships. This aspect of the development of direction expressions is analogous to the later development of "no" and "more" (see chap.12).

In summary, the model of the development of direction expressions I have outlined here is similar to the model outlined in the previous two chapters. The child's behavior suggests that he makes certain conceptual advances. He recognises similarities between events that he previously treated differently. For example, he recognises that the

movement of an object into a closed container is the same sort of event as the movement of an object into an open container, and that the same behavior is appropriate in both these situations. He also uses linguistic markers in both situations, he says "in" in both these contexts. Children use linguistic markers in this way at the same time or shortly after they first act in a way which suggests that they have acquired the appropriate generalisations. Moreover, they don't use these linguistic markers or other linguistic markers, to encode concepts they have acquired much earlier.

I have suggested that this pattern of development reflects the fact that the child uses linguistic clues, provided by adult usage, in order to solve cognitive problems. In particular, the fact that the same expression appears in various contexts helps the child to perceive the similarities between these contexts. He can then use these expressions as mnemonic or predictive devices. As his cognitive system changes and new cognitive problems arise he becomes able to take advantage of new linguistic clues, and his own language changes.

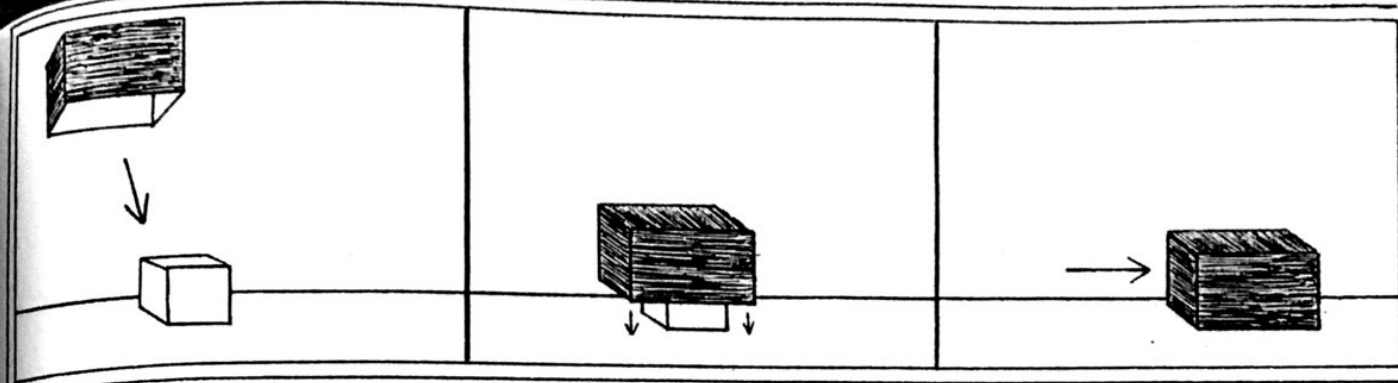
TABLE 38

Age in Months at Which Each Direction Expression and Locative "there" was First Recorded

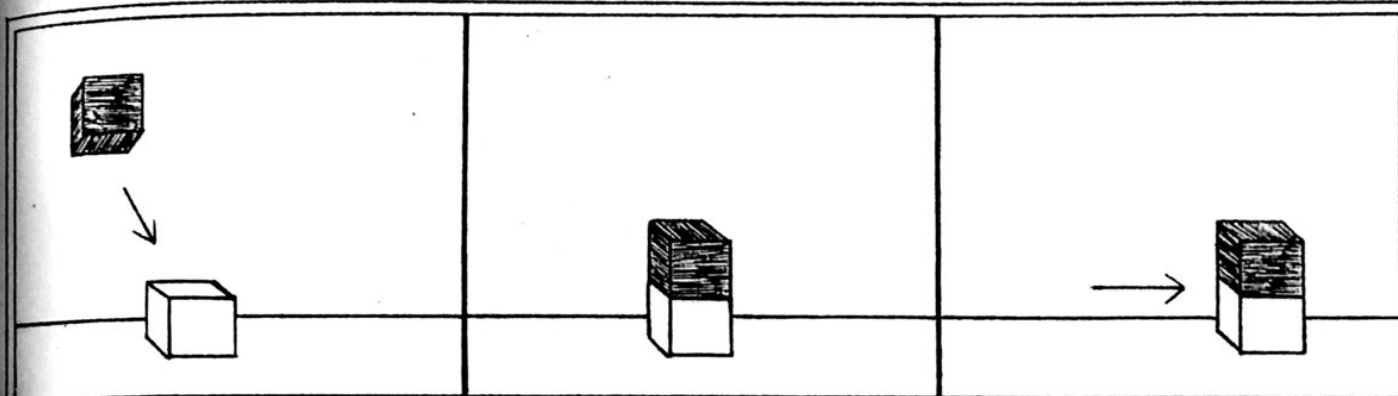
	GROUP I			GROUP II			GROUP III		
	Jonathan	Henry	Rachel	John	Christian	Harriet	Paul	Hannah	Anna
Down	12	23	18	16	18	15	20	18	19
In	24	23	21	18	20		21	24	19
On	24	23	20	18	20			18	19
Up	21	25		16		18		24	21
Out	26		23				22	24	18
Off	23	27	22	19		17	22		20
Loc. There	21	24	22				21	19	19

Mean Age

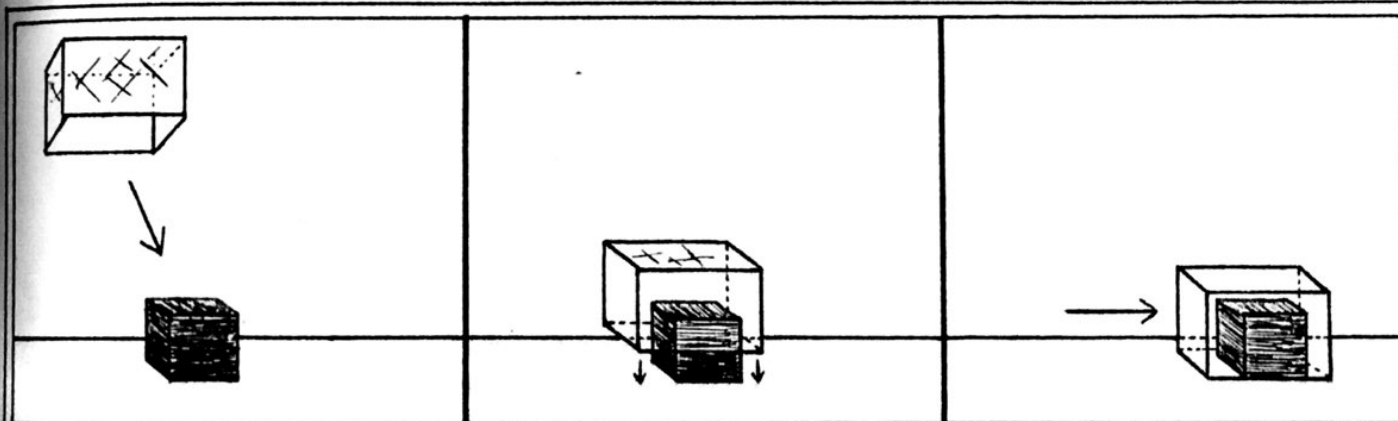
Down	17.7
In	21.3
On	20.2
Up	20.9
Out	22.6
Off	21.4
Loc. There	21



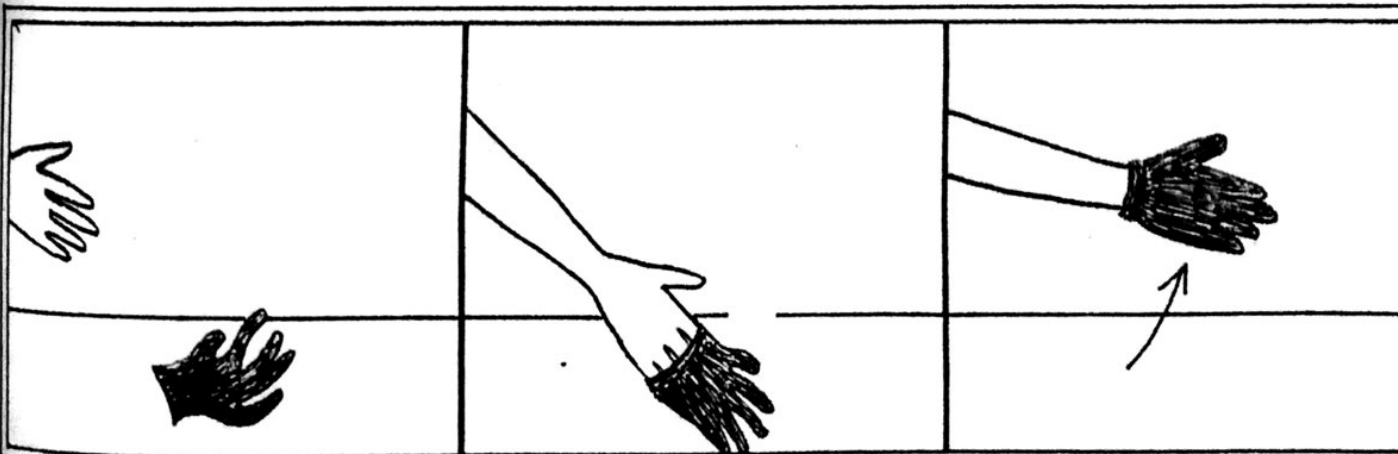
^a Figure 3. Containment^b (opaque)



^a Figure 4. Attachment



^a Figure 5. Containment (transparent)^b



^a Figure 6. Attachment of clothing^b

TABLE 39

Age of Children When "that" and Names were First Recorded

	GROUP I			GROUP II			GROUP III		
	Jonathan	Henry	Rachel	John	Christian	Harriet	Paul	Hannah	Anna
That	12	19	20	17	16	15	18	18	18
Names	17	21	18	17	16	15	18	18	18

CHAPTER 15

"THAT" AND NAMES, AND THE CONCEPTS OF OBJECTS
AND NATURAL KINDS

So far, I have investigated the development of the concepts encoded by "no", "there", "more", "oh dear", "gone" and direction expressions. I haven't considered the concepts encoded by "that" and the early names associated with "that". In this chapter I will argue for an account of early names and indicatives based on Putnam's (Putnam 1975) and Kripke's (Kripke 1971) theory of the meaning of names in the adult language. This account helps to explain many problematic features of early names, particularly the under extensions and over extensions of names, the relationship of names and indicatives, and the function of names. Finally, I will discuss the development of the concepts encoded by names and indicatives according to the Putnam-Kripke theory.

Theories of meaning in child language are almost bound to be based on theories of the adult language. This is certainly true about theories of naming. One group of accounts notably those of Clark (1973, 1974), Nelson (1974) and Bowerman (1978), are extensions of "description" or "feature" theories of naming originally formulated by Frege (1960) and Russell (1905), and psychologised by Katz (1972) and Rosch (1973, 1975). Some of the more recent accounts, notably Bruner's (Bruner 1975, 1976, 1978; Ninio and Bruner, 1978) account, are more closely related to the work of ordinary language philosophers such as Strawson (1950) and Donellan (1966).

Feature Theories of Naming

Some semantic theories argue that names mean because they are associated with intensions or descriptions. These intensions consist of a list of features. The name "tiger" for example is associated with a list of features which include "animate", "carnivorous" and "striped". This intension specifies an extension, it tells you which objects "tiger" refers to. Any object which satisfies the description in the intension, that is, any object which has all the features in the list, is a tiger.

This list, or description, or intension is a conceptual or psychological entity related to our experience of objects. In the more positivistic accounts, which have recently been echoed by the psychological theories of E Clark (1974) and H Clark (1973) and Miller and Johnson-Laird (1976), the features listed in the intension are ultimately perceptual features. The description specifies a set of perceptual configuration. It provides a way of recognising a tiger when you see one.

It has been assumed, reasonably enough, that names also function in this way in the child's language. They are associated with a list of features. The nature of this list determines the extension of the name, it determines which objects the name is applied to. We know that the extension of names in child language is often much narrower or wider than their extension in the adult language. The child may only call the family pet "dog" or he may call all animals "dog". Therefore the intension of the child's names must also be different.

Following a suggestion of Roger Brown (1958), Eve Clark (1973, 1974) has argued that the child's intension is incomplete. The child associates the name with one or two features, rather than the complete adult list of features. His intension for "cow" may simply be "animate, four-legged" rather than "animate, four-legged, milk-producing, slow, large, etc." As a result he over-extends the name. As he grows older he gradually adds new features to this list, restricting his use of the name as he does so, until eventually he has the full adult list.

Clark also argues that these features reflect perceptual properties of objects, such as size, shape, colour and texture. She assumes that the child's understanding of the world is organised in terms of these perceptual categories. The child produces a name whenever he sees a particular size, shape or colour. As a result he applies the name to objects which share a perceptual feature or a set of perceptual features. But, in a sense, he doesn't refer to the object at all, but rather to the perceptual features of the object. For Clark, the child's intension for "tiger" might be "orange, striped, four-legged".

Katherine Nelson (1974) accepts Clark's general model, she accepts the idea that the child's list of features is incomplete. But she argues that the child's intensions consist of functional features rather than perceptual ones. Exactly what Nelson means by "functional features" isn't clear, but she seems to mean both dynamic properties of objects, the way objects move or behave, and the role objects play in the child's action schemes. This claim is based

on a vaguely Piagetian view of the child's experience, a view that argues that this experience is organised in functional rather than perceptual terms. Nelson predicts that the child will apply names to objects that behave in the same way or that are acted on in the same way. For Nelson the intension associated with "tiger" would be something like "fast-moving, carnivorous, to be avoided".

Melissa Bowerman's (Bowerman 1978) account of early names is closer to Searle's (Searle 1958) and Rosch's (Rosch and Mervis 1975) account of names in the adult language. Bowerman sees the intension associated with a name as a cluster of weighted features rather than a conjoined set of features. Names are applied to objects that display some sub-set of the features in this cluster. Bowerman argues that these features are usually perceptual but they may also be functional. The child might apply the word "tiger" to a lion because it's dangerous and to a zebra because it's striped. For Bowerman the intension of "tiger" would be something like "definitely animate, probably dangerous, possibly striped".

Searle and Rosch have argued that the intension of an adult name is this sort of cluster. Rosch calls it a prototype. Names are applied to objects that have features in common with the prototype. For Searle and Rosch the prototype is not a specific object but an abstraction from many objects. The adult learns that no particular description explains all the application of a name so he develops a complex cluster of descriptions. For Bowerman, however, the prototype is a specific object. The child initially is likely

to apply the word only to this object. Then he analyses this object into a set of perceptual and functional features, and applies the name to objects with sub-sets of those features.

Bowerman's account makes better predictions than Clark's or Nelson's. Children do tend to initially apply names to specific objects, and then apply them to other objects that have various properties in common with that object. The child applies "moon" first to the moon, and then to a crescent shaped bit of paper and to a lamp. But Bowerman's account is least satisfactory from a logical and developmental point of view.

Clark's theory provides a plausible developmental sequence; the child begins with a simple concept and gradually adds to it. Similarly, Nelson's account echoes other theories of cognitive development. The child begins with a functionally based view of the world and gradually develops a perceptually based view. Also, Nelson and Clark both provide a simple and logical account of the way children actually use names. The child simply has to recognise experiences of a particular functional or perceptual type when they come along. In effect, he goes around saying "aha round" or "aha dangerous".

As Bowerman herself recognises, her model is much more complicated. The child has to analyse the prototype object into a set of perceptual and functional attributes, weight them, analyse other objects, compare this list of features with the original list, and decide if the two lists have a sufficient number of features in common to justify the

application of the name to the second object. This process is just as complicated as the adult process of naming. The prototype model makes sense when we apply it to adult language. In order to deal with the variations in the application of names in the adult language we have to construct this complicated system. But the child doesn't match the adult applications of names, and he hasn't had time to construct this system. Why should he initially use names in such a complex way when he could just apply them to objects with common features, as Clark and Nelson suggest, and match adult usage just as well?

There are some other limitations to the feature theory of early naming. We have seen that there is a close relationship between names and indicatives such as "that". They appear in the same contexts, "that" often precedes names, "that"+name is one of the commonest and earliest two-word strings, most children only use names after they use "that" and, according to Carter (1978) there is a phonological link between "that" and early names. Feature theories can't explain this relationship. "That" doesn't pick out features or sets of features or clusters of features.

Also this model can't explain why children use names in the first place, it can't explain the motivation or function of early naming. Why should an eighteen-month-old find the recognition of features such a fascinating activity? Why should he spend his time pointing out redness or roundness or dangerousness, or picking out sub-sets of a cluster of features?

Pragmatic Theories of Naming

An entirely different approach to naming has been developed by ordinary language philosophers such as Austin (1962), Strawson (1950), Donellan (1966) and Harrison (1972). These philosophers see the problem of reference as a pragmatic problem. Referring to an object involves drawing the attention of another person to the object. We choose a name, a demonstrative or a description because we want to accomplish something with that linguistic expression, rather than because of some abstract relationship between words, concepts and objects. Donellan argues, for example, that a description can successfully refer to an object even if it isn't true of that object. Referring isn't something words do, it's something people do with words.

This line of argument has been applied to child language by writers such as Lyons (1973) and Carter (1978), but, most comprehensively, by Ninio and Bruner (1978). On this view names and indicatives are devices children use to draw the attention of others, particularly their caretakers, to objects. Ninio and Bruner describe a number of pre-linguistic devices that caretakers and infants use to focus attention on objects. They argue that these devices are replaced by the linguistic expression "that", which serves the same function. Later, names take over this referential function.

This pragmatic approach has some advantages. It explains the close relationship between names and indicatives. Names are more elaborate devices that serve the same function as "that". The approach also presents a plausible

hypothesis about the function of early names. Children produce names because they want to draw the attention of their caretakers to objects.

This approach also has some limitations. It can't explain the phenomena of under and over-extension in any obvious way. More seriously, it can't explain some of the ways children use names and indicatives.

If names and indicatives are attention-directing devices we would expect them to occur in a particular type of social context. We would expect them to be used when an interlocutor didn't have his attention focussed on an object, and the speaker tried to make him focus his attention on the object by producing the expression. We would predict that the speaker would not use the expression when the interlocutor's attention was already focused on the object, and we would expect the speaker to be disappointed or upset if the expression failed to draw the interlocutor's attention to the object. A typical referential situation would be when, in a crowded cocktail party, one guest draws the attention of another guest to a third guest by saying "There's John" or "The girl in the red dress is Mrs. Smith".

In fact, children often produce names and indicatives in very different contexts. First, the expressions are often used in apparently non-social and non-communicative ways. No one is paying any attention to the child, and the child doesn't seem to be very concerned about the reaction of others to his utterance. Second, even when the child does use names communicatively, the interlocutor's attention is usually already focused on the object that the child refers

to. Child language is usually so closely related to the immediate context that the focus of attention is eminently clear even before the child says anything. When a mother and child are looking at a picture of a cow, and the mother points to the picture and says "That's a cow", it must be clear to the child that her attention is focused on the cow. When the child replies "that cow, that, cow, cow" it is bizarre to suppose that he is trying to get his mother to pay attention to the cow. So what is he going on about?

The feature account and the pragmatic account are in many ways complementary rather than contradictory. They try to explain different things. Names do seem to refer, to be associated with concepts and objects, regardless of how they are used on particular occasions. But we do frequently use names and other expressions to draw the attention of others to objects. It is important to investigate both the meaning of names and the way names are used, but even in early language meaning and use can't be identified.

The Putnam-Kripke Theory of Naming

Another approach to naming has recently been proposed by Hilary Putnam (1970, 1975a, 1975b) and Saul Kripke (1977). This approach is different from both the feature approach and the pragmatic approach. Putnam and Kripke are concerned with the meaning of names rather than with the referential function of language. But they do not accept the idea that this meaning consists of the association between a name and an intension.

Putnam and Kripke's arguments are convincing but they are complex. They are also controversial and have been the

subject of much philosophical debate. It is impossible to do them full justice in the space available here. I have attempted to indicate and outline the nature of their argument rather than to defend it in detail. At least it should be clear that the Putnam-Kripke theory is a plausible alternative to the feature theory. Kripke is primarily concerned with proper names and ontological problems, while Putnam is more concerned with common names and the theory of meaning. Therefore, I will concentrate on Putnam's account in the following section.

Putnam argues that, in a sense, names are directly associated with objects and natural kinds rather than being associated with descriptions of these objects and natural kinds. The core of this argument is that concepts or descriptions are defeasible, they change as our theories of the world change. The meanings of names don't usually change along with changes in theories. Instead names refer rigidly to the objects and natural kinds our theories are about.

The Critique of Description Theories

Putnam begins by showing where the description theory fails. The tenets of this theory, we will remember, are first that the meaning of names comes from their association with a description, and second, that this description specifies the extension of the name. If two names are associated with the same description they mean the same thing. If they are associated with different descriptions they don't mean the same thing. The name refers to objects that satisfy the

tenets fail.

Imagine a far-away planet called "Twin earth". Earth and Twin Earth are exactly alike except for one detail. On Twin Earth the colourless, drinkable stuff, that flows in the taps, fills the lakes and comes down periodically from the clouds is made not of H_2O , but of another chemical with the formula XYZ. The Twin Earthians call this stuff "water". Does the Twin Earth term "water" or T.E. "water", mean the same thing as the Earth term "water"? Normally we would say that it doesn't. T.E. "water" means XYZ and "water" means H_2O . Certainly we would say that the extension of T.E. "water" and "water" are different.

Now suppose we turn back the clock 200 years to a time when neither Earthians nor Twin Earthians knew the molecular structure of substances like H_2O and XYZ. Both the Earthians and the Twin Earthians would associate the term "water" with the same description, something like a colourless, drinkable, liquid. Clearly it would be odd to say that these terms referred to the same thing 200 years ago, but refer to different things now. It seems that 200 years ago T.E. "water" and Earth "water" were associated with identical descriptions but referred to different things.

This means either that it is possible for two terms to mean the same thing but refer to different things, in other words intensions don't specify extensions, or else that two names can be associated with the same description but mean different things.

There are other cases where two names can be associated with the same description without referring to the same

thing, or, in a sense, meaning the same thing. Putnam gives the example of a city-dweller like himself who doesn't know the difference between birch trees and elm trees. He associates exactly the same description with the words "birch" and "elm". Despite this he knows that "birch" and "elm" refer to different things and that they mean different things.

It is also possible for two names to be associated with radically different descriptions and yet to be understood to mean the same thing and to be treated as if they mean the same thing. For example, the medieval alchemist and the modern chemist would associate the word "gold" with almost entirely different descriptions. For the alchemist the description of gold would be something like "yellow, shiny, heavy, metal". For the chemist it would be "substance with a particular number of protons and electrons". According to the description theory the alchemist's word "gold" and the chemist's word "gold" should have different meanings. "Gold" should be like "suspenders" which has a different meaning for British and American speakers.

Intuitively, this seems untrue, and this intuitive feeling becomes clearer if we compare the behaviour of an Englishman and an American discussing suspenders and an alchemist and a chemist discussing gold. After a period of laughable misunderstanding of the type loved by British comedians, either the Englishman or the American would say " Oh, I see, you mean something to hold up stockings and I mean something to hold up trousers" and the discussion would

end. It seems highly unlikely however, that the alchemist or the chemist would say "Oh, I see, you mean a heavy, gold, metal and I mean an element with X electrons". It is much more likely that the chemist would try to demonstrate to the alchemist that gold didn't necessarily have the features he ascribed to it. They would behave as if "gold" meant the same thing for both of them, but they disagreed about the appropriate description of gold.

So-called "semantic anomalies" provide another example where the feature theory fails. Even according to a cluster theory "animate" would be a central feature of the intension associated with "cat". Therefore, according to such a theory, a sentence like "all cats are artifacts remotely controlled from Mars" should be semantically anomalous, deviant, unintelligible or contradictory. It should be equivalent to saying "some animate things are inanimate". In fact, we don't necessarily interpret that sentence as unintelligible, contradictory or even linguistically deviant. We may also assume that it reflects a peculiar theory of the world, and consequently a peculiar description of cats. We would be as likely to send the speaker of such a sentence to a psychiatrist as to an English teacher.

The Alternative: Stereotypes and Indexicals

So far I have argued that the identification of meanings and descriptions is unfounded. What is the alternative? How can names refer to objects except by means of descriptions? Putnam argues that some words manage to refer without being associated with descriptions. These are "indexical" expressions such as "now", "I" and particularly

demonstratives such as "that". "That" isn't associated with any list of features, but nevertheless, it refers to objects. It does so because it is associated with an ostensive act which picks out an object without making any claims about the features of that object.

Putnam argues that names have an implicit indexical element. A common name is shorthand for "That stuff and that stuff, and whatever else is like that stuff" rather than being shorthand for a list of features. Putnam claims that the meaning of most names is established ostensively, rather than by means of a description. Ultimately, the meaning of water is established by saying "That's water", rather than by saying "Water is a colourless, drinkable, liquid". We interpret this ostensive definition as if it picked out an object or a natural kind, rather than picking out a feature of the object or natural kind.

Even if the meaning of a name isn't established ostensively for a particular speaker, it is established ostensively by someone in the linguistic community at some point in it's history. Putnam calls this "the division of linguistic labour". Even if no one has actually said "That's water" to me, I assume that someone in my community, at some point, could say "That's water".

The indexical element in names explains the examples where the description theory fails. The Twin Earthians and the Earthians point to different things when they say "That's water". The city-dweller assumes that someone in the community would pick out different objects as he said "That's a birch" and "That's an elm". The alchemist and

the chemist could pick out a large number of objects of which they would both say "That's gold", while the Englishman and the American would pick out different objects when they said "Those are suspenders". Similarly, we can understand the paranoid's semantic anomaly because we can both point to the same object and say "That's a cat".

Putnam argues that the description theory arises because we use our descriptions of objects to indicate objects and, especially, to determine just what objects belong to a natural kind, that is, to determine just what objects are like the object we originally applied the name to. A description can behave ostensively. We can pick out an object by specifying a few identifying features of the object as well as by actually pointing to it. We can say, in effect, "You see that colourless, drinkable liquid? That's water". Moreover, we have to use our descriptions of an object to tell whether it belongs to a natural kind. If we're presented with a new substance, say the liquid on Twin Earth, and we want to know whether to call it "water" we try to see if it's the same sort of stuff as the ostensively defined water on Earth. In order to do this we check its features.

Our decision about which features are important changes depending on our theory of water. An alchemist might look at the object's colour or smell first, while a chemist might look at the way it conducts electricity. We can't judge beforehand which features of the object will turn out to define the natural kind. But in spite of this we can use "water" meaningfully. Even though we use descriptions to indicate which objects a name refers to, or to decide whether

an object is a member of the natural kind the name refers to, those descriptions don't constitute the meaning of the name.

Putnam argues that names are associated with what he calls "stereotypes". A stereotype is a rough and ready description which allows us to identify most of the members of the natural kind to which a name refers. However, stereotypes are likely to be incomplete and even untrue. They neither specify the extension of a name nor constitute the meaning of a name.

For example, stereotypical tigers are orange, striped, largish animals that live in the jungle. But an animal could be a tiger, it could belong to the same natural kind as stereotypical tigers, and be white, or small, or live in the desert, or all three. For Putnam the meaning of a common name consists of a stereotype and an indexical element.

Names and Realism

Putnam's account of the meaning of names is associated with an account of the realism that underlies our normal understanding of the world. Names and ostensive acts function as they do because of their relationship to this underlying ontology.

Normally, we distinguish between the real world of objects and natural kinds and our experience, knowledge, descriptions or theories of that world. We recognise that our experience\$or our descriptions can change, such change is the foundation of science. We assume that we can't predict the nature of future experiences and descriptions, we can always expect to be surprised. Also we recognise that

other people have different experiences, descriptions and theories. Despite this, we assume that there is in fact only one real world of objects that is the source of our experiences and that our descriptions are about. This world doesn't change when our experiences or descriptions change.

We have devices that we use to determine when two descriptions, particularly two successive descriptions, are about the same object or natural kind. These devices aren't algorithms. They don't give us certain answers, they are themselves subject to change and revision, and they are usually post-hoc. They allow us to recognise whether a description is a description of object X, but they don't allow us to generate all the possible descriptions of object X. Ostension is one such cross-theoretical device.

We can compare the general relationship between experience and objects to the relationship between evidence and theoretical entities in a science, say, the relationship between electrons and tracks in cloud chambers; we infer the existence of electrons from such tracks and from other sorts of evidence. However, we don't identify electrons with the evidence that allowed us to infer electrons, we don't say that electrons are the tracks in the cloud chamber. this is largely because we assume that electrons could give rise to new, unpredictable kinds of evidence.

We may debate the philosophical merits of this form of realism, but it is the form of realism we all practise in everyday life, it is naive realism. We may not elaborate it in this abstract and general form, but it underlies our

commonplace notions of truth, existence and possibility. Whenever we say "I thought Joe had blue eyes but they're brown" or "Is it true that Giscard was bribed?" or "Jane may have gone to London", we distinguish between our descriptions of the world and the world itself.

We treat names as markers for real objects and natural kinds rather than as short versions of lists of experiences or descriptions. If a name is associated with a description of an object, and we formulate an alternative description which according to our cross-theory devices is a description of the same object, the name may be associated with the new description. We interpret names, indicatives such as "that", and ostensive acts as if they refer to objects which are independent and unpredictable sources of experiences, rather than referring to clusters of experiences.

The Putnam-Kripke Theory ^{and} Child Language

Can we apply the Putnam-Kripke analysis to child language? If Putnam and Kripke are right, the child will have to develop this form of naming at some point. Let's assume that the child's first names have the same significance as adult names and see if we can explain the child's early linguistic behavior.

On this view the meaning of early names is established by ostensive definition, which seems likely enough. More significantly, the child interprets ostensive acts as ways of picking out objects which he conceives as independent sources of experience, rather than as ways of picking out a feature of the object or an experience of a particular type. The child sees a caretaker point at an object and say "ball".

He initially assumes that that expression is a proper name for that object, it marks that particular object, rather than marking a feature of that object. Then he notices that the caretaker points to another object and says "ball". Now he assumes that the object must mark a natural kind, rather than a particular object. That is, it must mark a set of objects that are like the original object. When the child then points to a round object and says "ball" he means "This object belongs to the same natural kind as that other object I call "ball", rather than meaning "aha, round again".

Of course the child doesn't know which objects belong to the natural kind, or which features of the object are important in determining whether it belongs to the natural kind. Not surprisingly some of his guesses don't match the standard adult description of the natural kind, a description that is itself subject to change. He may hypothesise that some objects belong to the natural kind which don't fit the adult stereotype.

The child's hypotheses will be limited as his over-extensions are corrected, and as he hears more examples of the name. The net result of this process of over-extension and correction will be a list of features that provide some indication of how to recognise members of the natural kind. This list will correspond to what Putnam calls a stereotype. The formulation of the stereotype won't keep the child from applying the name to unstereotypical members of the natural kind later on. The replacement of the child's original description with the stereotyped adult description is simply one of many changes in the description of the natural kind

that will take place throughout the child's life.

What predictions would this account make about the child's linguistic behavior? How would they differ from the predictions of a feature account? Let's consider an adult analogy. We're assuming that the child is like an explorer visiting a country where he doesn't know the language, and where his knowledge of the local flora and fauna is limited. Suppose a native pointed to a female lion and said "lion". How would the explorer's interpretation of that expression affect his subsequent behavior?

The explorer might assume that "lion" picked out some perceptual feature of the object. He might assume that it meant "sandy, four-legged" and would then apply the name to all sand-coloured, four-legged things he came across, such as camels and antelopes. This is Clark's hypothesis about the child's interpretation of names. He might assume that "lion" referred to a functional feature of the object, to the course of action associated with the presence of such a phenomena. He might assume that it meant "to be avoided at all costs". In that case, he would apply the name to other objects that are to be avoided such as wolves, tigers and rushing rapids. This is closer to Nelson's hypothesis. He might assume that "lion" referred to this object, that it was a proper name, the equivalent of "Elsa". In that case he would apply the name to this particular lioness only.

Finally, he might assume, correctly, that "lion" meant "the natural kind to which this object belongs", particularly if he sees the native apply the word to other

animals. In other words, he would assume that it meant "other objects that are like this object". In that case he might apply the word "lion" to tigers which are shaped like lionesses but have different colouring; to male lions which have the same colouring and size as lionesses but differently shaped heads; to lion cubs which have the same shape and colouring as lionesses but a different size, and to cougars, which have the same colour, shape and size as lionesses, but behave differently.

He would behave in this way for two reasons; first because he wasn't sure which features of the object would turn out to be important in defining the natural kind, but also because natural kinds often don't have a single feature in common, but instead have many different features in common with each other. This is because their similarity lies in some underlying properties which may give rise to a number of different kinds of features. Lion-cubs and male lions do belong to the same natural kind as lionesses, and are referred to by the term "lion", but male lions, female lions and lion cubs have different features in common.

The explorer's over-extensions of the term would be corrected by the natives, who would say "That's not a lion, it's a tiger", until the explorer acquired the native **stereotype** of the lion. These corrections would not only add to his knowledge of the native language, but would also give him information about the animals in the foreign country. They would tell him something important about the relationship between lions, lion cubs, female lions, tigers and cougars. Later, with increasing knowledge he might

discover that this stereotype was misleading. He might discover an arctic lion that was white rather than sandy, and he would have to revise his own description of lions and the native description accordingly.

The Putnam-Kripke hypothesis would argue that children formulate the last two hypotheses about the meaning of names rather than the first two. That is they hypothesise, initially, that the name marks the particular object, and later, that it marks the natural kind to which the particular object belongs. Keeping our explorer in mind, we should predict that the child would initially apply the name to the object or to a small set of objects to which a caretaker applied the name, and later would apply the name to a variety of objects that had different features in common with the prototype object. Like the explorer, the child would do this partly because he wasn't sure which features are important for defining the natural kind, and partly because he was aware that members of a natural kind have different features in common.

These predictions fit Bowerman's description of the child's linguistic behavior. We need to propose a complex and unmotivated process to explain this pattern of behavior on a feature theory. The behavior is quite logical if the child is trying to discover which other objects belong to the same natural kind as the object to which the name was originally applied, as the Putnam-Kripke thesis would suggest. This thesis provides a cognitive explanation for the linguistic pattern described by Bowerman.

Another advantage of the Putnam-Kripke hypothesis

is that it allows us to explain the relationship between names and "that". "That" is a purely indexical expression, particularly as it is used by children, who don't contrast it with "this" or "those". It functions simply to pick out objects without specifying the properties of those objects in any way. We might say that "that" establishes the ostensive function of language. This simple ostensive function is taken over by the early names. Carter (1978) suggests that the earliest names, which she calls pseudo-names, are used in exactly the same way as "that". Later, names are used consistently to pick out particular objects. Shortly, however, the function of names is extended, so that they pick out natural kinds, rather than particular objects. "That" continues to have its original function so that "that" and names can be combined to mean "this object belongs to this natural kind".

Putnam argues, on analytic grounds, that names have an indexical element. They are short for "that and that and that, and whatever else is like them". I am arguing that this indexical element is made quite explicit in development. Names are derived from "that" ontogenetically as well as logically.

This argument is similar to Bruner's argument that "that" establishes an ostensive function which is taken over by names. However, Bruner sees this function in social terms, ostensive acts, "that", and names, focus the attention of others on an object. I am arguing that ostension is also a cognitive function. Saying "that", pointing or naming, can pick out an object for the child himself as well

as for his interlocutors. It is important that these expressions pick out an object, an independent source of experience, rather than particular experiences or types of experience. It is possible, of course, that this cognitive function is derived from a social function which is established prelinguistically.

Finally, if we apply the Putnam-Kripke thesis to child language, we can explain the functional significance of early naming. On this view, naming serves an important cognitive function. In the course of learning names, the child will also learn how objects are divided into natural kinds, and which features are significant for different types of objects. The explorer who assumes that "lion" means sandy-coloured doesn't learn anything non-linguistic when he discovers that he is or is not correct. But the explorer who assumes that "lion" marks a natural kind, and who then learns the accepted extension of the term, learns some important facts about lions and other animals. Not only does he learn that male and female lions and lion cubs are more closely related to each other than female lions are to tigers and cougars, he learns that, as far as animals are concerned, natural kinds are more usually determined by the sexual and genetic relations between objects, rather than by their colour and shape. Through the medium of language, and particularly through names, the child can come to understand the way adults divide the world into natural kinds.

It is not surprising then that children find names so important and fascinating. The child who spends half

an hour naming every object in the room isn't just making an inventory of the perceptual features of the room. Instead, he is formulating a hypothesis about the nature of the objects in the room, a hypothesis which is subject to adult correction.

In summary, I am suggesting that children understand names in the same way that adults do, according to the Kripke-Putnam account. Either they assume that the name means "this object", or they assume that the name means "this object and other members of the natural kind this object belongs to". They think of these objects and natural kinds as independent entities, only indirectly related to experiences. The differences in the child's application of a name and the adult's stem from the child's ignorance of the adult description of objects and natural kinds. By learning the "correct" application of names, he learns the standard adult theory. Later, he may again modify his theory of objects and natural kinds, and change his linguistic behavior accordingly. This account explains the under-extensions and over-extensions of names, the relationship of "that" and names, and the function of names. Also, if Putnam and Kripke's analysis of the adult language is correct, this account allows for a continuous course of development which relates early names and later names.

that these descriptions are about. Putnam and Kripke argue that names are associated with objects, rather than descriptions. We can use interrogation and introspection to confirm that adult speakers do have this ontology, at least when they're not engaged in philosophical reflection. Obviously, we can't use these methods when we are dealing with eighteen-month-olds.

It may be objected that I am assuming that tiny babies have developed an abstract philosophical distinction between things as they are and things as they appear to be.

There are several answers to this objection. One is that these philosophical distinctions underly much of our ordinary thinking about the world, the sort of thinking even very young children engage in. After all, children not much older than eighteen months can comment on the truth or falsehood of a proposition. Second, we've seen that the eighteen-month-old's linguistic behavior supports this hypothesis. But also, the infant's non-linguistic behavior may suggest whether he has developed these distinctions. I will argue that the infant's behavior at least indirectly suggests that by eighteen months he makes some distinction between objects and natural kinds and groups of perceptual or functional features.

We can discover how behavior might reflect ontological beliefs by comparing two hypothetical scientists. The first scientist doesn't believe that there is a real world of objects that are the source of experience, and that his task is to describe that world. Instead, he is simply

concerned with collecting as many different experiences as he possibly can, and noting the regularities in those experiences. He goes around noting the types of experiences that surround him, rather like the infant does according to Clark and Nelson, writing down "there's a red bit, there's a round bit, there's a fast-moving bit". If he notices that a particular cluster of experiences say "orange plus striped plus fast-moving" often occur together, he might give the cluster a name, and call it "tiger".

How would such a scientist react to an object that displayed a novel or unexpected feature, say, an albino tiger or a super-conducting piece of gold? The first point is that he wouldn't search for or expect such novelties. They would simply be more experiences. Second, he would not apply the same name to objects that displayed this new feature and past objects. By definition for such a scientist an albino tiger wouldn't be a tiger. Nor would he change his behavior towards other objects he had already noted and catalogued. He would have no reason to suppose that other objects would also display new features or that this object would display other new features.

We may contrast this behavior with that of another scientist who believes that experiences are manifestations of objects or natural kinds. Such a scientist would expect objects to behave in unexpected and novel ways since he assumes that his experiences of objects and the objects themselves can't be identified. He would assume that the new feature of the object reflected an undiscovered underlying property of the object, an underlying property which

could produce other new experiences. He would also assume that other members of the natural kind to which the object belonged would share this property, and would behave in a similar way. Such a scientist then would continue to call the object by its old name, at least provisionally; would investigate the object to see if it behaved in other unexpected ways, and would investigate other objects similar to the original object in order to see whether they also displayed the new feature.

I am not claiming that this behavior necessarily presupposes a realist ontology. It is possible that with a sufficiently elaborate system we could reconcile this behavior with the kind of conceptual structure we have attributed to the first scientist, just as Bowerman reconciles the child's linguistic behavior with a description theory of meaning. But I am suggesting that these behaviors are naturally associated with the realist view. The simplest explanation for this pattern of behavior is that the scientist thinks of objects as sources of experience rather than as bundles of experiences.

Some of the observations reported by Piaget (1953) and others suggest that at a certain point the child's behavior is more like that of the first scientist, who simply collects and notes experiences, but that at around twelve months the infant begins to behave like the second scientist, who believes that objects and experiences are independent (see chap.12).

Nine-month-olds are largely concerned with exploring objects in an undirected way. These infants typically apply

a wide variety of "tests" to every object that comes their way. They examine objects visually, shake them, rub them, bang them against other objects, and especially, as all mothers know, taste them. If an object behaves unexpectedly, they may try to reproduce that behavior by reproducing the circumstances that preceded it, but they don't try to produce other new behaviors or to produce that behavior in other objects.

After twelve months infants begin to produce what Piaget calls "experiments in order to see". Consider the following observations, for example.

At 1:1:24 Laurent shakes (a table), knocks it then yields to a definitely experimental reaction in order to study the sound. He strikes it several times in succession, sometimes gently, sometimes hard and between times hits the surface of another table. There is no doubt whatever that he is comparing the sounds. Then he strikes the back of the chair and again the wide circular tier. Consequently, this is more than exploration since there is a comparison of several objects to each other and a serialisation of the effects produced. (Piaget, 1953; p.270).

At 0:11:20 Jacqueline slides a series of objects along her slanting coverlet. This is an experiment and not merely repetition, because she varies the objects and the positions. At 1:0:2 she rolls a pencil on a table by dropping it just above the surface or by pushing it. The next day she does the same with a ball. (Piaget, 1953; p.271).

At 1:2:8 Jacqueline holds in her hands an object which is new to her: a round flat box which she turns all over, shakes, rubs against the bassinet etc. she presses on the edge. The box then tilts up and falls again. Jacqueline is very much interested in this fortuitous result, and immediately applies herself to studying it Jacqueline immediately rests the box on the ground and pushes it as far as possible. Afterwards, Jacqueline puts her finger on the box and presses it, but she places her finger on the centre of the box and simply displaces it and makes it slide instead of tilting it up. Then, changing the point of contact she finally places her finger on the edge of the box, which tilts it up. She repeats this many times, varying the conditions but keeping track of her discovery. A moment later I offer by cigarette case to

Jacqueline. She throws it as far as possible and presses it at different points with her index finger to tilt it up. (Piaget, 1953; p.273).

I may add that as I was writing this chapter, I observed an infant, Alexei, aged 1;0:2 knock a blue cup against a shelf repeatedly, then knock it against a purple cup, then knock it against the shelf again repeatedly. Finally, he took the purple cup and knocked it against the shelf several times, and then knocked it against the blue cup. Like Laurent, he seemed to be fascinated by the difference in the sound of the cup against the shelf and the sound of the cup against the other cup.

In each of these cases the child begins by discovering a new property of an object, the way it makes a noise, the way it rolls, the way it tilts up. Rather than simply reproducing the effect, the children try to discover other unforeseen properties of the object by varying the circumstances that produced the first new feature. Laurent knocks the tier gently and hard; Jacqueline drops the object and pushes it, and presses on the edge and the middle of the box; Alexei knocks the cup against the shelf and against the other cup. Then they see what other objects that are generally similar to the original objects do in these circumstances. Laurent knocks on the table as well as the chair; Jacqueline rolls the pencil as well as the ball, and pushes on the cigarette case as well as the box; Alexei knocks the purple cup against the shelf as well as the blue cup.

This sort of experimental behavior suggests that the child has begun to see objects as sources of experience rather than as groups of experiences. The most important

characteristic of such behavior is the search for novelty. These children, in a sense, expect the unexpected. They intentionally set out to create new experiences by varying their actions on objects, and varying the objects they act on. Their behavior suggests that they aren't sure what the nature of these new experiences will be, they are often surprised and intrigued by the consequences of their actions. The expectation that objects and natural kinds will give rise to new, unpredictable experiences, is at least one element of a realist ontology. Certainly, it is difficult to think of a simple way of reconciling such an expectation with a view that identified objects and natural kinds with particular features of experience. It is interesting that children were most likely to apply "that" to novel objects or to objects that behaved unexpectedly (see chap. 4). Greenfield (1978) and Nelson (1974) claim that children are also particularly likely to apply names to new or surprising objects.

We can explain the shift from exploratory to experimental behavior if we consider the infant's initial ignorance of objects. Most infants only begin to crawl at around seven or eight months. Until they become mobile their opportunities to explore objects are rather limited. It's not surprising that once they can actually obtain objects themselves, instead of depending on adults to give them objects, they become tremendously interested in exploring and testing objects, or that they do this in a fairly undirected way.

The seven-month-old infant who had just learnt how to crawl is in the same position as a scientist who is faced

with a random collection of absolutely new objects, say, a shovelful of specimens collected from a distant planet. Such a scientist might well behave like the first scientist we have previously described. He would begin by submitting the objects to all the tests he could think of and noting the results and regularities before he would even try to sort the objects into natural kinds, let alone investigate the properties of those objects or natural kinds in a systematic way. When everything is novel there isn't much point in a controlled search for novelty. Such a scientist is of course better off than the infant, since he at least has a background of experience with familiar objects.

I am suggesting that the nine-month-old is primarily interested in extending his range of experience by thoroughly exploring as many objects as possible. Once he has acquired this corpus of experience he can begin to sort these experiences into clusters; he may note that certain types of experiences tend to occur together. We might think of these clusters as proto-objects or proto-natural kinds. If the child could talk, his language at this point might fit the description theory.

At some point, probably at around a year, the child begins to construct the theoretical entities of objects and natural kinds to explain the pattern of his experiences. He thinks of these objects as the source of the experiences he has already had, and as a source of new experiences in the future. He also hypothesizes that members of a natural kind will be likely to give rise to similar new experiences. This conceptual shift underlies the shift from exploratory

to experimental behavior.

This conceptual shift is also related to the development of plans which we discussed in an earlier chapter (see chap.12). Children who develop plans seem to recognise that the objects that serve as intermediaries are independent and may behave in unexpected ways. In fact, they explicitly marked such unexpected behavior by "oh dear". However, their reaction to such unexpected behavior was not to abandon the plan, but rather to modify their own actions to take account of the object's unexpected behavior. Their reaction is not "Oh, this must be a different object" but rather "Oh, my ideas about this object must have been mistaken".

This shift is also related to the development of concepts of disappearance, containment and attachment. We saw that in the course of development the child comes to associate a single object with more and more complex patterns of experience. Initially, the object is simply a particular type of experience, a bounded volume of space with certain features. As the child grows older he can associate the object with a particular sequence of experiences, the presence of a bounded volume of space followed by a disappearance of a particular type. Eventually, after eighteen months, the infant can disassociate the object from any experience. He can imagine or deduce or guess that an object exists at a location without any clear experiential evidence to support that guess. The shift from a perceptual to a conceptual definition of the object underlies the child's understanding of disappearance, containment and attachment.

The idea that an object can exist without being experienced seems more advanced than the idea that an object can produce new experiences, though these two concepts are related. I have suggested that the first development, which underlies the development of "object permanence", takes place several months after the second development.

However, both developments are related to the realist ontology I have described above, the ontology which underlies "naive realism" and, according to Putnam and Kripke, underlies adult naming. I am suggesting that this realist view of the world, or at least two important aspects of it, are constructed by the infant during his second year, starting at about twelve months and continuing until sometime after eighteen months. If this is true, then the twelve to twenty-four-month-olds in this study had just developed or were just developing the necessary cognitive equipment to use indicatives and names in the way that adults use them. They would be just able to pick out objects and natural kinds rather than experiences.

Cognitive Development and the Emergence of "That" and Names

If the view of early naming I have suggested here is correct, then we need to reconsider the relationship between early names and cognitive development. According to both the feature theory and the pragmatic theory the cognitive prerequisites of naming are rather simple. According to Nelson and Clark, all the child has to do is to recognise a perceptual or functional feature when he comes across it. Although Clark and Nelson might not relish the analogy, in

their view the child's behavior is not more complex in principle that the behavior of a pigeon who learns to peck one key every time he sees a round stimulus and another key every time he sees a square one, though for Nelson the pigeon would have to respond differently to fast-moving and slow-moving stimuli or to edible and inedible ones. While Bowerman's model is more complex, it is not qualitatively different. While Bruner's view of naming is more sophisticated, in his view the child is still extending an ability he has mastered pre-linguistically.

If the Putnam-Kripke thesis is true of child language, the cognitive prerequisites of naming must be considerably more advanced. If children use indicatives and names in the way adults do, they must encode concepts of objects and natural kinds. They must mark theoretical entities that are only indirectly related to particular patterns of experience. In developing these theoretical entities, the child must be able to distinguish between objects and natural kinds, and his experience of objects and natural kinds.

However, we have seen that the child's linguistic behavior suggests that he does use names in the way that adults do, and that his non-linguistic behavior, such as his "experiments in order to see", his planned behavior, and his reactions to disappearance, containment and attachment, suggest that at least some aspects of the realist view of the world are developed between twelve and twenty-four months. Perhaps the most significant developments from the point of view of the Kripke-Putnam hypothesis take place during the twelve to eighteen month period.

The average age at which "that" first appeared in Groups I and II was 16.3 months. The average age at which names appeared was 17.3 months. All three of the eighteen-month-olds in Group III used names and "that" in their first recorded session (see Table 39). This suggests that the infants use "that" and names to encode concepts that are relatively new, and are possibly still being developed. This would be similar to the relationship between other, non-nominal, expressions and the concepts they encode.

This relationship between linguistic and cognitive development again raises the possibility that linguistic clues facilitate the development of concepts of objects and natural kinds. The characteristics of caretaker speech might help the child to solve cognitive problems.

We have already seen one way in which names could facilitate cognitive development. By looking at the way names are applied the child can make hypotheses about the way different objects are divided into natural kinds. The fact that "lion" is applied to certain animals and not others tells the child something about lions and their relationship to other animals, as well as telling him something about the language. The acquisition of specific names such as "lion" is related to the acquisition of the standard adult theory of the natural kinds these names encode.

In addition, the general characteristics of names might reinforce the development of the general concept of "natural kinds". The fact that, in general, names are applied to objects which have different features in common with each other may help to reinforce the idea that the classification

of objects doesn't depend on the presence or absence of a

particular feature, but reflects more fundamental similarities and differences between objects. Attending to names might not only facilitate the development of the concepts of specific natural kinds, but in doing so, facilitate the development of the general concept of a natural kind.

The use of names to refer to absent objects might also help to develop the concept of the object. If the child hears the name applied in circumstances where no particular type of experience is present, and learns to use the name in such circumstances himself, this may reinforce the dissociation between objects and experiences. It is interesting that in two of the common two-word strings, "no" + name and "gone" + name, names are used in this way.

The relationship between uses of "that" and cognitive development is much less clear. It is clear that "that" establishes the ostensive function of language, a function elaborated by names. To begin with "that" seems to be a kind of pure ostensive act. The common factor in the contexts in which it occurs is simply that the speaker picks out an object.

It is also clear that in the adult language ostensive acts are important cross-theoretical devices. They enable us to confirm that two descriptions are about the same object. In other words, adults interpret ostensive acts as if they mark objects rather than features of objects. This interpretation is so deeply rooted that I suspect if our explorer entered a foreign country and saw someone point and vocalise he would immediately interpret that vocalisation

as if it referred to an object or natural kind. In principle, of course, that act could mean any number of things, it could mark a feature of the object, or the god controlling the object, or a stage or phase of the object, as Quine (1960) has shown. It could also have nothing to do with the objects at all, it could mean "I have indigestion" as Wittgenstein (1953) has shown.

It is striking that other early meanings, such as the meanings of "no", "gone", "more", etc., are not established ostensively. Ostension is not some sort of universal meaning establissher, but rather is related to a very specific sub-set of meanings, meanings associated with names.

The question is whether this relationship between showing attention and vocalising, and picking out an object or natural kind, is arbitrary. Is there a convention which interprets ostensive acts as references to objects, or is there some mysterious intrinsic connection between ostensive gestures and the vocalisations accompanying them and the concept of the object? The apparent universality of the ostensive act suggests that the latter hypothesis might be true. But, frankly, it is extremely difficult to see why there would be such a connection.

If there is, however, some intrinsic connection between ostensive acts and objects, if, for example, ostension is intrinsically a cross-theoretical device, then the mastery of the ostensive act might play some role in the development of the concept of the object. But these are very murky waters.

Summary

In this chapter I have presented a new view of the meaning of names and indicatives in child language. This view is based on the Putnam-Kripke analysis of adult naming, and is in contrast to the feature theories of Clark, Nelson and Bowerman, and the pragmatic theory of Bruner. I have argued that indicatives and names mark objects and natural kinds, rather than experiences or descriptions of those objects and natural kinds. This hypothesis presupposes a realist ontology. By applying this hypothesis to child language we can explain the under-extensions and over-extensions of names, the relationship of "that" and names, and the function of early names. Moreover, the infant's non-linguistic behavior suggests that he develops the realist concept of objects and natural kinds between twelve and twenty-four months. This suggests that early names and indicatives encode new concepts. It is also possible that the development of names and indicatives facilitates the development of the concepts of objects and natural kinds.

CHAPTER 16

CONCLUSION

In this chapter I will summarise the most significant results of this study. I will consider how these results fit various theories of language and cognition, and I will consider the broader implications of these results. I will begin by outlining a general picture of language in the twelve to twenty-four month old period. Then I will outline a general picture of cognition in the twelve to twenty-four month period, I will consider the relationship between linguistic and cognitive development in this period. Then I will briefly speculate about why language emerges between twelve and twenty-four months. Finally, I will consider what early language suggests about later linguistic and cognitive development and about the semantics of the adult language.

Language from Twelve to Twenty-Four Months

Between twelve and twenty-four months children used a wide variety of different expressions. Some of these expressions, like "bye-bye" and "yes", seemed to be social or conversational devices. Towards the end of this period some expressions, like "a" and "now", seemed to serve a purely formal function. However, most of the children's early words were related to their understanding of the world.

As Bloom suggested these expressions can be divided into two groups. Children did use names, that is expressions that referred to objects, but another group of expressions was equally important. These expressions were frequently used, they appeared at the very beginning of the one-word period,

and they were used by most children. The most important of these non-nominal expressions were "that", "there", "no", "more", "oh dear", "gone" and "down", "up", "in", "out", "on" and "off". These expressions turned out to be similar in many ways.

First, non-nominal expressions did not encode properties of objects or relationships between objects, at least not in the early period. Nor did they encode particular actions or types of actions or social relationships or emotional states.

The concepts they did encode had an egocentric quality. These children did not seem to treat other people as creatures fully analogous to themselves. When they applied an expression to their own plans they did not apply it to the plans of others. When they applied an expression to their own relationships to objects they did not apply it to relationships between other people and objects. For example, children said "there" when they successfully completed a plan but not when other people successfully completed a plan. They said "gone" when they could not see an object but not when other people could not see an object.

Children tended to use non-nominal expressions in contexts that involved plans. They tended to use the expressions in contexts that involved an action that was performed on an object in order to achieve a particular goal. Some expressions encoded abstract aspects of plans, others encoded events that featured in plans.

Finally, all these expressions encoded highly abstract concepts. Children would use a non-nominal expression in contexts that involved a wide variety of different experiences and actions. Some expressions, like "no", "gone" and "oh dear",

encoded the fact that the child did not have an experience or did not perform an action.

Despite these general similarities the expressions each encoded a different concept. Roughly the expressions could be divided into two groups.

"No", "more", success expressions like "there" and failure expressions like "oh dear", encoded abstract aspects of plans. These expressions did not encode particular types of plans, or encode plans with particular types of goals. They could be applied to any action or any object to achieve any goal. Instead these expressions encoded relationships between plans and planners, or plans and reality.

"No" encoded the fact that a plan was not successfully implemented, either because the child decided not to implement it or because other people or objects interfered. "More" encoded the fact that the child intended to repeat a plan. "There" encoded the fact that a plan was successful. "Oh dear" encoded the fact that a plan failed.

"That", "gone", locative "there" and the direction expressions "down", "up", "in", "out", "on" and "off" encoded abstract aspects of objects. "That" and "gone" encoded relationships between objects and observers, while locative "there" and direction expressions encoded spatial characteristics of objects.

In particular, "that" encoded the fact that the child perceived or attended to an object. "Gone" encoded the fact that he did not perceive an object. "There" encoded the fact that an object changed its location. Direction expressions encoded changes in the spatial relationships between objects. "Down" and "up" encoded the fact that an object moved towards

or away from the ground. "In" and "out" encoded the fact that an object moved inside or outside a container. "On" and "off" encoded the fact that an object became or ceased to be contiguous or attached to another object.

While these expressions encoded aspects of objects, children were particularly likely to use them when they formulated plans. This was particularly true of locative "there" and direction expressions, which encoded changes in the spatial relationships of objects. Children were particularly likely to use these expressions when they thought about these changes, especially in the early period. Children were also particularly likely to use "gone" when they made an object disappear, and they often used "that" when an object played an important role in a plan, or when they acted to make an object available for closer inspection.

The meaning of most non-nominal expressions changed during the twelve to twenty-four month period. Generally speaking, children initially used the expressions in an egocentric, action-oriented way and moved to more objective uses. There were three specific important types of change.

Expressions that originally encoded abstract aspects of plans came to encode abstract aspects of objects as well. Children initially used "no" when a plan was not successfully implemented. Later, they also used "no" to negate propositions. They initially used "more" when they intended to repeat a plan. Later, they also used "more" to comment on the similarity between two objects.

Second, expressions that originally encoded changes in the spatial relationships of objects came to encode static

spatial relationships. Children initially used locative "there" when an object changed its location. Later, they used "there" to comment on the fact that an object was in a location. Children initially used "in" when objects moved inside containers. Later, they used "in" to comment on the fact that an object was inside a container. The other direction expressions changed in similar ways.

Finally, expressions which were initially used when children brought about an event were eventually used when the event simply took place. Children initially used "gone" when they made an object disappear, but eventually used it whenever an object disappeared. They initially used "in" when they made an object move inside a container, but they eventually used it whenever an object moved inside a container. The other direction expressions changed in similar ways.

This study was not primarily concerned with the functions of early language. However, the contextual information that was used to determine the meaning of non-nominal expressions can also give us some clues about their function.

These expressions seem to be multi-functional, they were used to achieve a wide variety of ends. A child would use "gone", for instance, to get help in finding a missing object, to communicate the fact that he had made an object disappear, or as part of a hiding and finding game. Even "social" expressions like "bye-bye" and "yes" were used to achieve a variety of social ends, and were occasionally used in non-social ways.

Also some of the functions of non-nominal expressions

seemed to be "mathetic", or intrapersonal, rather than "pragmatic", or interpersonal. I have suggested that children are particularly likely to use non-nominal expressions when they experiment with difficult concepts. In these contexts the child seems to be talking to himself rather than to others and this speech seems to help him to improve his understanding of the world. I have suggested that, in many contexts, early words serve a mnemonic or predictive or regulative function rather than a communicative one.

How do these results fit the various theories of language development I have outlined in Chapter 2? How can we best explain the use and development of non-nominal expressions?

Non-nominal expressions have no consistent syntactic role. They come from a variety of syntactic categories, some, like "there", have a bewildering variety of syntactic functions, and others, like "oh dear", play no role in the adult syntax at all. It seems strange that the child would begin by using these expressions if he was innately set to acquire the adult syntax, as Chomsky suggests.

More significantly, the meanings of these expressions are only indirectly related to the semantics of the adult language. Failure, success, repetition and disappearance, are not usually considered to be important semantic categories. Even "no", "that" and direction expressions which are apparently related to semantic structures involving negation, deixis and location, have a different meaning in the one-word period. Initially, "no" does not negate propositions, but

rather marks the fact that a plan is not implemented. This concept does not play an important part in adult semantics. "That" does not enter into anaphoric relationships with other expressions, and it also is not used to clarify the speaker's reference, though these are important semantic functions of "that" in the adult language. Locative expressions which, in the adult language, are primarily concerned with the static locations of objects are initially used to indicate movement caused by the child's actions.

Clearly, the child's semantics will eventually become more like the adult's, we can see this development take place even within the one-word period. But, initially, his semantic structures, at least those encoded by non-nominal expressions, are quite different.

Certainly, we can't explain the meaning of early non-nominal expressions in terms of semantic primitives, semantic features or case categories, at least not in terms of any of the primitives, features or categories that have been proposed so far. Similarly, we can't explain changes in the meanings of these expressions in terms of the acquisition of primitives, features or categories.

It is not clear to what extent the development of non-nominal expressions is related to the child's linguistic problem-solving strategies. Certainly, some features of these expressions, such as the fact that they often occur in isolation and are often stressed, might make them easier to learn for a child who uses strategies. On the other hand, other expressions that appear in isolation and are stressed, like concrete verbs,

adult applications in speech addressed to children. It seems unlikely that caretakers only apply "down" to movements caused by children, or only apply "more" to the repetition of plans. Also, there were some over-extensions of these expressions. It seems unlikely that a caretaker would use "come off" to indicate failure in general or would apply "down" to the closing of a doll's eyes.

The development of these expressions also suggests that the child uses non-nominal expressions to encode concepts that are important to him, rather than matching the adult meanings. It seems unlikely, for example, that caretakers would independently shift from applying "down" to movement to applying "down" to location during the one-word period.

Even though caretaker speech is more restricted than normal adult speech it still allows the child to make a wide variety of interpretations of the meaning of non-nominal expressions. The child's productive speech suggests that he restricts his attention to certain utterances of these expressions and to certain hypotheses about their meaning.

The child's speech may also suggest what kinds of caretaker-child interaction affect the development of non-nominal expressions. Some of the games and social routines described by Bruner (Bruner 1976, Ratner & Bruner 1978), such as peek-a-boo or bookreading may provide a source for non-nominal expressions. However, productively, the child immediately extends his use of these expressions to other routines and to non-social situations. This is particularly true of

"that", "no", "more", etc. Other non-nominals such as "hello" and "hereyare" fit Bruner's model more closely. Moreover, if these games were the primary source of information about non-nominals, we could not explain either the egocentricity of the early uses of these expressions, or the development away from this egocentricity.

I have suggested that the caretaker's commentaries on the child's actions are more likely to be a source of non-nominal expressions (see Chapter 12). Even so, the adult speech still allows the child to make a variety of hypotheses about the meaning of these expressions.

I have argued that the child chooses to learn certain expressions, and chooses certain hypotheses about the meaning of those expressions primarily because of his cognitive concerns. In particular, I have argued that early non-nominal expressions encode concepts that play a significant role in the cognitive development of twelve to twenty-four month olds.

This general position is similar to the "cognitive constraints" approach I outlined in Chapter 2. Bloom (1973), Sinclair (1973), Nelson (1974), Slobin (1973) and Bates et al (1979), have all emphasised the fact that children use early words to encode important concepts they have already developed, and that these concepts may not be like the concepts encoded by adult language.

There is, however, an important difference between the views of these writers and the view I have outlined here. I have argued that children are particularly likely to use non-nominal expressions to encode new, difficult, problematic concepts, concepts that are at the frontiers of their

cognitive competence, rather than familiar or well-established concepts. I have argued that the child's early words are likely to encode concepts he is in the midst of developing, rather than concepts he has already developed.

In particular, I have argued that the concepts encoded by non-nominal expressions, the concepts of abstract aspects of plans, the concepts of relationships between objects and observers and also certain spatial concepts, are only developed at around eighteen months. I have also argued in Chapter 15 that although the concepts encoded by names may seem simple, they are actually highly abstract and are also developed between twelve and twenty-four months.

Most of the child's early words appear at about the same time as the concepts they encode. Children could choose to learn other expressions, or they could hypothesise that these expressions encode simpler concepts, but they do not.

Similarly, I have argued that changes in the use of these expressions reflect cognitive changes. As the child develops, concepts that were once new and problematic become familiar and well-established. He turns his attention to new problems. He applies the concepts he has already developed to these problems. As a result he changes and extends his familiar concepts. Similarly, the child applies expressions that encode familiar concepts to situations that involve new problems. He changes and extends his use of these expressions.

For example, once the child has mastered the concept of repetition he can turn his attention to the concept of object

similarity. He may apply the concept of repetition to situations that involve object similarity and develop a more general concept. At the same time he begins to use the term "more" which encodes the concept of repetition, in contexts that involve similar objects. I have also argued that the child needs to understand certain types of movement before he can understand certain types of static spatial relationships. The linguistic development of "there" and direction expressions reflects this cognitive development.

Cognitive development may affect linguistic development in a rather different way. I have argued that when the child's expressions encode new and problematic concepts he is likely to use the expressions when he experiments with those concepts, when he manipulates situations that involve those concepts in a controlled way. This explains why, in the early period, children are particularly likely to use expressions that encode events when they bring about those events. As the child grows older, and the concepts his expressions encode become familiar, he becomes less likely to use them simply to comment on events.

For example, the child uses "gone" to encode the concept of disappearance. Since this concept is problematic, he experiments with it by making objects disappear and reappear, and he uses "gone" when he carries out these experiments. Later, when he fully understands the concept of disappearance, these uses of "gone" become less frequent, and he simply uses "gone" to comment on interesting disappearances.

Cognition from Twelve to Twenty-Four Months

In this thesis I have also presented a picture of cognitive development in the twelve to twenty-four month period. This account was based on the observations, experiments and theories of developmental psychologists, particularly Piaget, Bower and Bruner. I have suggested that there are important changes in the child's understanding of action and his understanding of objects during this period. The most significant changes take place at about eighteen months.

First, the child's ability to act on the world changes considerably during infancy. Initially, he can only perform actions from a limited repertoire, and he will only do so in response to innately determined events, or in order to reproduce an action-event sequence that has taken place in the past. By about twelve months he can experiment with a wide variety of actions in order to achieve a particular goal. This allows him to produce intelligent planned behavior. After about eighteen months he constructs a model of his actions and their interactions with objects. This model allows him to construct hypothetical action-event sequences and so to solve problems using insight. It also allows him to make generalisations about his plans.

During infancy, the child's understanding of objects is also changing. Initially, an "object" for the child is simply a perceptual configuration of a certain sort. Then he begins to make predictions about the disappearances and reappearances of these configurations. We might say that he identifies an object with a sequence of perceptual configurations. After about eighteen months he constructs a model of objects, space

and observers. This model allows him to deduce that an object has moved to a location even if he has not seen the object move to the location. It also allows him to develop the general concept of not perceiving an object, it allows him to develop general concepts of movement and location, and it allows him to understand certain types of movements, such as movements that result in containment or attachment.

These two areas of development interact. The child's increasing understanding of objects allows him to decide which actions are likely to lead to a particular goal. His actions, particularly his experiments, allow him to improve his understanding of objects.

In both areas, the child's concepts are originally closely tied to actions he has actually performed, or to his actual perceptions. As he grows older his concepts become tied to complex sequences of action and perception. Finally, after eighteen months his concepts become independent of action and perception. He can act with insight because he can consider possible actions that he has never performed and never will perform. He can deduce the location of invisibly displaced objects or of hypothetical objects because he can consider possible objects and possible movements of objects that he has never actually seen.

The fact that the child's concepts are no longer tied to actual actions or perceptions also allows him to develop higher order concepts. These concepts may be applied to any action or any perception. I have argued that these concepts include the concepts of the non-implementation, repetition, success and failure of plans, the concept of not perceiving

an object, the concept of movement, certain spatial concepts, particularly the concepts of containment and attachment, and the realist concept of objects and natural kinds.

Most developmental psychologists seem to agree that something important happens to the child's cognition at about eighteen months. They are not always clear about exactly what happens, Piaget's account is probably the most detailed and widely accepted account of this transition. He argues that at about eighteen months the child develops a symbolic or representational capacity for the first time. This allows him to move from the sensory-motor stage to the pre-operational stage. While there are some similarities between this classical Piagetian view and the view I have presented here there are also some important differences.

First, it does not seem to be true that the child has no symbolic or representational capacity before eighteen months. Recent research on early infancy, particularly the work of Bower (1974,1979) and Meltzoff (1977,1979), suggests that the child has an innate representational system, at least in the sense that his early concepts already intergrate information from different sensory modalities and already intergrate perception and action. Similarly, in order for the infant to be able to develop concepts that are tied to sequences of past actions and perceptions, for example, in order for him to be able to predict that a perceptual configuration will reappear in a particular location, he must have at least some representational capacity.

Another difference between the picture I have presented

here and the classical Piagetian view concerns the role of action. For Piaget, the sensory and the motor are indissolubly linked before eighteen months. In particular, the infant's concept of the object is tied to his actions on the object. I have suggested, largely on the basis of Bower's work, that while perception and action interact, they are not inevitably linked. The infant can make cognitive progress simply by seeing objects behave even if he doesn't act on those objects. Of course, his actions can greatly extend his experience of objects.

We might sum up these differences between the classical Piagetian view and the view I have presented here by saying that in my view the infant has perceptual schemas and action schemas before eighteen months rather than sensory-motor schemas. Perception and action are representational in a way that sensation and motor behavior are not. However, both perception and action are rooted in the child's actual experience in a way that later concepts are not.

Another difference between the picture I have presented here and the classical Piagetian view is that I have emphasised the qualitative changes in the child's understanding of the world that take place at about eighteen months. In the Piagetian tradition the pre-operational period is very much an example of décalage. The achievements of the sensory-motor period are redone at a representational level. For example, insight becomes possible because the child internalises his experimental behavior. While I would agree that such developments take place, I have suggested that the eighteen-month-old immediately develops new types of

concepts, like the concepts of success, disappearance and containment. These concepts are not just internalised versions of the cognitive structures of the earlier period.

For Piaget, the transition from the sensory-motor period to the pre-operational period is like a translation from one language to another, or perhaps like a transcription from spoken language to written language. I have suggested that this transition is more like the shift from an observation language to a theoretical language that has been described by philosophers of science. The theoretical language is in some sense derived from the observation language. However, the theoretical language is also qualitatively different from the observation language.

The Interaction between Linguistic and Cognitive Development

These accounts of language and cognition in the twelve to twenty-four month period raised the possibility that language and cognition interact. Not only does cognitive development affect linguistic development but linguistic development in turn affects cognitive development.

From the linguistic point of view, I have suggested that the child pays particular attention to problematic contexts, contexts he is on the verge of understanding, rather than to contexts that he understands very well or to contexts he does not understand at all. He also pays particular attention to the language that adults produce in these contexts. Furthermore, he is particularly likely to hypothesise that expressions encode new concepts, concepts he is on the verge of developing, rather than well-established concepts or concepts that are way beyond his cognitive

competence. Finally, he is particularly likely to store expressions that encode new concepts, and to use these expressions in his productive speech. As he grows older, concepts that were once new and problematic become familiar, and concepts that were once totally incomprehensible become problematic; they become concepts he is on the verge of developing. He now turns his attention to contexts that involve those concepts and to new expressions that encode those concepts, and he extends his old expressions so that they also encode these concepts. In this way the child's developing cognitive system determines the expressions he chooses to learn, the hypotheses he makes about the meaning of those expressions, and the changes in the meaning of expressions.

At the same time, I have suggested that the fact that adult expressions encode new concepts could help the child to develop such concepts. Moreover, the linguistic facts could affect the shape of the child's new concepts. Just as the fact that a child pays attention to a context leads him to pay attention to the language adults produce in that context, the fact that adults produce language in a context could lead the child to pay attention to that context, and to consider whether it raises interesting cognitive problems. The fact that adults use different expressions in contexts that, from the child's point of view, are the same, could lead the child to consider the possible differences between these contexts, and could lead him to make finer conceptual distinctions. Finally, the fact that adults use the same expression in contexts that, from the child's point of view,

are very different, could lead the child to consider possible similarities between these contexts and could lead him to make new generalisations.

This final type of interaction, where the child uses linguistic clues to construct new generalisations, seems to be most important in the twelve to twenty-four-month-old period. I have suggested that children use linguistic clues to construct the higher-order generalisations that are encoded by early non-nominal expressions. For example, I have suggested that the fact that adults apply the word "there" to a variety of successful plans may lead the child to develop a general concept of success.

We might think of the child as someone exploring a new country who is suddenly given a map in the middle of his journey. He will not pay much attention to the parts of the map that chart the country he has already explored. He also will not pay much attention to the parts of the map that chart the unexplored country that is far away from his present location. Instead, he will focus on the parts of the map that chart the unexplored country that is directly in front of him.

The map will guide and direct and, in part, determine the course of his journey. Certainly, it will make the process of exploration much easier. As he travels on to new parts of the country, new parts of the map will become important. In this way, his journey will also affect his progress in understanding the map. His journey, that is his cognitive development, will determine what parts of the map he decodes first and how he decodes the rest of the map.

At the same time, his decoding of the map, that is his linguistic development, will also affect the direction of his journey.

This account of the interaction of language and cognition is much more like Vygotsky's (Vygotsky, 1962, 1978) account, or Bruner's (Bruner, 1966) account than like Piaget's account. For Piaget, language more or less follows after cognition. The child can only learn the portion of the map that charts the country he has already explored. For Vygotsky and Bruner cognition, at least in part, follows after language. The child uses linguistic clues to make cognitive progress.

There is however an important empirical difference between the account I have presented here and Vygotsky's account. For Vygotsky, the child only begins to apply language to his cognitive problems after he has made considerable linguistic progress, in fact after he is three years old. He learns a considerable part of the map before he uses it to guide his journey. I have argued that the child immediately uses language to make cognitive advances as soon as he learns his first words.

The Emergence of Language and the Eighteen-month-old Cognitive Shift

The interaction between linguistic development and cognitive development I have described in the previous section could take place at any point in the child's development. We have seen that important cognitive changes take place between birth and eighteen months. In principle, the child could use language to help him make these cognitive

advances. Why does he only start to use language in this way at about eighteen months?

It is possible that there are independent factors that make children sensitive to linguistic clues at this point. Some innate language capacity may mature at this point as Lenneberg (1967) suggests. Alternatively, the child may need to reach a certain stage of social development before he can make use of adult linguistic clues. However, some of the characteristics of the eighteen-month-old cognitive shift suggest a more interesting possibility. It is possible that there is something about the eighteen-month-old concepts that makes the use of linguistic clues particularly appropriate.

I have argued that before eighteen months, the child's concepts are firmly tied to his perceptions and actions and his memories of past perceptions and actions. After eighteen months he develops concepts that are independent of his perceptions and actions. What kinds of cognitive structures must the child have at each of these stages? Or, to put it another way, what is the language of the child's thought?

I would suggest that before eighteen months, the language of thought simply is the language of the child's perceptual and motor systems. Before eighteen months the units of thought actually are perceptions or instructions for action or memories of past perceptions or instructions. The child doesn't just think that an object is a perceptual configuration, he thinks a perceptual configuration where we would think about an object. Later, the child doesn't just

think an object is a sequence of perceptual configurations, he actually thinks a sequence of perceptual configurations. Similarly, in the early stages the child's thought is structured in terms of instructions for action, and later is structured in terms of sequences of instructions for action and perceptual configurations.

I should emphasise again that this innate language of perception and action is not at all simple or primitive. On the contrary, it is highly structured and, to a certain extent, is abstract and representational. Certainly, it is not just a language of retinal images and muscle twitches. Nevertheless, it is still a language of experience and cannot go beyond experience, even if the child's experience is far from being James's "blooming, buzzing, confusion". (James, 1890).

After eighteen months, the child's concepts become detached from experience. The child can consider hypothetical objects, movements and actions, objects and movements he has never perceived and perhaps will never perceive, actions he has never performed and perhaps will never perform. We can't define the realist concept of the object, that is, the concept of the object as an independent source of unpredictable perceptions, in perceptual terms. Similarly, we can't define the sort of plan that is the result of insight, the plan that predicts that an action that has never been performed will lead to an event that has never been perceived, in terms of instructions for action or in perceptual terms. I have also argued that higher-order generalisations about planning and perception, concepts of

success, failure, repetition, non-implementation, non-perception or space, can't be defined in perceptual terms or in terms of instructions for action. We might say that these concepts can't be formulated in the language of the perceptual and motor systems.

It is possible that at this point the child develops a new mental language, a conceptual rather than perceptual or motor language. He then systematically translates this language into the adult spoken language. This is Piaget's position.

But a more radical position is also possible. The child could actually use the expressions of the adult language, at least in part, as the language of thought. He could think words where he had previously thought perceptions or instructions for action. When he develops a new concept he could automatically store it in linguistic form rather than creating a new symbol in "mentalese" which is later associated with a linguistic structure.

If this admittedly speculative account is true, we would be able to explain both the simultaneous emergence of the eighteen-month-old cognitive shift and language, and the fact that so many early words encode new concepts. Before eighteen months the language of experience, the language of the perceptual and motor systems, is powerful enough to allow the child to make considerable cognitive progress. At around eighteen months he reaches a dead end as far as this system is concerned. If he is to make further progress, he needs a language that is not phrased in perceptual or motor terms, he needs a language like language.

The child's sense of the inadequacy of his perceptual and motor language could motivate him to be on the look out for a new sort of language, at least it could motivate him to take advantage of such a language. We might even imagine that if no such system was available he would create one himself. In fact, the work of Fedman and Goldin-Meadow (1978) on the emergence of sign-language in deaf children suggests that this may occasionally happen. But for most children a language that is independent of perception and action is available. It is the language spoken by the adults around them.

Furthermore, if the child's acquisition of language is motivated by his sense of the inadequacy of his cognitive structures we would expect that the child would immediately use language to formulate new concepts that couldn't be formulated in terms of perception or action.

In other words, I am arguing that the same processes that are involved in the acquisition of particular early expressions are also involved in the acquisition of language in general at about eighteen months. The dynamics of the child's developing cognitive system make him sensitive to linguistic clues which allow him to make further cognitive progress.

We might return to the previous metaphor of the map and the journey. As I originally phrased this metaphor, the map descended out of the blue in the middle of the journey. We might say instead that the child was provided with a map at the start of his journey, but that this map became inadequate at a certain point. In order to go any further, the child

would need a new map. This could make the child search for maps, and be particularly likely to take advantage of any maps that looked promising. Once an obliging grown-up provided him with a new map, he would immediately use it to travel further.

Another analogy might also be appropriate. In mathematics the invention of a particular type of notational system, the Arabic numerals, had great effects on the development of mathematical thought. Once this notational system was available important conceptual advances became possible. The motivation for the invention and adoption of this system was itself mathematical. The notational systems that were already available were perceived to be inadequate.

I am suggesting that, for the child, the adoption of the notational system of the adult spoken language might have the same cognitive effects as the adoption of the Arabic numerals. Moreover, the child's motive for adopting this system would be like the mathematician's motive for adopting the Arabic numerals. Once the child had reached a certain level of cognitive sophistication, he would begin to perceive the inadequacies of his available perceptual and motor systems, just as once the medieval mathematician reached a certain level of sophistication, he began to perceive the inadequacy of Roman numerals. Moreover, we would expect that as soon as the mathematician or the child acquired the new system, they would use it to solve the problems that could not be solved using the old system.

This mathematical metaphor leads us to consider

another interesting aspect of early language acquisition. It is significant that the child is in the position of a western mathematician who discovers the work of Arab mathematicians rather than in the position of the Arab mathematicians who invented Arabic numerals in the first place. The child adopts a system that has already been elaborated rather than having to invent the system from scratch. Moreover, the child can take advantage of the conceptual advances that have already been made using the system. By acquiring language, the child acquires a powerful conceptual tool, but he also gains access to all the theories that have already been constructed using that tool.

The child's acquisition of these theories will be gradual, and will be affected by his cognitive concerns and limitations. Learning theories is always a matter of reconstructing them. At the same time, the fact that these theories are expressed in language helps to make this process easier than the original process of constructing the theories.

In order to understand relativity or Gödel's proof, we need to make the same kinds of radical qualitative changes in our conceptual systems that Einstein and Gödel made. However, the fact that these theories have already been formulated makes these radical cognitive changes less difficult.

Different accounts of child language acquisition tend to stress different views of the evolutionary function of language. Chomsky's extreme nativism is associated with

the view that language has no special function, it is an evolutionary epiphenomenon. The various recent accounts that have stressed the role of social interaction in the development of language tend to stress the role of language in mediating social relationships and in allowing co-operation and communication. But, as Bruner (1972) has noted, language is also important because it allows education. It allows the cognitive achievements of past generations to be passed on to a new generation. I am suggesting that language serves this educative function at a very early stage.

Early Language and the Adult Language

The study of the twelve to twenty-four month old period can illuminate some aspects of later language. One obvious implication of this study is that the processes that explain linguistic development in this period may also explain later linguistic and cognitive development. Later changes in the structure of the child's language may both reflect and influence the child's cognitive development. In this respect, it is interesting that Bower (1979) has recently argued that many of the cognitive changes in the concrete operational stage reflect the influence of language. Of course, as he grows older, the child is also likely to treat the linguistic system, particularly the syntactic system, as a problem in its own right, a problem that may be separated from conceptual problems.

The study of early language also highlights certain aspects of language and particularly certain aspects of meaning that are relevant to theories of meaning in the adult language. One important moral of this study is that

there is an intimate connection between the child's semantic system and his particular theories about the world. I have even suggested in this chapter that, to a certain extent, the child's semantic system and his conceptual system may be identified.

But an even more important moral is that both the child's language and his theories of the world are constantly changing. I have suggested that the eighteen-month-old's world is qualitatively different from the adult's world, and is even qualitatively different from the twenty-four-month-old's world, and that these differences are reflected in the child's language. Linguistic development is not simply a matter of arranging an innately determined set of semantic categories, nor is it a matter of associating conceptual structures with linguistic structures, nor is it a matter of acquiring a set of social conventions. Instead, I have suggested that the mechanisms that underly linguistic development in the twelve to twenty-four month period are as complex as the mechanisms that underly the kinds of qualitative cognitive changes described by Piaget, Bower and Bruner, or the mechanisms that underly changes in scientific theories. In fact, I have suggested that all three types of change reflect the same underlying mechanisms.

The fact that early language reflects cognitive structures, and, more significantly, reflects constantly changing cognitive structures, raises some interesting questions about adult language and cognition. Does cognitive change stop at some fixed point? Do we develop invariant stable cognitive structures that may be related

to linguistic structure in a fixed way? I would argue that we do not.

The clearest example of cognitive variability and change in adult life is science. A number of writers, including Piaget himself, have noted the similarities between the changes in scientific theories and the changes in the child's understanding of the world. In both cases we have the curious phenomena of qualitatively different theories emerging from earlier theories. In both cases, empirical input and formal considerations, like simplicity and economy, play some role in the development of new theories, though we don't know exactly what that role is. Also in both cases we can compare theories and make judgements about them in spite of the fact that they are qualitatively different.

More profoundly, when we look at both the child's and the scientist's theories of the world, we realise that very few, if any, of our cognitive structures are indefeasible. Notoriously, whenever we think that certain concepts reflect inevitable, inescapable aspects of our understanding of the world (like the concepts of Euclidean geometry or Kant's a priori categories) some scientist or mathematician develops a system that uses different concepts and often these "unthinkable" concepts turn out to be very useful. Similarly, whenever we think certain concepts (again like the concepts of Euclidean geometry or Kant's categories) are so central they must be innately determined, we discover that these concepts are the result of a long developmental process. Both scientists and children think in surprising

ways and constantly change the way they think, and these facts are reflected in their language.

I would argue that if we can't find indefeasible concepts at either end of the cognitive spectrum, either in infancy or in science, we are unlikely to find such concepts in normal adult thought. Common sense theories of the world are just as variable and just as subject to change as the child's or the scientist's theories of the world. In adult life, however, this variability may be more likely to be reflected in historical, cultural or individual variations between common sense theories than in changes in the theories of a particular individual.

Again there are some similarities between the variations in the common sense of different individuals or different cultures or different historical periods, and the variations in the child's theories of the world, or the variations in scientific theories. In all these cases there may be profound qualitative differences between theories, and yet one theory may be derived from another, and they may be compared and judged.

It seems clear that the variations in scientific theories are reflected in the language of science. Indeed, scientists frequently invent new lexical items and even invent new unnatural, mathematical languages to encode new types of concepts. In this thesis I have argued that the child's language also reflects his changing cognitive structures. I would suggest that ordinary language, the linguistic counterpart of common sense, is also likely to reflect variation and change.

If this picture is correct, that is, if there are no invariant, indefeasible, cognitive structures, but instead are changing, variable theories of the world, and if these variations and changes are reflected in language, then we will have to find semantic theories that can cope with such changes. I have no idea what these theories would be like. However, I would suggest that the current attempts to develop extensional semantic theories of natural language, such as theories that depend on semantic primitives, feature theories and theories of natural logic, are doomed to fail.

We have seen that we cannot use the same semantic units to characterise language at eighteen months, language at twenty-four months and adult language. I would suggest that we also cannot use the same semantic units to characterise the language of Newtonian physics and the language of relativity theory. Furthermore, I have argued that we will be unable to use the same semantic units to capture the language of different individuals, different cultures or different historical periods. At best, such accounts will simply capture some of the characteristics of the most widely held views of people of a certain age in a certain place at a certain time.

The arguments I have advanced here are similar in many ways to the arguments of philosophers like Putnam (1975 a,b), Davidson (1979) in his most recent work, and Quine (1951, 1960). These philosophers have emphasised both the intimate connection between language and knowledge, and more significantly, the changing defeasible quality of

knowledge itself. For the philosophers, these insights have come from the contemplation of the profound linguistic and cognitive changes that are associated with the development of science. The final and most important moral of this study is that we can obtain equally important insights by contemplating the even more profound linguistic and cognitive changes that are associated with the development of our baby sons and daughters.

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