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To my parents, and my husband
for their constant love and support
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Finally, I am alone responsible for all the imperfections that inevitably still remain in this dissertation.
ABSTRACT

As their language develops, children acquire strategies to utilize surface forms (syntactic, prosodic, semantic, and morphological) to interpret the meaning and functions of sentences, including the ability to interpret information as Given or New. In Mandarin Chinese, the postverbal position in active, the position after bei in passive, the position after shi in cleft and pseudocleft, and stress tend to encode New information.

This study investigates how Chinese-speaking children, aged 5, 7, 9, 11, 13, and adults utilize word order and structure in the above four sentence types, and different levels of stress to interpret Given and New information in isolated (hereafter IC) and contextualized (hereafter CC) conditions. In IC, the determination of Given and New was made within isolated sentences, while in CC, the identification of Given and New was made across sentences. In both conditions, three stress conditions were provided for each sentence type: normal stress on New, emphatic stress on New, and emphatic stress on Given. Subjects' choice and description of pictures in IC, and choice of the context sentence in CC were considered to be measures of their comprehension of the Given and New distinctions implied in a particular stimulus. It was hypothesized that: (1) in IC, subjects would assume Given information to be true, and focus their attention on New information; (2) in CC, subjects would choose the context sentence that contained the Given information of the stimulus. The results revealed that: (1) children were unable to use word order effectively in IC; a U-shaped development of using word order was found between five- and nine-year-olds in CC; (2) children could generally utilize marked syntactic structures; a U-shaped development in use of passive structure was found between seven- and eleven-year-olds in CC; (3) when stress converged or competed with word order or syntactic structures, children responded nonuniformly; interaction effects are discussed in the light of the Competition model; (4) the development of processing...
strategies for Given and New interpretation varied as a function of context; (5) processing strategies varied across individuals, suggesting that there was heterogeneity of reliance on one type of information over another.
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<td>CL</td>
<td>Classifier</td>
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<tr>
<td>NP</td>
<td>Noun phrase</td>
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<tr>
<td>N</td>
<td>Noun, number, New</td>
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<tr>
<td>G</td>
<td>Given</td>
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<td>MS</td>
<td>Mean Score</td>
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<td>p</td>
<td>Probability</td>
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<td>Standard deviations</td>
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<td>ANOVA</td>
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<td>NS</td>
<td>Not significant</td>
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<td>S</td>
<td>Subject</td>
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CHAPTER 1
INTRODUCTION

The immensity of the human capacity to learn language has long motivated researchers of language acquisition to investigate the process of how language is acquired. Researchers have been searching for answers to the following general questions: What is grammar? How do children acquire the complex grammar of their particular languages? What are the potential factors that help children bootstrap into the grammar system? How do functional constraints and cognitive-perceptual factors influence and shape children's acquisition of the grammar of their languages? How do children come to understand and use the surface formalisms of their languages? How may individual differences influence developmental routes in language acquisition? How are linguistic devices exploited in comprehension or production of specific functions? What are the potential factors that may account for language universals and language particulars in children's development of grammar? What theories or models can adequately account for language development phenomena? As studies on language acquisition and language use have flourished during the past three decades, grammar has been defined in different ways, and acquisition problems have been addressed with emphasis on different aspects of language behavior within each distinctive theoretical framework (Gleason 1993).

For those language acquisition researchers who adopt a strict Structuralist/Nativist approach, those linguistic forms which are regarded as embodying innately-endowed abstract grammatical rules have been the major concerns of their descriptions. This traditional approach is far removed from dimensions of context, meaning, function, and processing in its theoretical framework. Ever since the 1970s, there has been another strand of research interest focusing on semantic and pragmatic functions, and on the cognitive factors involved in the process of language learning.¹ There has been
accumulating empirical evidence suggesting that the major part of language use involves the functional aspects of semantic, pragmatic, and cognitive processes, and that grammatical structure can not be understood outside a semantic-pragmatic and processing framework (Bates 1974; Karmiloff-Smith 1979; Bates & MacWhinney 1982; Maratsos 1983; Slobin 1985).

1.1 FUNCTIONALISM

In linguistics and psycholinguistics, linguistic functionalism has been defined as the belief that "the forms of natural languages are governed, constrained, created, acquired and used in the service of communicative functions" (Bates & MacWhinney 1989:3) interacting with processing constraints. Functionalist researchers have emphasized child language behavior in cognitive, functional, and processing terms in their quest for language universals and language particulars (Slobin 1977, 1982; Karmiloff-Smith 1979, 1986; Bates & MacWhinney 1982, 1987; Peters & Boggs 1986; Bates & Synder 1988). Bates & MacWhinney (1989) proposed the following four themes that underlie the theoretical framework of the particular functionalist approach adopted by the present study: (1) cognition as the basis for language universals, (2) grammars as solutions to the form-function mapping problem, (3) biology as providing the roots of function, and (4) quantitative analyses as ways of understanding qualitative variation. The following discussion will amplify these four themes.

Grammar is explained in universal cognitive and communicative terms by functionalist researchers. Human cognition is seen as the universal wellspring of basic meanings and communicative intentions that need to be mapped onto linguistic forms. Normal human beings are innately endowed with biological apparatus and cognitive capabilities to perceive, process, memorize, organize and learn. All natural languages have to evolve some means of encoding objects, and events as perceived, processed and organized, as well as relationships of human action, and principles of human intention and
interaction (Bates & MacWhinney 1989). The construction of grammar is seen as a result of interaction of cognitive predisposition, communicative intentions and the linguistic structure of a particular language. Grammar is seen as a class of solutions to the problem of the mapping between form and function. The mapping of meaning and intentions, i.e., the universal contents of cognition onto real-time linguistic form is constrained by a limited set of linguistic devices and by a universal set of processing constraints (Slobin 1977; Bates & MacWhinney 1979).

Slobin (1977) proposed a functionalist, competition model of language, putting forward four competing factors, or processing constraints, which operate to determine the range of possible grammars across all human languages. These four competing constraints on language are clarity, processibility, efficiency and expressivity. The clarity constraint preserves a transparent, one-to-one relationship between surface form and underlying function. In accord with the clarity principle, surface forms will tend to reflect the temporal or logical order of real events. For example, children tend to express two meanings with two morphemes instead of a single conflated form. Surface forms which follow the temporal order of real events, such as $X \text{ before } Y$ are easier to process and produce than the forms which violate logical order, such as $\text{ before } Y, X$. The processibility constraint requires that surface forms demand minimal memory and maximal perceptual clarity. For example, the statement of the topic, which is crucial to the understanding of subsequent information, is preferentially ordered before the comment. It is preferred that highly associated units, such as verb and object, not be broken up. The efficiency constraint exerts pressures to ease the load for production. For example, in rapid speech, there is often erosion or conflation of phonological distinctions, which is not compatible with efficiency in comprehension. The expressivity constraint exerts pressure on the language to encode not only ideational content but also semantic, pragmatic, social and rhetorical
information. For example, language needs to be able to encode social relationships between speaker and hearer, or informational highlighting and backgrounding.

These four processing constraints enter into competition with each other to gain access to the limited resources of the channel of language. Bates & MacWhinney (1982) pointed out that solving the mapping problem between form and function entails a competition for limited resources for channel access among diverse pragmatic and semantic functions. When forces enter into competition, alternative forms arise. Bates & MacWhinney employ the concepts of divide the spoils and peaceful coexistence to describe resolution of competition among forms and functions; these will be discussed in more detail in chapter 3. Human grammar emerges whenever universal categories of nonlinear meanings compete to be mapped onto a limited channel.

The importance of biology is recognized in functionalism, in that human language is seen as partly determined by the unique biological heritage of our species, including many capacities that are not unique to language itself (as claimed by linguistic nativism). As Karmiloff-Smith (1987) put it, "models of language acquisition must include a level of analysis which can capture cross-domain processes, rather than be restricted to the specific domain of language" (Karmiloff-Smith 1987:187). The human capacity to map universal meanings onto a limited channel may not be based entirely on direct genetic guidance, but is insured by innate cognitive factors and problem-solving constraints (Bates & MacWhinney 1989). Thus, the universal properties of grammar are only indirectly innate in the sense that although they are based on interactions between innate abilities and processing constraints, such interactions may not be language-specific.

Language has qualitative and quantitative differences. By qualitative difference, is meant that certain linguistic devices such as word order constraints may be present or absent in different languages. For example, word order is a very strict constraint in English, while it can be varied extensively in Italian (Bates et al. 1984). Languages also
differ quantitatively in the extent to which the same linguistic device is used at all and in the range of functional roles that that same particular linguistic device has come to serve. For example, Chinese does not use definite and indefinite articles as does English; indefinite articles are used in functionally different ways in Italian and Hungarian from English. In both Italian and Hungarian, the indefinite has somewhat the sense of a numeral which identifies a single member of a larger class which has already been mentioned (MacWhinney & Bates 1978), while in English indefinite articles are used to indicate new information. Crosslinguistic studies are particularly valuable for providing empirical data to gain more insight into both qualitative and quantitative differences. This particular functionalist approach offers new perspectives on the language learning process, and provides a valuable theoretical framework for addressing actual language performance in universal communicative and cognitive-processing terms through crosslinguistic studies of language use.

1.2 THE ROLE OF LANGUAGE PROCESSING IN LANGUAGE DEVELOPMENT

From the functionalist perspectives discussed above, child language development can be viewed as a process involving the acquisition of the abilities to map linguistic forms (syntactic, semantic, prosodic and morphological cues) onto the meanings and functions of sentences. The need to include sentence processing strategies, such as sentence interpretation, in a theory describing children's acquisition of grammar has been noted by a number of researchers. Clark (1978) pointed out that the whole range of cognitive resources is brought into the process when people try to solve the problem of mapping forms onto meaning and functions in sentence interpretation. Processing strategies for the interpretation of functions in sentences are part of these cognitive resources. Bates & MacWhinney (1982) proposed that grammar is a description of the elements, categories and operations that mediate between meaning, and functions and the particular surface forms of
a given language. Semantic, pragmatic and perceptual-mnemonic strategies must all be represented directly in the system.

There have been a number of dimensions that have been covered under the rubrics of meaning and function, including the semantic relations that underlie sentences, the pragmatic intentions of speakers, the influence of cognition on language, and communicative aspects such as informativeness. One of the most important universal communicative functions that language serves is to effectively impart information to other people; the importance of this function has long been recognized among researchers of child language acquisition (Halliday 1975; Peters 1994). When sentences are spoken, it is frequently the case that one part of a sentence is used by the speaker to convey Given information (what is assumed to be known to the hearer), and another part is used to state New information (what is assumed to be unknown to the hearer) at the moment of speaking. The informative function is correlated with the pragmatic function of imparting information as Given or New. In view of the importance of the role of processing, the investigation of how children develop their cognitive processing strategies to map linguistic forms onto Given and New function becomes a relevant issue as we explore how children are acquiring the grammars of their particular languages.

There has been some psycholinguistic research investigating the way pre- and primary-school English-speaking children exploit surface devices such as word order, stress, and marked syntactic structure to interpret the pragmatic distinctions of Given (Topic) and New (Comment), both in isolated and in contextualized conditions (Hornby & Hass 1970; Hornby, Hass & Feldman 1970; Hornby 1971; Hornby 1973; Halliday 1975; Maratsos 1976; Warden 1976; MacWhinney & Bates 1978; MacWhinney & Price 1980; Solan 1980; Bates & MacWhinney 1982, 1987; Paul 1985; Cutler & Swinney 1987; Bamberg 1987). A number of studies have also been carried out to explore how adults utilize surface devices to make the Given and New distinction in comprehension,
perception, verification and recall (Tannenbaum & Williams 1968; Hornby 1974; Carpenter & Just 1977; Bock and Mazzella 1983; Fowler & Housum 1987).

So far, most of the limited number of studies of children's development of processing strategies for Given and New interpretation have been done in English. To my knowledge, there has been no serious research that has investigated Mandarin-speaking children's development of pragmatic abilities in this regard. Different languages have different linguistic means to indicate Given and New information in surface structures at the discourse level (Halliday & Hasan 1976; MacWhinney 1977). For example, in Mandarin Chinese, postverbal position is an obligatory marking for New information, while it is not obligatory in English. Speakers of different languages may rely on different processing strategies in interpreting sentences for specific functions (Bates et al. 1982, 1984). Hence, the findings that have been reported from studies on English may not be generalizable to speakers of other languages. Given the paucity of data regarding processing strategies for the interpretation of Given and New, more crosslinguistic studies are needed in order to describe language universals and language particulars in the development of children's processing strategies in this respect. Since Mandarin Chinese is typologically different from English, it will provide a new testing ground for the examination of children's development of such strategies.

1.3 AIM OF THE PRESENT STUDY

The present study investigates how Mandarin-speaking children aged 5, 7, 9, 11, 13, and adults use surface cues for Given and New interpretation. The study focuses on older Mandarin-speaking children for the following reasons. Some studies have shown that children's ability to use certain linguistic forms functionally in the same way as adults does not develop until an older age. For example, Hickmann & Liang (1990) reported that their Chinese subjects did not fully master the distinction between Given and New information encoded by indefinite NPs and postverbal position before the age of eight.
years. Moreover, the ability to use language to establish relationships between utterances should be connected with children's cognitive competence. As Karmiloff-Smith (1986) has noted, many cognitive changes still take place after the age of 5, up to age 14, which leads to the hypothesis that the child's linguistic competence will also reflect these changes beyond the age of 5. Since there are not many studies covering the period between 5 to 14, the present study is intended to partly fill this gap.

1.4 ORGANIZATION OF THE DISSERTATION

The rest of this dissertation is structured as follows. Chapter 2 provides an overview of linguistic encoding for the Given and New distinction. Chapter 3 discusses the Competition Model, a cognitively-based model of performance on which this study is partly based. Chapter 4 reviews relevant studies of children's and adults' pragmatic use of Given and New. Chapter 5 presents the aim, method and research design of the present study. Chapter 6 describes the results of the study, for both the isolated and contextualized sentence conditions. Chapter 7 discusses the findings and draws implications. Chapter 8 provides the conclusion, and discusses limitations of the present study and directions for future research.
NOTES TO CHAPTER 1

1 Methods that have been commonly employed in recent child language studies include: observation of spontaneous language use with caregivers, peers, and siblings, observations of elicited verbal and nonverbal behavior in home or laboratory setting, the influence of environmental context. See Bloom (1970), and Peters (1986) for more discussion.

2 Halliday (1975) identified seven functions in young children's one-word utterances: instrumental (to get something), regulative (to influence the behavior of others), interactional (to get contact with others), personal (to express one's own feelings or interest), heuristic (to explore the surroundings), imaginative (to create a world of one's own), and informative (to inform others of new facts). Peters (1994) pointed out that in the process of language acquisition, some determinants of language structure might arise from the external constraints of social requirements, such as the need to distinguish information of what is known from what is novel to listeners.

3 In studies on information structure, there have been many pairs of terms which have been proposed to draw dichotomous distinctions similar to Given-New (Halliday 1967; Clark & Haviland 1977). These include Theme-Rheme (Firbas 1964; Halliday 1967), Topic-Comment (Hockett 1958; Hornby 1971; Gundel 1988), Presupposition-Focus (Jackendoff 1972; Hornby 1974; Prince 1986), Foregrounding-Backgrounding (Chafe 1976; Wilson & Sperber 1979), Old-New (Chafe 1970).
CHAPTER 2
LINGUISTIC ENCODING OF GIVEN AND NEW

2.1 GRICE'S COOPERATIVE PRINCIPLE

Language is a vehicle of communication. Natural languages and communication channels utilize several means for rhetorical and pragmatic functions such as encoding for Given and New information, to facilitate smooth transfer of information. Participants in a conversation follow a cooperative principle (Grice 1967). To impart a message efficiently and informatively, the speaker identifies which information is shared by the listener and which is as yet unknown, setting a point of departure inferable by the addressee; this is accomplished by packaging the utterances through the means of appropriate linguistic cues. Reciprocally, the addressee acts on the assumption that s/he can uniquely infer or predict this point of departure by utilizing the information structure provided by the speaker to interpret information (Chafe 1974; Paprotte & Sinha 1987). The information structure of the linguistic structure provided by speakers is expected to be congruent with speakers' assumptions about their hearers' mental world (Clark & Haviland 1977). This is what is generally referred to as the Given-New principle (Halliday 1967; Haviland & Clark 1974; Chafe 1976; Clark & Haviland 1977; Allerton 1978; Prince 1981, 1985, Kuno 1989).

Although the area of information structure of Given and New has been the subject of much attention, many concepts correlated with the Given and New distinction have been used in slightly differing ways by different writers. The following discussion will be helpful to clarify the confusion.

2.2 CLASSIFICATION AND IDENTIFICATION OF INFORMATION STATUS

In the literature on information structure, the definitions of what constitutes Given or New, the criteria used to distinguish Given from New, and the taxonomic structure for Given and New relations have been proposed by different researchers in different ways.
As there has been a terminological, classificatory, and definitional maze in this area, further illustration in the following is provided.

2.2.1 DICHOTOMOUS INFORMATION STRUCTURE

The formulation of dichotomous information structure was first instituted by scholars of the Prague School under the rubric of the communicative dynamism (CD) of the elements within the sentence (Firbas 1992). Within the central concepts of the Functional Sentence Perspective (FSP) proposed by the Prague School linguists, two (sometimes three) elements are identified: Theme and Rheme (enunciation) and sometimes Transition. According to Mathesius (as quoted by Firbas 1992), the Theme refers to what a sentence is about and represents what is known or at least obvious in a given situation and from which the speaker proceeds in his discourse, while the Rheme refers to what is said about the Theme (which invariably precedes the Rheme). In this sense, the Theme is, to a certain extent, correlated with Given information and the Rheme with New information.

Halliday (1967) is the one who introduced and developed the ideas proposed by the Prague scholars for Western scholars; he established the two categories of information status as Given and New. He introduced the importance of intonational marking to account for information structure of Given and New. According to Halliday, any text in spoken English is organized into what is called information units, each of which is realized as one tone group. A clause may be realized as a single tone group or two or more tone groups, depending on the way the speaker has organized the components of the message block to specify their relation to what has preceded. Within each information unit, a certain element or elements are selected as points of prominence through the assignment of the tonic nucleus (primary stress) as information focus. The information focus assigns the function New to what is within its domain.

A distinction is made between unmarked focus and marked focus. Unmarked focus is realized as the location of the tonic on the final accented lexical item, which assigns the
function New to the constituent in question but does not specify the status of the remainder. Marked focus is realized as any other location of the tonic, which assigns the function New to the focal constituent and that of Given to the rest of the information unit. Consider the following examples, in which the capitalized word stands for tonic element:

(1) JACK painted the house yesterday.
(2) Jack PAINTED the house yesterday.
(3) Jack painted the house YESTERDAY.
(4) Jack painted the HOUSE yesterday.

Sentence (1) implies ‘who painted the house yesterday?’ and is equivalent to Jack (did) in the sense that it is the predicted form if the implied question had actually been asked. Sentence (2) implies ‘what did Jack do to the house yesterday?’ and is equivalent to he painted it if the question had been asked. Sentence (3) implies ‘when did Jack paint the house?’ and is equivalent to yesterday if the question had been asked. But, sentence (4) does not necessarily imply ‘what did Jack paint yesterday?’ It may simply imply ‘what happened?’ Sentence (4) is regarded as an example of unmarked information focus. An item with unmarked focus may be represented as having the structure either Given-and-New or simply New. Given information is defined as the complement of a marked focus. Generally, it expresses what the speaker is assuming to be recoverable from some source or other in the environment, either the situation or the preceding text (Halliday & Hasan 1976).

Kuno (1978) defined Given (Old) and New in terms of predictability/recoverability. He suggested that an item which is recoverable/predictable from the preceding context is treated as Given information. By this definition, Given information is a particular item that the speaker assumes the hearer can predict to occur in a particular position within a sentence. The notion of recoverability correlates with deletability, but unfortunately it wrongly predicts that the pronoun he in the sentence Jane
paid Jack, and he bought himself a new jacket is New because it is not deletable. Kuno reintroduced the notion of Anaphoric-Nonanaphoric: an NP is Anaphoric if its referent has been mentioned in the previous discourse or is in the permanent registry, according to what the speaker assumes about the hearer's assumptions.

Clark & Haviland (1977) defined the notion of Givenness in terms of shared knowledge: what the speaker assumes that the hearer knows, assumes, or can infer about a particular thing (but is not necessarily thinking about), while New information is defined as what the speaker believes the listener does not yet know. Clark & Haviland further observed that Given information often has as its antecedent some piece of information not directly mentioned, but closely associated with an object, event or situation mentioned. They used a judgment test to examine whether standard lexical or syntactic markings for givenness seem appropriate, and the results showed that parts of previously mentioned objects, and objects or persons that play roles in previously mentioned events can be appropriately treated as Given.

Chafe (1976) suggested the notion of saliency as a defining property to determine Given and New information status. Given/Old information is what the speaker assumes that the hearer has or could appropriately have in his/her consciousness at the time of hearing the utterance. For an NP to qualify as Given/Old, its referent must have been explicitly introduced in the discourse or be present in the physical context or be categorized in the same way as a referent previously introduced or physically present. Chafe's definition of Given and New differs from that of other writers to a certain extent. For example, to Chafe, an inferentially related NP the beer in the sentences 'we got some picnic supplies out of the trunk. The beer was warm.' can not be considered Given. However, for Clark & Haviland, the NP the beer is Given. Proper and possessive nouns are Given to Kuno and Clark & Haviland because they are in the permanent registry or inferrable, but they are New for Chafe.
Paprotte and Sinha (1987) proposed two pragmatic constraints underlying an interlocutor's discourse organization: identifiability and informativity. The former refers to what is associated with positive values in terms of evidentiality (having a high degree of certainty or firmness), mutuality (being already entered in shared knowledge) and textuality (having already been mentioned) and is therefore Given; the latter refers to what is informative associated with negative values of the three properties, and is therefore New.

Recently, researchers on information structure have attempted to provide a more adequate taxonomic classification of information structure. The criteria used to distinguish Given from New, and oversimplification of a dichotomous Given and New information structure have been criticized and further elaborated (Allerton 1978; Prince 1981; Brown & Yule 1983; Givón 1988; Herring 1990; Needham 1990; Mackenzie & Keizer 1991, Gundel et al. 1993). The central issues include the effect of the interaction between syntactic and phonological devices, the formulation of multilevel taxonomical information structure, the role of semantic memory in determining Given, cognitive status factors, and language-specific differences.

2.2.2 FORMULATION OF MULTILEVEL INFORMATION STRUCTURE

A number of researchers postulated multiple levels of information structure to replace the dichotomous one. Allerton (1978) noted the interaction between syntactic expressions and intonation in English, and suggested that the information status of constituents of an utterance can be classified as New, Semi-new, Semi-given, and Given. The information that is first introduced to the listener is New, and can be indicated by the use of an indefinite noun phrase with stress. The information which can be recalled from the relatively distant past of the text or from recesses of the mind is Semi-new (off-stage); it can be represented by the use of an indefinite noun phrase with separate falling pitch. Semi-given (on-stage) information refers to the information that the addressee is expected
to recall the referent for without effort because it has been stated or made obvious in the relatively recent past.

The term Given was defined by Prince (1981) as that part of knowledge assumed to be shared by speaker and addressee. She further claims that the Given and New distinction proposed by other writers is based on the speaker's assumption about what the hearer assumes. The views of some writers seem to take the position of an omniscient observer and do not consider what ordinary, nonclairvoyant humans do when they interact verbally. She proposed the term Assumed Familiarity to replace the Given and New dichotomy. Her scale contains entities classified as New (Brand-new and Unused), Inferable, and Evoked (Situational and Textual). Brown & Yule (1983) proposed the Current and Displaced given entities, which are equivalent to Prince's textual information. A Current Evoked entity is defined as an expression referring to the most recently introduced entity before the New entity, while any Displaced Given entities were introduced prior to that. Although Prince's model avoids the arbitrary classification of a clear-cut Given and New distinction, she fails to take intonational marking into consideration.

Another proposal of multiple levels of information structure came from Mackenzie & Keizer (1991). They pointed out that the distinction between Given and New can be made at various levels, and that the disregard of the complexity of these notions led to inadequate formulation of the Given and New framework. They maintained that "Given and New must be understood not merely in terms of what is in the addressee's consciousness, or even in the discourse, but in the addressee's full body of knowledge" (Mackenzie & Keizer 1991:183). The full body of knowledge contains long-term information about the world (general information), information derived from the situation where the interaction takes place (situational information), as well as contextual information derived from linguistic expressions (contextual information). An element can be Given and New at the same time. They provided the following two examples to illustrate this point:
(5) Could you pass me the salt please.

(6) The Prime Minister has just resigned.

The elements *the salt* and *the Prime Minister* are Situationally Given and Generally Given respectively, but, both are at the same time Contextually New. This shows that a simple distinction between Given and New is insufficient.

Table 2.1 summarizes terminologies, and defining properties correlated to Given and New distinction proposed by various authors.

Table 2.1

<table>
<thead>
<tr>
<th>Authors</th>
<th>Terminology</th>
<th>Defining Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firbas et al. (1964)</td>
<td>Theme &amp; Rheme</td>
<td>communicative dynamism</td>
</tr>
<tr>
<td>Halliday (1967)</td>
<td>Theme &amp; Rheme, Given (unmarked) &amp; New (marked)</td>
<td>recoverability</td>
</tr>
<tr>
<td>Clark &amp; Haviland (1977)</td>
<td>Given &amp; New</td>
<td>shared knowledge</td>
</tr>
<tr>
<td>Prince (1981)</td>
<td>New (Brand-new, Unused), Inferrable (Noncontaining &amp; Containing), &amp; Evoked (Situational, &amp; Textual)</td>
<td>assumed familiarity</td>
</tr>
<tr>
<td>Brown &amp; Yule (1983)</td>
<td>New (Brand-new, Unused), Inferrable (Noncontaining &amp; Containing), Evoked (Situational, Current &amp; Displaced)</td>
<td>assumed familiarity</td>
</tr>
<tr>
<td>Paprotté &amp; Sinha (1987)</td>
<td>Given &amp; New</td>
<td>identifiability, informativity</td>
</tr>
<tr>
<td>Mackenzie &amp; Keizer (1991)</td>
<td>General, Situational, Contextual</td>
<td>memory representation, physical context &amp; textual context</td>
</tr>
</tbody>
</table>

2.3 ELABORATION OF INFORMATION STRUCTURE

2.3.1 INFORMATION STRUCTURE AND SEMANTIC CONCEPT

Recent work has suggested that the formulation of information structure should also take into consideration the organization of conceptual structures (Greenspan 1986;
Clark and Haviland's proposition (1977) that parts of objects previously mentioned in discourse can be treated by speakers as Given information is called into question in view of the findings that semantic properties of objects differ in how they are instantiated in a reader's or listener's representation of a sentence mentioning that object. To investigate the relations between objects and their properties, Greenspan (1986) did an experiment by employing a lexical decision task to test whether mention of an object in a sentence results in differential priming of central and peripheral properties of that object. Taking context into consideration, Greenspan varied the context in which the objects were mentioned; however, the result showed that priming was found for central properties, regardless of whether the context directed attention to those properties or to peripheral properties. But, for peripheral properties, priming was found only when the context directed attention to those properties. In other words, central properties were always instantiated while peripheral properties were instantiated only when the context directed attention to them.

Drawing implications from Greenspan's study, Needham (1990) did a study to test the hypothesis that a speaker may be more likely to treat central parts of previously-mentioned objects as Given information than peripheral parts. In his recent article "Semantic structure, information structure, and intonation in discourse production," Needham reported comprehension experiments which showed that previously-mentioned central parts of objects in discourse are more likely to be treated as Given information than are peripheral parts. It was then hypothesized that this difference could affect speakers' treatment of a part as Given or New information. Needham suggested that some sources of discourse Givenness can be specified in terms of relations in semantic conceptual structures. Mention of an object tends to make its central parts more accessible during comprehension, and speakers are thus more likely to treat those parts as Given information. As an attempt to construct a more specific and elaborated formulation of some of the
sources of the Given and New structure in discourse, Needham further suggested that characteristics of knowledge structures other than object/part semantic structures which make particular items more accessible during comprehension would be potential factors affecting speakers' treatment of those items as Given or as New information. For example, our knowledge of categories and their members appears to be stored in such a form that prototypical members of a category are more accessible than other members. Or our knowledge of actions or goals involved in common events and activities tend to be stored in the forms of scripts or schemas. It would be desirable to determine if such relations in those knowledge structures might influence speakers' treatment of items in discourse as Given or New.

2.3.2 COGNITIVE UNDERPINNING AND INFORMATION MARKING

Although the speaker's assumptions about the hearer's knowledge and attention state have been considered an important factor in the speaker's packaging of an utterance, the addressee's cognitive status was further explored in some of the recent studies on referring expressions.

In referring to things, different linguistic forms can be used to refer to the same thing. The question we might ask then is what are the underlying cognitive reasons for a speaker/writer to choose a particular form as the most appropriate one to refer to a particular object so that the hearer can correctly identify the intended referent. Gundel et al. (1993) recently proposed a theory which stipulates that different determiners and pronominal forms conventionally signal different cognitive statuses as to their location in memory and attention state. They postulate six cognitive statuses that can be assumed by a speaker regarding the addressee's knowledge and attention state: in focus, activated, familiar, uniquely identifiable, referenced and identifiable by type. A proposed given hierarchy of referring expressions in English (7) & Chinese (8) for example, suggests the existence of close correlations between forms and assumed cognitive status.4
Given (1988) studied the correlation between topicality and word-order variation by examining various languages, and suggested that formal syntactic structures tend to discretely partition the underlying scalar cognitive dimensions, such as ease of recall, amount of attention or degree of mental effort. The two underlying cognitive parameters which serve as information processing constraints are informational predictability and task importance.

In view of the inconsistent interpretation for constituent ordering in terms of pragmatic theory, Bock (1982) proposed an information processing framework which permits a potential resolution of contradictions in the literature on pragmatic determinants of constituent order in adult language use. From her review, for example, it has been suggested by some researchers that a perceptually prominent entity or item tends to be mentioned first because it is viewed by subjects as more important. A conflicting claim is that an assertion (New information), which usually conveys the information the speaker wishes to emphasize and which generally appears close to the ending of the sentence, is more important than any presupposition (Given information). Here, the fundamental issue is whether presuppositions or assertions are regarded as more important by the speaker; clarification of the issue will help provide a framework for the formulation of information structure. If, on the one hand, salience controls word order, New information should precede Given (Clark & Clark 1977). On the other hand, if a prior perspective, which is supplied by Old information, is assumed by the speaker as important information
from which the listener can interpret New information, Given information should precede New as a consequence of Gricean courtesy. To resolve the contradiction partly arising from the terms importance and salience, an explanation in terms of presence or absence of context was put forward by Johnson-Laird (1977). He proposed that a sentence in linguistic context tends to place what is asserted in the object position, whereas a sentence lacking such a context places what is most important in the subject position. The problem for this argument, as noted by Bock, is that the factors associated with early placement in nondiscourse context are in certain aspects very similar to the factors associated with late placement in discourse contexts. In an attempt to account for apparent contradictions and inconsistencies, Bock proposed that information that can be lexicalized earlier by the speaker is produced earlier in the sentence. As she put it, the transient processing demands of lexical retrieval may place constraints on the choice of syntax structure, sensitive to the accessibility of lexical information. In a discourse context, Given information usually results from repeated reference, which activates "appropriate semantic and phonological productions during prior formulations of the information, and related productions will have benefited from automatic spreading activation" (Bock 1982:37). Even without repetition, the representations of the lexical information selected to convey a repeated referent are likely to be more accessible than those for New information. Since more factors of lexical retrieval for the item chosen to convey Given information are facilitated, Given information should tend to be formulated faster than New information. In a nondiscourse context, lexical processing differentials are smaller and will therefore play a smaller role in determining constituent order than in referential processing; this explains the apparent prevailing inconsistencies in interpretation of constituent ordering.

2.3.3 LANGUAGE-SPECIFIC DIFFERENCES: A TYPOLOGICAL PERSPECTIVE

Givón (1983) claimed that referents in a discourse have different degree of topicality (or continuity). Crosslinguistically, it seems that the most continuous topics are
realized as unstressed pronouns or zero elements in situ, while the least continuous ones appear as indefinite NPs. Syntactic structures such as right-detachment, left-detachment, focus-preposing, and clefting occupy intermediate positions. However, a study done by Vallduvi (1994) on right-detachment in Catalan showed that the association between a particular form and a particular function need not be consistent across languages. In English, right-detachment is a case of afterthought or an encoding of a topical or continuous referent (Givón 1983; Gundel 1988). Right-detachment in Catalan, which is characterized by "the placement in a right-peripheral position of a sentential constituent that would normally appear within the core clause" (Vallduvi 1994:575) has an independent intonational phrase, and does not signal any particular referential or topicality standing of the detached phrase. Right-detachment in French has similar characteristics with that in Catalan. Instead, right-detachment in Catalan has a function of a tailful instruction.6 Vallduvi claimed that what is expressed by right-detachment in Catalan can be expressed exclusively by prosodic shift in English. To cite Vallduvís examples Catalan (9) and English (10):

(9) El Lluc se l 'ESTIMA, el gos.
the Luke self obj 3s-love the dog

(10) Luke LOVES his dog.

Both the Catalan sentence (9), and the English sentence (10) encode the same kind of instruction to the hearer, namely tailful instructions, a GOTO(ℓ) (ENTER-SUBSTITUTE(INFORMATION)) instruction. In other words, a single function of tailful instruction is associated with different structural realizations, i.e., syntactic detachment configuration in Catalan and prosodic shift in English. Vallduvi suggested that the association between a particular form and a particular function need not be constant across languages.

Herring (1990) reviewed four different principles that have been hypothesized to account for the ordering of information: (1) Given information before New information, (2)
newsworthy things first, (3) discourse iconicity and (4) word order type. Principles 1 and 2 seem to conflict with each other. Languages such as English (Hannay 1991) prefer to follow Principle 1 by placing Given information before New information while languages like Papago (Payne 1985) tend to put New information in pre-verbal position and Given information in post-verbal position. As for Principle 4, Herring pointed out that information structure is determined relative to a language's basic word order. Verb-subject languages tend to order focus (comment) before topic, in contrast with languages of either the SVO or the SOV type.

The above findings suggest that there are language-specific difference in the association of form and function as well as in the ordering of information structure.

Despite the differences of definitions, terms and criteria proposed by different writers to account for information status for Given and New, similar linguistic devices have been identified as markers for realizing Given and New distinctions. To help better understand how Given and New information is realized through linguistic marking, we will discuss linguistic markings for the realization of Given and New information status in the following section.

2.4 SURFACE STRUCTURE DEVICES FOR GIVEN AND NEW

MacWhinney (1977) proposed that there are three levels at which information can be extracted for Topic (Given) and Comment (New) distinction in conversation. The lowest level is the **lexical level** (reference and substitution), in which current lexical items are related to antecedent entities by Givenness, while New referents are introduced into the frame by Newness. The next level is the **predication level** (ellipsis, word order, marked sentence form), in which the sentence Theme relates the current predication to previous discourse, while the sentence Rheme represents a comment predicated on the previously-established Theme. The highest level is the **backgrounding level**, in which story-lines are related to subsidiary frames in the text, while the foregrounding elaborates the plot under consideration. Devices at the first two levels are used to establish Given and New relations across clause pairs while devices at the third level are used to achieve cohesion at the discourse level. Since the present study concerns only the first two levels, we will limit our discussion of devices for Given and New realizations at these two levels by using Mandarin Chinese and English as illustrations.

2.4.1 **SYNTACTIC DEVICES**

2.4.1.1 **NOUN PHRASE AND WORD ORDER**

The Noun phrase is a commonly used syntactic location for encoding Given and New reference. For example, in English, nouns with definite articles, demonstratives, and pronouns are used to signal a high degree of Givenness, while a full indefinite NP is used to denote New information. Chinese employs NP types as one type of linguistic device to encode Given and New, but these concepts are encoded in linguistic forms differently than in English in their forms and functions in NP types.

There are several major differences in NP realization employed in English and Chinese to encode Given and New: (1) English has definite and indefinite articles which Chinese does not; (2) in Chinese, NP types interact with word order to indicate Given and New information (Chen 1986); (3) unlike English (subject-prominent), Mandarin is a pro-
drop (topic-prominent) language, which often allows subjects to be omitted (Li & Thompson 1981; Sun & Givón 1985; Li et al. 1992). Mandarin Chinese may use zero forms to indicate information which is known, in addition to the use of pronouns. Table 2.2 lists the NP types for encoding Given and New in Mandarin Chinese, and English (Note: Given information in Mandarin Chinese tends to occur in preverbal position, although it can also occur in postverbal position).

Table 2.2

NP types and Given and New information in Mandarin Chinese and English

<table>
<thead>
<tr>
<th>Mandarin Chinese</th>
<th>Given</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td>preverbal</td>
<td>Ø, pronouns, demonstrative determiners and classifiers, possessives, restricted relative clauses, bare nominals</td>
<td></td>
</tr>
<tr>
<td>postverbal</td>
<td>Ø, pronouns, demonstrative determiners and classifiers, possessives, restricted relative clauses, bare nominals</td>
<td>nominals with numeral determiners &amp; classifiers, bare nominals</td>
</tr>
</tbody>
</table>

English

definite articles, pronouns
indefinite articles

Mandarin Chinese, unlike English, has no definite or indefinite articles. Nevertheless, noun phrases are commonly used to signal Given and New information in Mandarin Chinese. According to Chen (1986), Chinese NPs can be subgrouped into three types in terms of their uses for Given or New information: definite NPs, indefinite NPs, and bare nominals. The definiteness of a noun phrase is indicated by the presence of a definite determiner, such as demonstrative determiners and classifiers, possessives, restricted relative clauses, and pronouns, while indefiniteness of a noun phrase is generally indicated by using numeral determiners together with classifiers, such as yi-CL 'one-classifier' (Li & Thompson 1981). In the immediately following section, the discussion will first be restricted to general noun phrases, to the exclusion of pronouns.
In Mandarin Chinese, there is interaction between the information status of a referent and its position in relation to the verb. Definite NPs tend to be preverbal and to denote Given information, while indefinite NPs, which can not be placed in preverbal position except at the beginning of narration, tend to be postverbal and encode New information (Li & Thompson 1981; Sun & Givón 1985; Hickmann & Liang 1990). A bare nominal in the preverbal position only indicates Given information, but a bare nominal in the postverbal position can denote either Given or New information. In other words, NPs denoting Given information can occur either in preverbal or postverbal position, but NPs denoting New information can only occur in postverbal position (Sun & Givón 1985). According to Chao (1968:76), in Mandarin Chinese, the subject, sentence-initial NP is likely to represent the known while the predicate introduces something unknown; thus there is a very strong tendency for the subject to have a definite reference and the object to have an indefinite reference. As Hickmann et al. (in press) noted, Chinese local markings of newness are optional, global ones are obligatory, i.e., referent introductions must be postverbal. In other words, the interaction between NP types and their position in relation to the verb is a central discourse marking for Given and New information while that in English is more flexible.

Pronominals are the devices that are employed both in Mandarin Chinese and English to denote Given information. The referential expressions of pronouns can be classified in two types: Endophoric and Exophoric. The term Endophoric is used to "refer to the relationships of cohesion which help to define the structure of a text," (Crystal 1985:109) while the term Exophoric is used to refer to "the extralinguistic situation accompanying an utterance" (Crystal 1985:114). We are interested in endophoric reference, a thing which can be identified in the surrounding text.

Endophoric reference can be divided into anaphoric and cataphoric (Halliday 1976). Anaphoric reference is the term used for a linguistic unit which refers backwards to some
entity previously expressed. Take the following two sentences as examples: *I met an old man yesterday. He looked so unhappy.* The anaphoric pronoun *He* in the second sentence refers back to the noun phrase *an old man* in the first sentence. Cataphoric reference refers forwards to some entity that is about to be expressed. For example, in the sentence *Here is the news, here* has a cataphoric function. Both English and Chinese employ pronouns as a means to signal Given information; however, there are differences between the two languages.

Unlike English (subject-prominent), Mandarin is a pro-drop (topic-prominent) language, which often allows subjects to be omitted (Li & Thompson 1981; Sun & Givón 1985; Li et al. 1992) when it is known information. In Mandarin Chinese, zero forms are often used, together with pronouns, to denote the most presupposed entities in the discourse or non-linguistic context. As Prince (1981b) pointed out, the use of these devices correlates with a loss of explicit information such that understanding is greatly impeded if the item is not actually provided for the receiver.

2.4.1.2 MARKED SYNTACTIC STRUCTURE

Marked syntactic constructions such as clefts, passives, relative clauses, topicalization, existential constructions, Gapping and VP-deletion are also used to convey the information status of Given vs. New information (Kuno 1989, Prince 1981, 1985; Atlas & Levinson 1981). For example, in existential constructions, the occurrence of clefted elements, relativized elements, and full NPs denotes New information while topicalized NPs, passivized NPs, and Gapped elements mark information as shared (or Given) knowledge. In Mandarin Chinese, specific syntactic constructions have also been proposed as having focusing functions in discourse (Teng 1979; Ross 1983, Cheng 1983). We will focus here on five types of marked constructions: the *shi*-initial cleft, the pseudo-cleft (equational) construction (Ross 1983), the existential presentative construction, the passive, and the adverbial clause.
In Mandarin Chinese, the copula shi 'is' has the function of focusing the constituent it immediately precedes as New information (Cheng 1983; Teng 1974; Tsao 1979). Take the following two sentences as examples of cleft and pseudocleft constructions:

(11) Shi wugui zhui mao.
    it-is turtle chase cat

'It is the turtle that chases the cat.'

(12) Zhui mao de shi wugui.
    chase cat NOM is turtle

'What chases the cat is the turtle.'

In these two sentences, the elements following shi, are used to convey New information. Similar discourse functions of clefts and pseudoclefts have been reported in English (Prince 1978). In both it-clefts such as It was John who broke the window, and wh-clefts What John broke was the window, the focused elements John and the window represent New or contrastive information. However, the pragmatic properties of the two types of construction may not be equally appropriate in the same discourse context (Prince 1978; Gundel 1985). Prince claimed that the presupposed parts in these two types of structures differ in their assumptions. The presupposed part (Wh- clause) of a wh-cleft represents information assumed by the speaker to be in the hearer's consciousness, i.e., Given information by Chafe's (1976) definition, while the presupposed part (that/Wh- clause) in it-clefts represents information that the speaker assumes the hearer knows or can deduce from the context, but need not be in his/her consciousness.8 The difference in the assumption of the presupposed part nicely accounts for the finding by Hornby (1974) that people made more perceptual errors in verifying Wh- clefts against a picture than in verifying it-clefts, when the presupposed part misrepresents the picture. Prince added that since the presupposed information in wh-clefts is marked as Given, i.e., the information assumed to be in the hearer's consciousness, cooperative subjects, acting as if that were the case, did not bother to verify it in many cases (close to 50%).
Another specific focusing construction in Mandarin is the so-called existential presentative construction, containing the existential verb *you* 'exist/have' in Mandarin Chinese (Teng 1974; Li & Thompson 1981). Here, the existential verb *you* indicates that the following NP is indefinite and nongeneric, and thus can not be a topic (Tsao 1979). Hence, the NP that occurs after the existential verb denotes a referent that is assumed to be New (unknown) to the listener (Chao 1968; Givón 1988). The construction is used to introduce a new referent which can then be picked up later as a topic. For example, in the following existential presentative construction:

(13) You have ge ren bei che zhuang le.

'There is a person who was hit by a car.'

the noun phrase *ge ren* 'a person' occurring after the existential marker *you* 'have' indicates a new referent.

Another type of marked construction relevant to topic maintenance is the passive, which is used when the patient is the topic of the conversation, and the agent is optional. Some studies have suggested that people's focus of attention affects the use of voice. When the focus is on the object, passives are likely to be used (Turner & Rommetveit 1967).

2.4.1.3 ADVERBIALS

Adverbials were found by several writers as commonly used linguistic devices to encode Given and New information in discourse. A quantified text analysis done by Abraham (1991) by analyzing English mystery fiction, biography and learned/scientific writing indicated that the use of the adverbial links *because* and *because of* is constrained by Given and New information management. It was assumed by the author that *because* and *because of* offer alternative structural options that are differentiated by how much detail and elaboration they permit. The subordinate conjunction *because* offers a structural option...
to encode some information with greater elaboration, while *because of* offers the option of compacting causality. Consider the following two examples cited by Abragam:

(14) He has spent most of his life in Egypt because he has always been obsessed with finding Nefertiti's tomb.

(15) He has spent most of his life in Egypt because of his obsession.

In sentence (14), the proposition introduced by the subordinate conjunction *because* is elaborated as detailed and expanded. In contrast, in sentence (15), the causality content is compacted within the confines of a nominalization. It was expected that in terms of Given and New information, New information, which is not already known to the hearer/reader, would require greater elaboration, while Given information, which has already been known to the hearer/reader, would not require detailed elaboration, and thus would be adequately treated in a compact way. The choice of the clausal link *because* permits the addition of more detail and elaboration, while the choice of the phrasal link *because of* allows condensation within a nominalization. The result of the analysis confirmed the prediction. It was found that *because of* tends to encode Given information, shared or inferrable, whereas *because* tends to encode New. Take Abraham's examples:

(16) I threw a tarpaulin over it because of passing motorists.

(17) It never came out because I chose to resign.

The situation in which sentence (16) occurred was like this. The speaker and the hearer were standing beside a road, where motorists were driving automobiles. The phrase occurring after *because of* was treated as inferrably Given information. In sentence (17), the verbal unit *chose to resign* was New information. Accordingly, such a *because* clause was treated as New information.

According to the study, *because* always occurred far more frequently than *because of* in the three examined genres of writing. This indicates that the speaker/writer is very cautious in assessing which information can be treated as Given, especially shared or
inferrably Given because she/he wants to be understood. In addition, it was found that there is an extreme disparity between the relatively high frequency for because and infrequency for because of, especially in spoken discourse. Abraham claimed that since there is less time available for on-line processing in spoken discourse, the speaker is cautious in assessing the information as Given and marks more information in a message as New to make himself/herself understood.

Given and New information management thus is both a pragmatic constraint based on expediency and a cognitive constraint based on processing limitations for the choice of variation of causal links by the speaker. After the relevant information is encoded as New by choosing the clausal link, it is further assessed for its topicality status; this then determines the selection of one causal alternative or the other.

Clause-initial adverbials of time and place were investigated by Virtanen (1992) in terms of the relationship between information status and textual marking strategies. Using Prince's taxonomy of Given and New information, clause-initial adverbials such as one evening, or at the south end of King Street can serve as crucial indicators of text-strategic continuities, textual shifts, and as a point of departure for the textual unit they introduce. This may be reflected in the information status of the adverbials. According to Virtanen, adverbials of time and place typically indicate information characterized as inferable, being able to be inferred from other elements in the text. Through a chain of initially placed adverbials, continuity of a text can be formed. Thus, the adverbials may function as a marker of a text-strategic continuity. Since adverbials can be characterized as assuming different degrees of familiarity, they may indicate major or minor textual shifts. When clause-initial adverbials contain more informationally New material, they indicate the starting point of a major textual shifts, while adverbials that have lesser familiarity may indicate minor or local shifts. Take two examples by Virtanen (1992), where the adverbials are italicized:

30
Then one day, winter came. **All of a sudden**, it snowed and the wind was wild. The man and woman stayed indoors, warm and snug.

The cats sat still and stared at him. **Then**, each one **WINKED** one big, round, yellow-green eye.

In (18), the adverbial in italics illustrates a marker of a major shift while in (19) the adverbial signals a minor shift. In sum, in narratives or travel-guide books, clause-initial adverbials are commonly used as markers of text strategies, working closely with the information status they convey.

### 2.4.2 THE PHONOLOGICAL DEVICE OF STRESS

A body of empirical evidence from studies on child and adult speech has shown that stress is another commonly-used linguistic device to mark New information in English (Chafe 1976; Wieman 1976; Atkinson 1979; Brown 1983; Cutler 1983, 1987; Bolinger 1989). In Mandarin Chinese, stress is an available linguistic device to denote New information as well. A stressed element has as its acoustic correlates higher pitch, wider pitch range, longer duration and greater amplitude (Fry 1955; Bolinger 1958). Acoustic studies on stress in Mandarin Chinese have confirmed that stress is determined primarily by pitch range and duration, and secondarily by loudness (Chao 1968; Howie 1976; Shen 1990; Duanmu 1990). On the stressed element, stress is achieved by a raising of pitch on the high tones and a lowering on pitch of the low tones, and/or by a lengthening of the syllable duration within the sentence, especially on a sentence-final syllable which is not an enclitic. Contrastive stress in Mandarin Chinese is signaled primarily by changes in duration, and the syllable receiving emphasis is lengthened. Firbas's (1992) theory of Functional Sentence Perspective (FSP) holds that there exists a correspondence between the gamut of communicative dynamism (CD) and the gamut of prosodic weight. An item that denotes New information is said to have higher CD. The higher the CD is, the heavier the
prosodic weight becomes. The empirical evidence of acoustic correlates of stress in Mandarin Chinese confirms its potential to signal New information.

In the area of pragmatic discourse, studies have shown that surface cues are used to identify Given and New assignments in context (Tannenbaum & Williams 1968; Bolinger 1972; Grieve & Wales 1973; Hornby 1974; Bock 1977; MacWhinney & Bates 1978; Most & Saltz 1979; Yekovich, Walker & Blackman 1979). It is the reliance on different cues that influences processing strategies and determines the interpretation of Given and New relations in pragmatic comprehension. To fully understand language users' behavior, it is felt that language user's processing strategies employed at any given time should be considered (Bever 1970; Greenfield, & Smith 1976; Bates, & MacWhinney 1982, 1987). Some psycholinguistic studies on children's processing strategies have shown that there is a developmental progression in children's ability to identify Given and New relations; this will be discussed in Chapter 4. In Chapter 3, I will briefly outline the Competition Model, a cognitively-based model of performance, on which the present study is partly based, in order to better understand the nature of processing.
NOTES TO CHAPTER 2

1. Chafe first introduced the term "package" to describe how a message is sent and secondarily to describe the message itself. Prince (1992) used the term to describe the sentence and the noun phrase levels where information packaging operates.

2. Brown & Yule (1983) pointed out that pitch prominence can also be exploited by a speaker for other discoursal functions in addition to the marking of information as Given or New, such as the marking of the beginning of a speaker's turn, the beginning of a new topic, special emphasis, and contrast.

3. Allerton's (1978) notions of "Semi-new" and "Semi-given" are equivalent to Dahl's (1976) notions of "Off-stage" and "On-stage."

4. The symbol > indicates the higher degree of representing presupposed entities in the discourse.

5. An interchange of argument was carried on between Johnson-Laird (1977) and Costermans and Hupet (1977) concerning the interpretation of the results of their experiments. They conducted similar experiments, where subjects were given pairs of sentences, and were asked to indicate which sentence of the pair was the better description of the display. The display strip was divided into two successive segments of red and blue, with the red segment larger than the blue segment. The result showed that subjects preferred the description "After the red, there is some blue." rather than "Before the blue, there is some red." In other words, the smaller portion of different types of displays tended to be mentioned in the (New) assertion of preferred sentences.

6. According to Vallduvi (1995), tail instruction is one type of information-packaging instruction. It "encodes instructions cum tail, which specify a particular record that the information of the sentence alters or completes in some way" (Vallduvi 1994:598).

7. There are many other languages which mark definiteness by exploiting devices other than articles. For example, in Turkish, a definite object is marked by accusative marker while an indefinite object is marked by the Nominative case. In Korean, definiteness is signalled by case endings. In Finnish, definiteness is associated with no stress and indefiniteness with stronger stress.

8. There is another variety of it-clefts called informative-presupposition it-clefts, in which the focus usually contains an anaphoric item, and the presupposed part of the that/wh- clause contains the fact known to the speaker, but not to the hearer. For example, in the sentence It is he who broke the window, the presupposed part (wh-clause) who broke the window represents information that is known to the speaker but not to the hearer. This type of it-cleft is typically used in historical narrative and at other times when self-effacement is sought by the speaker, e.g., for politeness.

9. Givón (1983) argues that all discourse referents possess different degrees of topicality or continuity. He proposed a scale of topicality, starting with the highest degree on the left: zero anaphora > weak pronoun > strong pronoun > right-detachment > neutral order (+definite) > left-detachment > Y-movement > cleft > indefinite NP.

10. An element which has relatively higher pitch, greater intensity, and longer duration than its adjacent element tends to be perceived as stressed (Lehiste 1970; Klatt 1976).
CHAPTER 3
THE COMPETITION MODEL

3.1 DEFINITION

The Competition Model (Bates & MacWhinney 1982, 1987, 1989; MacWhinney et al. 1984), influenced by work in linguistics, psycholinguistics, and child language, is presented as a form of functionalism at the performance, or parole level (Givón 1979; Slobin 1973; 1977; Karmiloff-Smith 1979). The term Competition is derived from the claim that functions which underlie language such as semantic relations, pragmatic intentions of speakers etc., must compete for a small number of possible surface representations. In the Competition model, language processing is characterized as a process which involves competition in terms of audition, articulation, role assignment, polysemy, and allomorphy (MacWhinney 1987). Language-learning is characterized as a process of four stages: (1) the child develops a function to express (functional acquisition); (2) the child makes a first try at a way of mapping the function onto a form (jumping in); (3) the range of available forms is narrowed or widened through an ensuing period of competition; (4) a period of learning based on conflict validity works to block residual erroneous uses of a form (MacWhinney 1987). We will first briefly introduce the main concepts recognized in the model before we look over empirical evidence for the Competition model and present a critical review.

3.2 BASIC TENETS OF THE MODEL

3.2.1 COALITIONS OF FORM-FUNCTION MAPPINGS

According to the Competition Model, two levels of processing are specified: a formal level (where all the surface forms or expressive devices available in the language are represented) and a functional level (where all the meanings and intentions to be expressed in an utterance are represented). Language is assumed to be a system of mappings between
form and function in the domain of performance or parole. The correlations can be of three types—vertical correlations between forms and functions, horizontal correlations between forms and horizontal correlations between functions.

In the vertical correlations between forms and functions, the formal linguistic cues may compete or converge with each other to convey functions (Bates & MacWhinney 1987; MacWhinney & Bates 1989). There are three configurations of cues that have been proposed in the Competition model: convergence, competition and conspiracy. By the convergence principle is meant that, in a sentence in which all surface sources of information converge (e.g., word order converges with contrasts in animacy), the most consistent encoding decisions will be produced across a group of subjects. Sentences with less information (e.g., word order operating alone with no animacy contrast) will produce less consistent decisions. The competition principle states that surface sources may also compete with each other for a particular function. A fairly consistent decision will result when a stronger cue competes with a weaker one, although reaction times may be slower than in situations of convergence. By the conspiracy principle is meant that, when more than two variables are manipulated in the same sentence, a weak source of information may conspire with the loser of a close race to produce an outcome different than when only two variables are in competition. For example, in a sentence in which word order competes with animacy, the alliance of one of the cues with contrastive stress may change interpretation decisions.

The Competition model also introduced the concept functional readiness, which means that children develop a set of functional concepts they want to express before they acquire the relevant linguistic forms. Language learning is viewed as a process of acquiring coalitions of form-function mappings. For example, expression of topic-comment relations (the point-making function) is hypothesized as one of the basic communicative functions that drives the acquisition of the linguistic forms (such as the
category of subject), and as a strong causal role in the way linguistic forms are used by adults (Bates & MacWhinney 1982). The topic-comment system is characterized as a function revolving around multiple motives, including Givenness and Newness, perspective, and perceptual and attentional salience. The motives may be applied to layers of points and to different degrees of specification. In terms of Givenness and Newness, Givenness is a central determination for topic selection while Newness is a central motive for the choice of comments. The term Perspective, which is often correlated with Point-of-view, or Ego-perspective, predicts that topic selection will tend to move along a continuum from elements of discourse closely identified with the speaker to less speaker-related elements. For example, first-person is more likely to be selected as subject than second or third person. In addition, the case role hierarchy reflects the preference for animate entities over inanimates in establishing the point-of-view for a sentence (Givón 1979). By perceptual and attentional salience, it is suggested that personal idiosyncratic salience also affects topic selection. The point-making process is believed to be applicable several times within a given utterance, and to have a wide range of variation in the amount of specification. Any language must provide a set of linguistic devices to express the communicative functions resulting from competition and convergence of all these complex dimensions.

The mapping between the surface form and the function expressed is said to be direct, and governed by a system of parallel activation with strength-based conflict resolution. According to the model, however, the mappings between form and function are not one to one. This is the concept of multiplicity of form-function mapping. Languages make extensive use of polysemy, thus producing grammatical systems in which the same form can map onto several functions, while the same function can also map onto several forms. The mapping system is a coalition of many-to-many mappings between the level of form (e.g., preverbal position, stress, articles, etc.) and the level of function (e.g., topic of
an ongoing discourse, agent, perspective of the speaker, etc.). For example, the grammatical concepts of subject and object are neither single symbols nor unitary categories, but prototypes (Bates & MacWhinney 1982). The categories of subject and object are emergent properties of a great many weightings between individual forms and functions. The concept Coalitions refers to the situation where functions may "peacefully coexist," and share the same surface manifestation. For example, the functions of agent, actor, and topic prototypically map onto the set of devices that constitute the grammatical subject. There are cases of breakdown of coalitions, where surface devices are split and assigned to separate elements. Functions divide the spoils, with each function mapping onto an appropriate surface representation. For example, topicalization in Italian is a typical divide the spoils solution for functions of agent and patient. Preverbal position is assigned to the topicalized patient but verb agreement is still assigned to the agent.

The competition process involves competition among partially as well as completely overlapping form-function connections through a system of parallel activation of nodes with strength-based conflict resolution (MacWhinney 1989). Each link between a given surface form and an underlying function is assigned a weight or strength, which is adjusted as more data input comes in. Learning takes place through a process called "back propagation" (Rumelhart et al. 1987) when there is a discrepancy between the desired output (presented by the teacher/environment) and the actual output (predicted by the system at its current level of learning, in the presence of a given input). At each output node, the degree of discrepancy is noted and propagated back through all input-output connections leading to that node. Each of the intervening weights is adjusted in strength: increased if actual output matches the desired output, or decreased if the actual output does not match desired output.
3.2.2 **CUE STRENGTH AND PROCESSING LIMITATIONS**

The concept of cue strength figures in the Competition Model (Bates & MacWhinney 1982, 1987, 1989; MacWhinney et al. 1984, 1989). Surface cues at the syntactic, morphological, semantic and phonological levels may compete with each other for indicating a certain function. The strength of a cue is primarily determined by its cue validity, i.e., its information value for the identification of linguistic functions and the weight that speakers or listeners assign to it. The cue validity is defined as the product of availability times reliability. The term availability means how often the cue is present when a given interpretation has to be made. The term reliability means how often a cue leads to the right answer when the cue is available. Cue availability is high if a cue is there whenever you need it. Cue reliability is high if a cue always leads you to the correct conclusion when you rely on it. When cues are in conflict, which cue will win out to indicate a given certain function depends on the structure of the specific language. In sentence interpretation, speakers of different languages rely on different cues. For example, in a sentence such as *the cats saw he*, case-marking conflicts with word order. English-speaking people resolve the conflict by relying on word order to give the sentence an SVO interpretation, while Dutch-speaking people rely more on case-marking, and interpret the sentence as OVS (because in Dutch there are rare cases where word order conflicts with case marking) (McDonald 1986). In language learning, during the initial stage of cue learning, cue validity is a reliable predictor of cue strength. The strengthening of individual forms simply results from positive learning (MacWhinney 1987). The cue that leads to the appropriate interpretation of an input sentence will receive positive reinforcement through back-propagation in the connectionist network. However, as learning proceeds, the best predictor of learning becomes what has been called conflict validity (McDonald 1986). In some sentences, it is possible that a cue conflicts with another to determine the final interpretation. The conflict validity estimate is "the number of
competition situations in which that cue wins (i.e., leads to a correct interpretation), divided by the number of competition situations in which that cue participates" (Bates & MacWhinney 1989:41-42). In other words, represented by a ratio, conflict validity measures the number of times a cue is used in the correct interpretation divided by the number of times in which that cue occurs in conflict situations. When children encounter cases where cues conflict, the conflict will be resolved in favor of one cue. Any cue that is not correlated with the appropriate interpretation of an input sentence will be negatively activated. In addition, the child creates a specific inhibitory link between the correct form and any incorrect forms. When correct forms are activated during learning, the use of incorrect forms is specifically blocked. The connection between the two forms "siphons" activation off from incorrect forms, and serves as one way to prevent usage of incorrect forms (MacWhinney 1987).

The Competition Model assumes that acquisition of cue strength can be modulated by two kinds of processing limitations: perceivability and assignability, the two influences introduced by Carroll (1978). The term perceivability refers to the extent of difficulty with which a cue can be detected for use in sentence processing. If the processing cost is too high, the learner may use even a very informative cue less than we would otherwise expect. In other words, cue validity is not of much use if the cue is difficult to detect. Such a cue may take longer to have an effect on learning. Thus, the perceivability of a cue may interact with cue validity in determining the strength of the cue. For example, in Hungarian, although case marking has high cue validity, some case suffixes are harder to hear. The nominative/accusative case contrast can involve a vowel length contrast with the suffixed case marker 't, such as kutya/kutyat', or only the suffix /t/ when the word has a dental or alveolar consonant such as mokus/mokust. In the first case, listeners rely on case marking in sentence interpretation. However, since the suffix /t/ in the second case is more difficult to identify, listeners often use word order and semantics in interpretation. Experiments
done by MacWhinney et al. (1985) confirmed that the difference in the perceivability of cues interacted with cue validity in determining the probability that a Hungarian listener will rely on case information.

The term assignability is used to refer to a situation in which a given cue can be assigned a role. A cue which can be easily perceived requires less memory in processing, can be utilized faster, and has high assignability. The concept of assignability is related to the memory cost associated with the calculation of the existence of that cue. Cues which are hard to detect, or which span two or more disparate discontinuous elements may retard children's acquisition even though they are informative. For example, the case suffix in Turkish is completely unambiguous. As soon as the suffix on the noun, which is called a local cue by Ammon & Slobin (1979), can be classified, its semantic role can be assigned. However, if the cue spans discontinuous elements, i.e., is a global cue, or if more words need to be considered for a cue (such as verb-agreement), assignability is relatively lower. Experiments done by Devescovi & Caselli (1985) on Italian children between three and nine years of age on the use of word order, animacy, and number agreement between the verb and one of two nouns showed that a global agreement cue did not become dominant until the age of seven, while the other two cues become dominant very early. This is because a global agreement cue places too much load on the young child's limited memory, and young children did not utilize it due to high cue cost.

In the following, we will briefly present empirical evidence from crosslinguistic studies of adult sentence interpretation and child language acquisition as supporting evidence for the Competition Model.

### 3.3 Empirical Evidence from Crosslinguistic Studies

In recent crosslinguistic studies of English, Italian, German, Turkish, etc., subjects were presented with sequences of words consisting of NNV, NVN, or VNN, where cues of word order, animacy, inflection, and stress were manipulated. Adult and child speakers
of different languages were asked either to say which of the two nouns was the actor/subject or to act out their interpretations of the stimuli by using toys. The reliance on different cues by adult speakers of different languages and different orders of acquisition of subsystems such as case marking or word order by children indicate that the strength of a particular cue varies across languages.

3.3.1 Sentence Interpretation by Adults of Grammatical Subject and Object

Crosslinguistic studies of interpretation of the grammatical relations subject and object by adults provide evidence that a strong cue in one language can be relatively weak in another (Miao 1981; MacWhinney, Bates & Kliegl 1984; Bates, MacWhinney, Caselli, Devescovi, Natale & Venza 1984; Li, Bates & MacWhinney 1992).

English is a language which predominantly uses word order for distinguishing the subject from the object of a verb (MacWhinney et al. 1984). In a sentence with an intransitive verb, the SV ordering is preserved. English makes extensive use of dummy subjects to avoid subject deletion. The rules of do-insertion and subject-auxiliary inversion in interrogatives keep the subject in front of the lexical verb and object. There are only a few OSV and VOS patterns; the former are produced in left dislocations and questions, e.g., My cat, Mary likes her, and What do you see, while the latter occur in right topicalizations and right dislocations, e.g., Makes a cake, my old lady, and She makes a cake, my old lady. English avoids the OVS, VSO, and SOV options. English can also use case marking to distinguish subject from object, but overt case marking only exists in the pronominal system (e.g., we versus us), but not in nominals. Subject-verb agreement is used in English as well, but the verb morphology system is not rich because only third-person singular present or singular/plural for copula are marked distinctively. Thus, bound morphology is an unreliable source of information about sentence relations in English. In a word, in English, word order is a more reliable cue than agreement or case marking for the subject (actor) and object (patient) distinction.
Hungarian and Turkish use the morphological cue of case inflection to mark the grammatical relations of subject and object. Hungarian is a language which has variable word order constrained by the properties of stress and definiteness. However, its inflectional case marking system is so uniform that direct objects of the verb are always marked by the accusative suffix on nouns and pronouns (MacWhinney, Pléh & Bates 1985). The suffix consists of the phoneme /t/, which is sometimes preceded by a linking vowel. For example, the word for house is ház and the accusative is házat. Since there is no passive construction in Hungarian, in a sentence with a transitive verb, the noun with no accusative marking is the subject/agent. Like Hungarian, Turkish is another language where all six possible orders of subject, verb, and object are grammatical. It primarily uses case suffixes to indicate subject and object relations (Slobin 1982; Slobin & Bever 1982). For example, the word for ball is top, and the attached case suffix -u (top-u) indicates that it is definite and the direct object.

Italian is a language which permits a wide array of word order variations for pragmatic reasons. So, word order is not a reliable cue to yield a single consistent interpretation of who was the actor and who was acted upon (Bates et al. 1983). As a pro-drop language, i.e., a language in which subject omission is very common, flexibility of word order is compounded. The identity of subject and object is not at all predictable in Italian from word order alone. Italian does however make better use of verb agreement to mark subject and object distinctions than English. In Italian, the subject must agree with the verb in person and number. The pronominal system is much richer and more informative than in English. The ending on the verb in all instances helps to identify the subject, except when subject and object are both nouns that are both singular or both plural, and between third person singular and formal singular you. Since the subject is inferrable from the form of the verb, subject noun phrases and pronouns are frequently omitted. The presence of a clitic object pronoun also is used to mark object roles. Contrastive stress is
used to suspend "default" interpretation. Thus, in Italian, assignment of semantic-syntactic roles is based on a combination of cues other than word order.

German permits a variety of word orders: SVO (active declarative main clauses), VOS & VO (imperatives), OVS (object contrast), SOV & VOS (only in yes-no questions with auxiliary), OSV (rare), VS(O) (yes-no questions). SVO is the canonical order. The use of dummy subjects and avoidance of subject omission leads to a high frequency of SVO and SV. The semantic notion "agent" and the related subject role are often associated with the first noun before the verb (MacWhinney et al. 1984). But, although the word order cue in German is more important than in Turkish and Italian, it is less important than in English. German also uses both case marking and subject-verb agreement to distinguish subject and object. German has a full system of morphology on both nouns and pronouns for case marking. Nominative marking of nouns marks subject while accusative marking of nouns marks object. Although the distinction between the nominative and accusative for the feminine and neuter is neutralized and the contrast between the nominative and accusative is leveled in all three genders in the plural, German uses case marking on nouns to distinguish subjects from objects. As cited by MacWhinney et al. (1984), an analysis of German written text by David Zubin (1979) showed that in transitive clauses about 70% had masculine singular nouns, and therefore provided case markers to identify subjects. German is also a language which makes use of subject-verb agreement to mark subject and object, although not as much as in Italian. German has an unambiguous present tense verb paradigm as does Italian; however, there are some problems that are not present in Italian: the contrast between the third person singular and the second person plural often disappears; the singular formal is identical to the plural formal; the first person plural is the same as the third person plural; in the past tense, the first person singular is the same as the third person singular. In addition, the agreement on the verb must be coordinated with a variety of markers on the noun due to the complex system of plural marking for German
nouns. The cue of subject-verb agreement to identify subject in German is thus not as reliable as in Italian.

Japanese is a language which represents a middle ground, using both word order and inflections to indicate grammatical relations, but neither one entirely consistently (Clancy 1985). In Japanese, the dominant word order is SOV. But in ordinary Japanese conversation, word order is quite flexible preceding the verb. OSV is a possible order, and either subject or object may optionally be placed after the verb, which is not inflected for person or number. In a sentence, -ga is used to indicate the subject while -o is used to indicate the direct object. However, -ga can also be used to indicate the object of a stative predicate and the object of the verb in the potential and desiderative. Since case particles in casual speech are often ellipted, especially in baby talk, the acquisition of these particles often causes problems for children. In comparison with Turkish, functors are less reliable cues in Japanese.

In Chinese, unlike English, being in preverbal position is not a reliable cue and is not associated with a fixed function in interpretation of subject or object for the following reasons: (1) Chinese is a pro-drop (topic-prominent) language, in which subject is frequently omitted. A Chinese sentence in informal speech often consists of a single noun or a single verb. Hence, subject omission greatly reduces the utility of preverbal position as a cue to identify subject; (2) although SVO is the basic word order in Chinese, three other word orders, OSV (object topicalization), SOV (ba construction), and VOS are also found in the spoken language (Li & Thompson 1981; Sun & Givón 1985; Li et al. 1992). In other words, there is high availability of certain marked and noncanonical word orders in both formal and informal speech, in which both subject and object can occur preverbally. However, since OVS and VSO orders do not exist in Chinese, postverbal position seems to be a reliable cue to identify the object role, although the object does not have to follow the verb immediately. Since word order in Chinese is not so reliable a cue as in English, it is
predicted that Chinese speakers would make more use of other cues such as animacy than English speakers. Studies of sentence interpretation by Chinese speakers (Miao 1981; Li et al. 1992) did demonstrate that animacy is a stronger cue than word order in Chinese but a weaker cue in English. As reported in the psycholinguistic literature, the cue of animacy has a tendency to be associated with agency in natural languages (MacWhinney 1982). People tend to perceive the more animate of two nouns as the agent of an action; they also tend to prefer animate agents as subjects. In addition, although Mandarin Chinese does not have morphological inflection, the passive marker *bei* functions like the passive morpheme *by* in English and is a strong cue in sentence interpretation in Chinese as well. Moreover, in Mandarin Chinese, preverbal position usually indicates information denoting the pragmatic function of Old information, which is often encoded by definiteness, while in English preverbal position can indicate either Given or New information. Moreover, Chinese is a topic-prominent language, where the subject is strongly associated with the functional notion of discourse topic, which must be Given information (Tsao 1979). Since definite NPs are used to mark Given information while indefinite NPs are used to mark New information, the subject in Mandarin is strongly associated with definiteness. Chinese does not have definite or indefinite articles. The definiteness of a noun phrase is indicated by using demonstrative determiners, possessives or pronominals, while indefiniteness of a NP is indicated by using a numeral with a classifier such as *yi-ge* 'one-classifier.' English is a subject-prominent language where the association between subject and topic is not so strong and indefinite NPs can occur both in preverbal and postverbal position. In other words, the association between subject and definiteness in English is not so strong as that in Chinese.

Stress is a linguistic device that is often used to mark Newness and/or contrast, especially in the case of referential shifting in English (Halliday 1967a). However, in
many languages stress is seldom a major cue, and is often used in combination with specific word orders to signal grammatical relations (MacWhinney et al. 1984).

In sum, it is proposed that the validity of different cues differs across languages, and the Competition Model correctly models how these differences are reflected in the different ways cues are used in adult sentence processing. As demonstrated by crosslinguistic studies, speakers of different languages rely on different cues in the interpretation of the grammatical relations agent (subject) and patient (object). English speakers rely more on word order because word order is more available and reliable than other cues. In Turkish, Hungarian, German and Japanese (Slobin & Bever 1982; MacWhinney, Pléh & Bates 1985), adults trust case (inflectional) marking most in interpreting subject and object. Italians (MacWhinney et al. 1984) rely on grammatical morphology more than on other cues. When the lexical semantics of animacy is placed in competition with word order, Chinese base their interpretations on lexical cues (Miao 1981; Li et al. 1992). Table 3.1, partly adapted from Bates & MacWhinney (1989), summarizes these findings. The symbol > represents greater reliance on the cue on the left than on the right. The degree of reliance of a particular cue in a particular language decreases from left to right:

Table 3.1

Crosslinguistic variations of cue strength

<table>
<thead>
<tr>
<th>Language</th>
<th>Cues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese</td>
<td>Animacy &gt; SVO</td>
</tr>
<tr>
<td>English</td>
<td>SVO &gt; VOS, OSV &gt; Animacy, Agreement &gt; Stress</td>
</tr>
<tr>
<td>Hungarian</td>
<td>Case &gt; SV &gt; Agreement &gt; SVO, SOV &gt; Animacy &gt; V-O Agreement</td>
</tr>
<tr>
<td>Italian</td>
<td>SV Agreement &gt; Clitic Agreement &gt; Animacy &gt; SVO &gt; Stress</td>
</tr>
<tr>
<td>Japanese</td>
<td>Case &gt; Animacy &gt; SOV</td>
</tr>
<tr>
<td>German</td>
<td>Case &gt; Agreement &gt; Animacy &gt; SOV, VSO, SVO</td>
</tr>
</tbody>
</table>
3.3.2 Sentence Interpretation by Children of Grammatical Subject and Object

Crosslinguistic studies of child language acquisition provide a new database on which proposals of hypothesized universals and predictions of the Competition model in language acquisition can be reevaluated. The first language universal is that children will acquire word order cues before they master grammatical morphology (Pinker 1982). The second proposed universal in language acquisition states that a developmental primacy will rank semantic strategies over word order strategies. These two language universal proposals are challenged by the Competition model, whose predictions can be epitomized in the following two concepts: (1) The model predicts an order and age difference in the acquisition of grammatical devices: relatively more consistent and more reliable cues will be acquired earlier and predominantly used; (2) different cues compete with each other at different points in time for different children as they acquire grammar. The predictions of the Competition model which challenge the two universal proposals are confirmed from crosslinguistic differences in language acquisition. The findings show that different information value of cues in different languages affects their acquisition by children (Slobin & Bever 1982; Bates et al. 1984). We will briefly provide some empirical evidence in the following discussion.

The first hypothesis challenged by the model is that children will acquire word order before they master grammatical morphology (Pinker 1982). Although the hypothesis is supported by studies of production data for both English (Brown 1973) and German (Mills 1985), data from other languages show that the developmental priority of word order over morphology cannot be universal. Slobin & Bever (1982), studying sentence interpretation by Turkish children, offered a clear counter-example to Pinker's claim. It was found that Turkish children have completely mastered the use of case inflections to identify subject (actor) and object (patient) by the age of two. They showed little or no sensitivity to word order until around the age of four, and even then the effect remained...
extremely small. Since in Turkish, the cue validity of nominative-accusative case marking as a guide to subject (agent) and object (patient) approaches 100%, children use those cues that are most regular and consistent. This is correctly predicted by the Competition Model. Recent studies on the acquisition of Serbo-Croatian (Slobin & Bever 1982), and Hungarian (MacWhinney et al. 1985) also showed children acquiring unstressed case inflections before demonstrating systematic use of word order patterns. In Serbo-Croatian (Slobin & Bever 1982), although the acquisition of case suffixes is somewhat later than in Turkish children, there is no point in development at which canonical word order is more important than case. Since case contrasts are frequently ambiguous in Serbo-Croatian, children begin with a bias toward semantic information (animacy). But semantically based interpretations drop off and case becomes dominant by age 5. In Hungarian, where case contrasts are very rarely ambiguous, semantic and morphological cues are roughly equivalent in strength at age 3, and case is firmly established as the dominant source of information by age 4. There is a one-year difference between Serbo-Croatian and Hungarian children in the relative strength of case cues. The difference is quite compatible with the differential validity of case in the two languages. In studies comparing sentence comprehension strategies of children acquiring English and Italian, Bates et al. (1984) also reported that word order is not the cue which shows the largest effect in Italian children at every age from 2 to 5. In Japanese, children acquire case marking earlier than word order (Clancy 1985). Thus, the results of crosslinguistic studies of children acquiring different languages disconfirm the hypothesis that word order is universally acquired earlier than grammatical morphology. Crosslinguistic differences in the order and age of acquisition of grammatical devices are correctly predicted by The Competition Model.

The second proposed universal of language acquisition states that semantic strategies win over word order strategies during acquisition. The indirect and direct evidence that reliance on strategies based on lexical semantics does not always precede
word order comes from the following studies. Chapman and Kohn (1978), by controlling the degree of event probability in the stimuli, found that English-speaking preschoolers relied more on semantic strategies based on event probabilities than on word order up to the age of 4, and after that SVO word order was more important than semantics. But, they did not find evidence for a general semantic strategy like "agent-action" at any age level in American children. Remember that in English word order is a more reliable cue than any other. Bates et al. (1984) found that American 2-year-olds use simple positional relations in processing NNV to identify actor and patient. SVO word order is the first cue to have a significant effect on sentence interpretation in children as young as 28 months, and canonical order remains the strongest cue to meaning from 2 through 82 months of age. In English, SVO word order completely dominates over semantic and other strategies.

Sinclair and Bronckart (1972) showed that French-speaking children increasingly rely on SVO order from 2 to 7 years of age, although the strategies based on semantic event probabilities were also strong at all ages. The claim that semantic strategies win over word order strategies is counterevidenced by the above crosslinguistic acquisition differences.

Just as Slobin (1982, 1985) put it, different types of languages call distinctly different processes into play, and there appears to be no single universal schedule of development. Children may begin by attending to word order, semantics, or morphology, depending on the relative validity of those cues in their native language (Bates & MacWhinney 1989). The above crosslinguistic studies of children's acquisition of subsystems of grammar provide supporting evidence for the Competition model.

In addition to crosslinguistic empirical evidence, the Competition model offers an ingenious model of learning mechanisms to account for developmental phenomena within a single language system.
3.4 COMPETITION, OVERGENERALIZATION, INDIVIDUAL DIFFERENCES IN LEARNING PROCESS

In studies of morphological acquisition, some interesting developmental phenomena such as overgeneralization and U-shaped patterns of learning have been observed by a number of researchers. Writers from different camps offer different learning models to account for the developmental phenomena. The key issue that has triggered extensive debate among researchers from different camps concerns the formulation and application of rules by children in morphological processing. For those researchers who adopt a generative approach, a learning account is described in terms of abstract innately guided rule formulation. For example, during a stage when children mistakenly produce the past tense form of draw as drawed, generative researchers would say that the children must have formulated a past tense rule, which adds -ed to the present tense, and applied the rule to all present tense forms. However, the status of rules in descriptions of children's language behavior has been called into question by several writers (Slobin 1982; MacWhinney et al. 1989). It has been pointed out that there has been no direct evidence that language users actually manipulate rules and rule symbols in their heads as linguists describe. The major difference between the generative approach and the Competition model in this regard is that the former attributes an amount of abstract innate knowledge (rules) to the learner, while the latter minimizes the recourse to innate knowledge of rules, and maximizes the contribution of the learning process. Instead of postulating innate structural rules in the learner, learning and processing are treated directly in the same architecture in the network of the Competition model. As the network learns, its processing abilities develop. During children's learning process, two forces, episodic memory and analogic pressure, are in competition. To illustrate this interaction, MacWhinney presents the following diagram as postulated by the Competition model (MacWhinney 1994):
Drawing on the concept of analogic processes characterized in Rumelhart and McClelland (1987), the Competition model recognizes the importance of rote lexical access. Analogic processes involve the extraction of patterns, while rote lexical access is related to actual frequency, recency and memory of incidence. When rote access fails, the analogic cue-based process wins out. In learning past tense, children may produce both the regular and irregular forms correctly by rote learning (episodic memory). Later on, the past tense morpheme -ed will be chosen as a reliable cue for past tense from those regular forms that are most frequently addressed to children. This is what is called "analogic pressure," which imposes a constraint on the acquisition of the system as a result of cue availability. The past tense morpheme -ed of the regular forms will be generalized to the irregular forms which have not been fully analyzed yet. As learning proceeds, children encounter a residual set of forms where cues conflict or canonical form is violated. They need to learn to readjust the activation strengths between the connections of the stem and past tense morphemes for these forms. For example, in English, the past tense morpheme can be realized in different forms (allomorphs), and verbs can be inflected for past tense in different ways, such as regular verbs want/wanted and irregular verbs sing/sang, cut/cut, etc. Children use sequences of phonemes from the stem of the present to cue the activation of phonological markings for the past tense. For example, the final velar nasal in the verbs sing or ring may be used as a cue to activate the central vowel a in the past tense verb sang and rang. However, if these cues are not strong enough at that point of learning, the
analogic general form of the past tense morpheme -ed will win out. A child may first produce *singed by using the analogic process. Whenever the correct form sang is heard, the representation of the rote form sang will be strengthened, and will be easier to retrieve. As MacWhinney points out, however, analogic pressure does not disappear immediately and may continue to influence the system; this explains the coexistence of the both correct and incorrect forms during certain developmental periods. As long as the retrieval of the correct form is solidified, the child can successfully inhibit the incorrect form. Similar allomorph competition has been reported in the acquisition of German articles der, die, and das, which mark gender and case (MacWhinney 1987). Children use positional terminations or semantic cues to activate correct forms. One interesting finding is that, just as the English high frequency irregular verbs (such as went), resist the regular pattern, German nouns such as Knie are exceptional to the cue patterns and have direct connections to the correct articles das. The finding implies that rote retrieval is facilitated through high frequency, and becomes strong enough to override a regular cue pattern.

As we have seen, overgeneralization is viewed as arising from readjustment of the connection strength between past tense morpheme and the verb stem during learning process. Acquisition of morphology is viewed as a process of competition between linguistic cues and episodic & analogic forces. At the initial stage, both the regular and irregular forms may be produced correctly by rote learning. As learning proceeds, there may be a period when both the correct and incorrect forms are used. Compared with children's previous performance, there seems to be a backward progression in later stages, which may result in U-shaped learning patterns (Bowerman 1987). The Competition model better captures overgeneralization phenomena in language learning than a series of all-or-none decisions postulated on parameter setting.

Recently, individual styles of language acquisition have received attention from researchers (Klein 1978; Peters 1983, 1994; Echols 1993; Bates, Dale & Thal 1994).
Individual differences have been noted as one of the factors that affect acquisition, which can not be fully explained by a nativist modular theory of acquisition. Children learning language with different cognitive styles will attend to different part of the input, which will result in different developmental routes across children in extraction size for segmentation, and within the domain of linguistic content area. For example, as Peters (1977, 1983) has pointed out, expressive (pragmatic) children, unlike analytic children, may not attend to local cues of morphological marking, but focus more on canonical structures, and extract language consisting of long, gestalt utterances that are useful for pragmatic purposes. Children with different orientations differ in the size of unit they are able or prefer to manage. Within semantics, children who have a predisposition to talk about objects demonstrate higher a proportion of nouns (referential vocabularies), while children who are socially-oriented tend to talk about themselves and others, and acquire more expressive vocabularies. In early word combination, nominal and pronominal children are distinguished by a concentration on the word-order properties of language or on closed-class items respectively (Nelson 1973; Bloom et al. 1975). Within phonology, as is evidenced in children's early productions, some studies have revealed that certain children seem to be more attuned to segmental details within single syllables, while others focus on prosodic information such as number of syllables, stress pattern and pitch variation (Peters 1977, 1983; Klein 1978; Peters & Menn 1993). For example, some children such as Menn's Daniel (1973) focus more on reproducing single stressed syllables and the segments within them while other more prosodically tuned children, such as Peters' Minh and Seth (1977, 1993) orient to the number of syllables and the overall stress or rhythmic pattern. Even among prosodically-tuned children, different children seem to be biased to attend to different prosodic aspects, such as stress or overall intonation or rhythmic structure. For example, Echols (1993) analyzed a corpus of early productions by three children in the one-word speech period, and suggested that some children must attend to
the salience of stressed syllables so that utterances containing filler syllables and full or partial reduplications are produced. Gerken (1990), adopting a metrically based model, suggested that her English learning children, aged from 23 to 30 months, parsed phrases into a strong-weak (trochaic) pattern. Phrase-initial weakly-stressed syllables such as pronouns and other function morphemes, which are difficult to perceive and which cannot be assigned to one of these binary feet, tend to be omitted. The consistency with which these extrametric weakly stressed syllables are omitted can be explained on the hypothesis that English-speaking children come to use strong-weak (trochaic) feet as a rhythmic parsing template. In terms of the Competition level, it can be said that the content of the "competition pool" that different children use for evaluation differs as a result of individual differences.

In general, crosslinguistic divergences between adult's sentence interpretation and children's acquisition of grammatical relations bear out what is predicted by the Competition Model. However, there are some findings that cannot be accounted for by the model. Moreover, many concepts which are utilized in accounting for child language acquisition, are not clearly defined in or explicated by the model. In the following, a critical review of the model is presented.

3.5 INADEQUACY OF THE MODEL

Despite its strength in predicting divergent phenomena in crosslinguistic processing, and its power to account for certain language acquisition phenomena, the Competition model has its weaknesses.

First, the model can not account for how children abandon overgeneralized forms in cases where preemption of the existing forms expressing the same meaning does not work. The term Preemption is used to mean that when children formulate overly general rules, they eventually give up overgeneralized forms if they consistently hear other forms expressing the same meanings (Bowerman 1987). For example, at a certain stage,
children may use *goed* as the past tense form for *go*. However, since they only hear *went* from other people, they might abandon the form *goed* in favor of the correct form *went*. The preemption can be accounted for by the Competition model as the outcome of competition between the regular pattern of past tense morpheme *-ed* and the episodic memory of the correct form *went*, which will eventually win out through increased activation strength as it is consistently heard. However, some studies have reported that there may not be a consistent relationship between a child's overgeneralized form and an adult counterpart. In such cases, a child's utterance is usually a "one time only" construction. Children have no way to know that there is another way to express the same meaning (Bowerman 1982). To take an example from Bowerman (1987), children overgeneralize an effect-complement sentence pattern to describe a certain passing configuration of cause and effect such as *I'm patting her wet* when patting sister's arm after dipping her own hand into a glass of water. As a description of a passing configuration, no alternative ways to express the same meaning are likely to be heard. When there is no conventional adult counterpart for a child's overgeneralized forms, no mismatch can be detected by the learning system. Then, how can learners use alternative cues as potential competitors to override the incorrect forms?

Secondly, the model claims that during the initial stage of cue learning, cue validity is a reliable predictor of cue strength, while in later stages, the best predictor of learning becomes what is called conflict validity. However, it is not clear how and why less reliable cues come to be more highly valued than more reliable cues at later stage of acquisition. For example, French has standard SVO order, which is a reliable cue for grammatical relations, but in later stage of acquisition or in adult processing, less reliable cues such as morphology and semantics are used. As Kail (1989) reported, his French children paid attention to word-order cues up to the age of six, while adults concentrated on less reliable morphological and semantic (animacy) cues, ignoring word-order. The concepts of cue
availability and cue validity cannot explain the shift. Kail provided an alternative explanation by proposing that learning is initially based on cue availability and reliability but shifts to a basis on conflict validity for French-learning children at around age six. After the initial phase, French-learning children's development appears to be controlled primarily by conflict validity even though French has a standard SVO word order. Since children regularly encounter patterns of nonstandard word order imposed by syntactic, pragmatic and contextual constraints which they cannot understand, they shift to morphological and semantic cues because, although these conflict with word-order cues, they give correct results (Kail 1989). However, it is not clear how a connectionist implementation with back-propagation gets less reliable cues to be more highly valued than more reliable cues of word order in French (Gibson 1992).

Thirdly, the model ignores the importance of social factors, which play an important role in shaping children's developmental routes into language acquisition (Peters 1986). According to the model, cue validity can be obtained by analyzing corpora of spoken and written speech. However, considering corpora of spoken data, it has been noted that in different cultures even within the same language community mothers may address children in different ways. In addition, mothers address their children in a different way from the way they talk to adults (Newport et al. 1977). If cue validity is a major determinant of children's strategies, the use of different text counts will definitely influence the calculation of cue validity. For example, in English, some researchers found that imperative sentences constitute a large proportion of the input to English-learning children (Newport et al. 1977), which brings up the question whether preverbal position is really indeed a highly available cue for subject (actor) for children, as claimed by the Model. Motherese input to children needs to be examined more closely before any claim concerning cue validity can be made. Besides, cue validity may vary between spoken and written forms.
Fourthly, cue is a very important unit upon which the framework of the Competition Model is built, but its definition is not explicitly given within the framework (Gibson 1992). Gibson has pointed out that the number of cues which a learner might consider is not constrained in a principled way in the framework. In the input stream, there is an unlimited number of possible properties that can be associated, such as phonetic components of a word, semantic properties of several kinds, relative position of a word to other words, etc. In addition, to use a positional cue, children must first identify the verb. However, the model does not explain how the learner has access to the cue of preverbal or postverbal position, for example, which is assumed to be highly correlated with the actor thematic role in English.
The Swiss linguist Ferdinand de Saussure introduced the terms *langue* and *parole* to distinguish two senses of the word LANGUAGE. The term *langue* refers to the collective language system of a speech community, while the term *parole* refers to the concrete utterances produced by individual speakers in actual situations. The term *parole* is analogous to the term *performance* (Crystal 1985).

In some natural languages, animacy is an indispensable concept in the formulation of descriptively-adequate grammar. For example, in Navajo, nouns are ordered before the verb in terms of a strict hierarchy of animacy levels (Perkins 1978). Marking of ergativity in some languages falls on inanimate objects and animate subjects (DeLancy 1981).

There are, however, some morphemes, which are treated as suffixes, such as *zi* 'son (literal meaning),' in linguistic analysis of Chinese, and some words such as *bei* 'passive marker' which function like the passive morpheme 'by' in English.

In the Philippine languages, indefinite subjects are entirely ungrammatical. To introduce a referent, Philippine speakers would use some kind of existential clause, and add a verb comment after the subject has been established in the discourse (Schachter & Otanes 1972).

Some researchers claim that children do not get negative evidence to test their hypotheses about possible grammatical rules hypothesized at a certain point. Despite this, children are still able to learn language from impoverished input, which supports that they must be endowed with innate linguistic knowledge (Pinker 1984). The concept of "preemption" may provide one possible solution to the "no negative evidence" problem. However, there have been some studies which reported that children did receive indirect feedback such as clarifications, repetitions, and recastings from parents or might note that some ungrammatical forms were never used by other people (Hirsh-Pasek, Treiman & Schneiderman 1984). However, other researchers have claimed that the feedback given from parents is too weak. A child would have to repeat a given sentence verbatim many times to decide with reasonable certainty that it is ungrammatical. In addition, feedback may not apply to all children at all ages for all types of errors (Marcus 1993).
CHAPTER 4
LITERATURE REVIEW OF PRAGMATIC USES OF GIVEN AND NEW

4.1 GIVEN AND NEW EFFECT ON ADULTS' PROCESSING

Psycholinguistic researchers on pragmatic discourse have been interested in investigating how surface linguistic devices for indicating Given and New information might affect sentence processing by adults in comprehension, perception, verification, memory, and production (Tannenbaum & Williams 1968; Grieve & Wales 1973; Hornby 1974; Haviland & Clark 1974; Bock 1977; Carpenter & Just 1977; MacWhinney & Bates 1978; Most & Saltz 1979; Yekovich, Walker & Blackman 1979; Bock and Mazzella 1983; Conrad & Rips 1986; Fowler & Housum 1987; Abraham 1991; Holmes 1995). In the following, we will review some literature to show how surface marking of Given and New affects sentence processing, proceeding from comprehension to production. Our review will be limited to those devices that are relevant to our present study, including stress, word order and marked syntactic structures.

4.1.1 SENTENCE COMPREHENSION

Understanding spoken or written discourse involves not only decoding an abstract semantic representation of individual word and sentence but also relating the words in the sentence to the previous part of the discourse (Haviland & Clark 1974; Hornby 1974; Carpenter & Just 1977). In view of limited working memory and processing capacity, we might ask how listeners can rapidly establish the connections among propositions (idea units), and gain access to the meaning of connected speech as a whole under processing constraints. Are there any linguistic devices that listeners can utilize to accomplish such a task? Can the denotation of Given and New information through the appropriate use of linguistic devices facilitate comprehension? To answer these questions, before we provide
some empirical evidence, illustration of the steps of comprehension process might be helpful.

Clark & Clark (1977) categorized comprehension into two processes: the construction process and the utilization process. The former is concerned with the way listeners construct an interpretation of a sentence from the speakers' words, starting by identifying the surface structure of a sentence, including its words, their temporal order, and grouping, and ending up with an interpretation that resembles an underlying representation, including a set of propositions plus their interrelations. The utilization process is concerned with how listeners utilize this interpretation for further purposes, such as registering New information, answering questions etc.

MacWhinney (1980) introduced a concept called point-sharing to capture the comprehension steps accomplished in conversation. According to him, communication involves a speaker's point-making and a listener's point-using. Point-making refers to the speaker's formation of an intention by deciding what to talk about and what to comment about it, together with the formation of an expression by utilizing the most appropriate surface structure to convey this intention. Point-using on the part of the listener involves extraction and utilization. The listener makes use of the surface properties of the utterance to extract the speaker's topic, either choosing from possible frames present in the discourse or retrieving them from the general shared knowledge store. Next, the listener needs to recover the speaker's intention in elaborating on this topic, and integrate this new knowledge into the shared knowledge base. This is the process called utilization. It can been seen that during the utilization process the registration and identification of the Given and New information helps listeners to integrate information as a whole. This integration of information is accomplished through a processor called a short-term buffer or working memory, where necessary memory structure is activated to search memory for a direct
antecedent that matches the Given information precisely and to link the New information to the memory structure (Haviland & Clark 1974; Barsalou 1992).

The search process is directed partly by various linguistic devices for Given and New that can be used as an index. Psycholinguists studying discourse comprehension have shown that linguistic devices for Given and New can affect people's comprehension. These devices include definite and indefinite articles, pronominal references, word order, marked grammatical structures, and intonational patterns. For example, the use of a definite expression, such as definite articles and pronouns, has been shown to serve the function of telling the listener that its referent has been mentioned before. People utilize these devices to establish relationships with previously-mentioned antecedents, to retrieve previous relevant information, and to facilitate integration of information in comprehension or recall (Lesgold 1972; Devilliers 1974; Singer 1976; McKoon & Ratcliff 1980). In the following, we will briefly review some psycholinguistic studies to show how stress, word order and marked syntactic structures for Given and New relations may affect comprehension, perception, verification and recall.

4.1.1.1 STRESS

The relationship of a sentence to its context is often indicated by the focus structure of the sentence, in which the focus is usually New information. The phonological device of stress is one of the commonly used means to signal New information, while Given information is systematically destressed. Psycholinguistic studies have shown that people utilize stress to anticipate semantic focus and use destressing to identify Given information and retrieve information relevant to the Given information. Comprehension is facilitated because integration of related materials in discourse is sped up.

Cutler & Fodor (1979) did a study to investigate how semantic focus, which often carries stress, influences comprehension. In their experiment, focus was manipulated by asking a question before presenting a target sentence. The experimenters assumed subjects
would focus on that part of the sentence which contained the answer to the question. In a phoneme-monitoring task, subjects were asked to comprehend sentences and at the same time to listen for the occurrence within them of a word beginning with a specified target sound. It was found that reaction time to detect a phoneme target in a sentence was to be faster when the word in which the target occurred formed part of the semantic focus of the sentence. In other words, sentence accent, which is used to indicate New information, is anticipated and identified by the listeners, and used to facilitate sentence comprehension.

Bock & Mazzella (1983) also conducted two experiments to investigate how stress influences comprehension of subsequent targets. Each time, subjects were presented a context sentence and a target sentence (NVN). In each set, there were four sentence pairs with four types of accent relations manipulated between each pair. In one sentence pair, the accented New information in the target sentence had its counterpart in the same position in the context sentence. In the second sentence pair, the accented element in the target sentence did not have its counterpart in the same position in the context sentence. In the other two sentence pairs, no context accent was provided. The result showed that comprehension time for a target sentence is shorter when its New, focal information has its counterpart in the same position in the context sentence than in other conditions. This suggests that listeners use intonation cues to anticipate New focal information; this helps facilitate the processing of sentences in comprehension.

Most & Saltz (1979) studied how people determine New information from the surface cues of stress and word order. Four groups of subjects were given active and passive sentences with stress imposed either on the agent or the patient. For example, group A heard an active stressed-agent sentence; group B heard an active stressed-patient sentence; group C heard a passive stressed-agent sentence; group D heard a passive stressed-patient sentence. They were asked to write down appropriate questions to which each of the sentences might serve as an answer. The result showed that a greater number
of agent-questions were produced in the two conditions which the agent was stressed than in the two conditions in which the patient was stressed. It suggested that stress is more effective when placed on the agent than when placed on the patient. Most and Saltz also provided evidence to invalidate a hypothesis advanced by the theory of Communicative Dynamism. According to the theory, the second noun (rheme) of a sentence will be taken as communicating the New information in the sentence. However, their result showed that the marking of stress on the second noun in patient-stressed active sentences and in agent-stressed passive sentences did not yield more appropriate questions than in patient-stressed passives and in agent-stressed actives; this was in disagreement with what was predicted by the theory of Communicative Dynamism. The finding was interesting because it invalidated what was implied by Hornby in his 1974 study that stress conspires with sentence form to mark New information.

While most researchers have focused their attention on the use of stress to signal New information, Fowler & Housum (1987) investigated how a destressed word used to signal Given information affects the perception, recognition and retrieval of its relevant context. The first four experiments in their study showed that talkers reduce a word by lowering their voice pitch when it is mentioned for the second time, especially in context, and that listeners can tell whether a particular utterance of a word is New (mentioned for the first time) or Given (mentioned for the second time). The last experiment further investigated whether listeners could use information that a word was Given to promote retrieval of an earlier production with its context. From a monologue Fowler & Housum constructed 42 prime target pairs on which subjects would make judgments whether or not a word had occurred before in the passage. At 42 selected locations in a re-recording of the monologue, a 1000-Hz tone was placed on the second channel of the tape used to present the monologue to subjects. This tone, when input to a computer, caused the program running the experiment to stop the tape recorder and to present a warning tone followed by
two words on which subjects made speeded recognition judgments. Response times were measured from prime and target onset. The general findings were that responses to reduced primes are overall faster than to first productions, and that response times to targets are faster following old primes than following new primes. The implication is that listeners can identify words as Given by using destressing as a clue, and can take advantage of the information that a word is Given to retrieve the earlier context of the word and facilitate integration of related material in a discourse.

To summarize, people utilize the phonological device of stress to identify or anticipate New information. They also use destressing to identify Given information and to retrieve information relevant to the Given information. Comprehension is facilitated because Given and New information is identified faster and the integration of related materials in a discourse is sped up.

4.1.1.2 WORD ORDER

Word order is a common syntactic cue to indicate Given and New information. The early part of the sentence tends to encode Given information, while the latter part tends to encode New information. In psycholinguistic studies of discourse pragmatics, researchers are interested in investigating the psychological reality of the proposal that the early part is interpreted by adults as Given, and the latter part as New, and how word order cues may facilitate integration of information in comprehension.

Yekovich, Walker & Blackman (1979) reported that linguistic marking of presupposition (the part of a sentence that a speaker/writer assumes a listener/reader to know about or take for granted), and focus (a sentential element that usually receives stress to convey New information or occurs near the end of the sentence in written communication) play an important role in guiding the integration of sentences. Information early in a sentence is usually what is presupposed, while information appearing near the end of the sentence end is what is focused. Both the context and target sentences contribute
to successful integration of the information. The integrative process involves identifying a
candidate antecedent from a context sentence and matching the Given information, an
appropriately marked anaphor from the target sentence, with the candidate antecedent in the
context sentence. When the markings in the context and target sentences are appropriate,
the integration and comprehension are optimal. Comprehension time experiments have
shown that, with both active and passive target sentences, comprehension was fastest when
context sentences incorporated the noun phrase as focal, and target repetition marked it as
presupposed. The results suggested that subjects were sensitive to the Given and New
relations signalled by word order, which was used to guide comprehension for information
integration.

Hupet & LeBouedec (1975) did an experiment to test whether adult subjects show
preferences for sentences in which the early parts code Given information. Two series of
paired active and passive sentences were constructed. In each series, two animate referents
in each sentence type were differentially marked either definite or indefinite. Consider the
following examples:

Series (1)
Active: 'I thought that the gangster had injured a policeman.'
Passive: 'I thought that a policeman had been injured by the gangster.'

Series (2)
Active: 'I thought that a gangster had injured the policeman.'
Passive: 'I thought that the policeman had been injured by a gangster.'

Subjects were required to pick out that one of the two syntactic forms which they would
prefer to use in each series. The result showed that in series 1, 78% of subjects' choices is
the active form while in series 2, 81% of choices is the passive form. They claimed that
there is a psychological preference for sentences where the presupposed information,
encoded by definite nominals, is in grammatical subject position. They also found that
subjects prefer the sentences where the assertional information is in the grammatical object position in actives and in the position after the preposition by in passives.

However, some studies have shown that word order may not be reliably employed by speakers to signal Given and New information. Most & Saltz (1979), using the experimental paradigm reported in section 4.1.1.1, presented opposite findings for the actives although their result for the passives conformed with that of Hupet & LeBouedec (1975). Subjects in four groups were given active and passive sentences. They were asked to write down appropriate questions to which each of those sentences might serve as an answer. Most & Saltz argued that if, according to the theory of Communicative Dynamism, the second noun (patient) in actives is treated as indicating New information, more patient-questions should be produced. However, 58.3% agent-question responses were given when subjects formulated questions to which an active sentence served as an answer. 70.8% agent-questions were given as response to passives, where the second noun of agent was taken as communicating New information. The results suggested that word order is used by English speakers to interpret Given and New information in passives, but perhaps not in actives.

In sum, psycholinguistic studies have shown that, in English, speakers prefer sentences where Given information is encoded in the early part, and New information in the latter part. Comprehension is facilitated when sentences mark the information status of referents in this ordering. However, it is still unclear whether word order is utilized in actives to interpret Given and New information.

4.1.1.3 MARKED GRAMMATICAL SENTENCE FORMS

The relation between a sentence and its context can be investigated by looking at 2 kinds of mapping: (1) the mapping between a sentence and its nonlinguistic context, e.g., the physical and social environment, or a mental representation of the environment; and (2) the mapping between a sentence and its preceding text (written or spoken) (Greenspan &
Segal 1984). A number of researchers are interested in investigating how marking of presupposed or focused propositions in marked grammatical structures may influence people's comprehension in the above two kinds of context. In sentence-verification tasks to investigate the first kind of mapping, subjects were presented with target sentences and pictures, and were asked to verify the truth of the sentences they heard against the picture. In tasks of the latter kind of mapping, subjects were presented with context sentences followed by target sentences, and were asked to press a button when they understood the target sentences.

In some studies employing sentence-verification tasks, where an isolated target sentence is used to verify against an accompanying picture, it has been shown that people tend to assume that Given (presupposed) information is true and to verify the New (asserted) information (Hornby 1974; Carpenter & Just 1977). Hornby (1974) did two experiments in which subjects were asked to decide whether a sentence correctly described a picture which involved misrepresentation of the presupposed or the focused proposition. A relatively larger number of perceptual errors occurred when the misrepresentation involved the presupposed proposition than when it involved the focused information. Hornby argued that the reason why the subjects frequently failed to notice the discrepancy between the presupposed proposition and the picture is because people tend to assume that the presupposed part of the picture is true and focus their attention on the part of the picture which is relevant to determining whether the focal assertion is correct. The experiment further showed that when there is a discrepancy between the presupposed proposition and the picture, perceptual errors increase with the syntactic structures used for focusing, in the order of pseudocleft passive, cleft passive, pseudocleft active, standard passive, cleft active and standard active. Hornby advanced four different factors proposed in the literature as surface structure indicators of what is focused: later occurring part of a sentence under normal intonation (Halliday 1967); the object occurring after the preposition
by in the passive voice (Fillmore 1968); the phrase containing the locus of heaviest stress (Chomsky 1971); and the post copular position in cleft and pseudocleft sentences (Akmajian 1969). He suggested that when these factors are used in combination, there is a stronger tendency for people to take the presupposed part as true and to search for what is relevant for determining the truth of the focal assertion. For example, the pseudocleft passive sentence structure exploits all four of these markers of presupposition, producing the greatest amount of presupposition. This can account for why Hornby's subjects more frequently failed to notice a discrepancy between a presupposed proposition and a picture under this condition. He concluded that various sentence structure features may be employed in combination to mark presupposition and influence people's perceptual abilities.

Carpenter & Just (1977) designed a similar verification experiment to examine how the information structure of a sentence influences the way it is related to a perceptual event. In their experiment, subjects read a sentence which described the relative positions of two people, and looked at a schematic array that depicted two people walking in a particular direction. Their task was to verify whether the sentence was a true description of the picture. It was assumed that if mismatches on constituents were compared earlier between the sentence and the display, there would be shorter response latencies than when mismatches on constituents were compared later. Thus, the relative response latencies for the two kinds of false trials should give a clue as to whether the information marked as Given or New is attended to and verified first. The interesting question was whether there were different response latencies between the stimuli in which the picture contradicted the information linguistically marked as New and those in which it contradicted the information marked as Given. It was hypothesized that New information would be verified first (Clark & Clark 1977; Clark & Haviland 1977). The prediction was that response latencies would be shorter when there was a mismatch between the picture and the New information.
conveyed by the sentence. In their experiment, for example, displays which failed to
represent the New constituent were used. For example,

(3) The one who is leading Dave is Jill.
    Sue  Dave
    <----  <----

In sentence (3), *Jill* is the constituent which conveys the New information, and is not
present in the display. Displays which contradicted the Given information were also used.
For example,

(4) The one who is leading Dave is Jill.
    Jill  Mike
    <----  <----

In sentence (4), *Dave* is the constituent which conveys the Given information, and is not
present in the display. In verifying the sentence against the display, subjects tended to
fixate first on the part of the display that contained the New information, and to verify that
information with the display. The results showed that their subjects demonstrated shorter
response latencies in verifying example (3) than (4) because in (3), people compared *Jill*,
the New information, with *Sue* and spotted the mismatch earlier, while in (4), people first
compared *Jill* with *Jill* and did not spot the mismatch until they compared *Dave*, the Given
information with *Mike*. The results confirmed their hypothesis that New information is
verified first.

Carpenter & Just (1977) also investigated the order in which Given versus New
concepts are processed. They used pseudoclefts and clefts as target sentences to be
compared with pictures. The subjects were first presented with a line drawing of a male or
a female named John or Barb walking either to the left or to the right. They were then
shown a sentence such as *The one who is leading Barb is John*. After seeing the sentence,
the subjects were asked to indicate whether the person not represented in the picture was to
the right or to the left of the depicted person. The result showed that responses are faster
when the Given information encoded in the sentence corresponded with the picture, which
established pragmatically old information for the reader. They designed another
experiment, in which the subjects heard a test sentence first and were then presented a
picture. Their task was to verify if the sentence truly described the picture. It was also
noted from an eye movement monitor, that subjects tended to look at the referent of the
New item first and that latencies were shorter when a mismatch involved the New
information than when the mismatch involved Given information. They suggested that
subjects first compare the New information encoded in the sentence with the relevant part
of the picture.

There have also been some studies which examine how the information structure
encoded by a sentence is utilized to integrate its meaning with its previous linguistic
context. Langford & Holmes (1979) conducted an experiment in which subjects verified
cleft, pseudocleft and factive complement sentences with respect to preceding context
paragraphs, which contradicted either the assertion or the presupposition of the target
sentence. They found that subjects take significantly longer to verify sentences with false
presuppositions than sentences with false assertions. This result seems to be explained by
the hypothesis that listeners generally assume Given information to be true, and only search
for facts which are related to New information. This hypothesis also implies that subjects
should be less likely to detect false presupposition. However, that implication was
disconfirmed by Langford and Holmes (1979). Another experiment showed that given
enough time, subjects rarely failed to detect false presuppositions when they were present.
Langford & Holmes (1979) postulated that subjects do eventually search the context for
information corresponding to the Given part of the sentence, but only after they have
searched for, and failed to detect discrepant New information.

In a reading experiment, Carpenter & Just (1977) asked their subjects to judge
whether a target sentence was consistent with a previous context sentence. For example,
subjects were first introduced to a context sentence such as *The ballerina captivated a*
musician in the orchestra during her performance. Next, a target sentence such as The one who the ballerina captivated was the trombonist or The one who captivated the trombonist was the ballerina were presented. It was found that the former target sentence is judged and accepted faster. Carpenter & Just claimed that the Given-New information structure of the former target sentence matched that of the context sentence, while there was a mismatch in the information structure between the context sentence and the latter target sentence. Comprehension is facilitated when the information structure is congruent between the context sentence and the successive target sentence, and when the Given information conveyed by the target sentence is known from the previous context.

Conrad & Rips (1986) conducted four experiments to investigate the processing ordering of Given and New information. In the first two experiments, subjects were supplied with a target sentence, which was preceded by a question, and a visual display. They were asked to verify against the picture whether the target sentence was true or false. Four displays accompanied target sentences each containing pairs of a square and an oblong within which there were either black or blue stripes or dashes. Each target sentence could be decomposed into three propositions. For example, the sentence The square has blue stripes contains the propositions: (1) The square has stripes. (2) The stripes are blue. (3) The square has blue (parts). The target sentence The square has blue stripes was preceded by a question, which was intended to manipulate the Given or New information. For example, when the question was Which shape's parts are stripes?, the lexical item stripes were considered to be the Given term. After hearing the question, subjects began to verify the target sentence The square has blue stripes by combining the Given term stripes with either blue or with square. These propositions are called Given propositions since they include the Given item. The third proposition is called the New proposition. It was assumed that people comprehend the sentence incrementally by putting together the meanings of the individual words into larger units, and that combination can begin by
forming any of these atomic propositions. The result showed that there were faster comparison times when both Given propositions in the sentence were false than when only one was false. The effect dramatically increased in experiment 3, where stimuli were presented orally. Their fourth experiment was designed to investigate the way people consider the conceptual relations within the target sentence itself; the preceding question was replaced by _it_-cleft and _wh_-cleft constructions to vary the location of Given and New information. The clefted constructions were constructed in such a way that the New information contained two content terms. For example, one of the possible target _it_-cleft sentences is _it's the square's blue parts that are stripes_, where New information contains the two content terms _square_ and _blue_ in _it_-cleft. A possible target _Wh_-cleft sentence is _What is blue is the square's stripes_, where New information contains the two content terms _square_ and _stripes_. In the condition when the first two context words of the sentence suffice to disconfirm the sentence, the Given First strategy predicts an advantage for _Wh_-clefts over _It_-clefts. The result showed that responses were faster when one of the first two content words was Given than when both were New. All the results of these experiments suggest that subjects begin with the Given words, and then relate New items to these Given meanings, no matter how the Given information is signalled, either externally through a question or internally through a marked syntactic construction. The above findings are consistent with what was postulated in some comprehension models that sentence understanding in context begins by locating Given facts within a mental domain of previous concepts, and proceeds by adding New information to those concepts (Haviland & Clark 1974; Clark & Haviland 1977; Clark & Clark 1977; Lesgold, Roth & Curtis 1979).

To summarize, people are sensitive to the encoding of information as Given or New in marked grammatical structures, and such information is utilized in the process of perception, verification and comprehension as evidenced by psycholinguistic studies of pragmatic discourse.
4.1.2 *Sentence Production*

According to Levelt's (1989) psycholinguistic model of speech production, speakers go through several stages of decision-making when producing utterances. Three phases are explicitly proposed to characterize the processes that speakers go through (Levelt 1989). In the first *conceptualization* phase, speakers choose a message which they want to communicate. In the second *formulation* phase, the speaker accesses the lexicon for words that will express the intended concepts appropriately, and chooses a syntactic structure which the words will be put into. In the third *articulation* phase, the speaker converts the computed representation into phonetic representations for the articulatory system. Speakers need to determine the information structure of a message at the conceptualization phase, depending on the particular discourse context they are in. They decide how much information should be provided to the listener as Given or New at a particular moment in time. This affects the choice during the formulation phase of syntactic and prosodic devices appropriate to revealing this structure, and affects phonetic representation in articulation. For example, in English, when speakers assume that information is known to listeners, it will be encoded with definite articles and pronouns. When speakers assume that information is new to listeners, it will be encoded with indefinite articles (Grieve 1973; Delis & Slater 1977). The following sections provide some empirical evidence to show how speakers' assessment of information status as Given or New affects their choice of linguistic devices to encode it in production, and how speakers of different languages, because of language-specific differences, differ in their preference for linguistic devices to convey Given and New information within discourse (MacWhinney & Bates 1978; Bates & Devescovi 1989; Holmes 1995). Our review will be limited to the devices that are relevant to our present study, including referring expressions, stress, word order and marked grammatical sentence forms.
4.1.2.1 Stress

Psycholinguistic studies of English have suggested that New information is usually encoded by the addition of phonological stress, while Given information is destressed and systematically reduced by lowering the pitch.

Brown (1983) did an experiment to examine how stress is used in discourse. In the experiment, subjects were divided in pairs. In each pair, A could see a diagram which B could not. A was asked to give instructions to B so B could draw the diagram. Brown adopted five categories proposed by Prince (1981b) and Brown & Yule (1983) by distinguishing expressions into Brand-new, Inferred, Contextually-evoked, Currently-evoked, and Displaced-evoked entity. She found that a speaker introduces Brand-new and Inferrable information with high pitch, and the other types with low pitch. Interestingly, the potential availability of inferrable information to the hearer did not lead a speaker to treat it as though the hearer expected it. Only information which was obvious or which was specifically mentioned in the previous discourse was treated as Given, and marked with low pitch.

Fowler & Housum (1987) designed an experiment to measure talkers' productions of words conveying Given and New information. One of their research interests was to ask whether the stressed vowels of second productions of words are shorter and lower in fundamental frequency and amplitude than in their first productions. In their experiment, 35 words were selected from a monolog adapted from a radio program. The selection criteria were that a word should have occurred at least twice within the whole monolog and have referred to the same object or event in both productions. Pairs of words in which one production was given final lengthening at the end of a major syntactic boundary were excluded. Each word's duration, average fundamental frequency and the peak amplitude of the stressed vowel were measured. Findings indicated that talkers do systematically
attenuate their productions of many Given words as compared to New words, and that attenuation largely appears to take the form of shortening.

In sum, experiments have showed that people make decisions about information status, use stress to highlight information assumed to be New, and destress Old words, which are assumed to be less important because they are currently at the focus of the listener's attention.

4.1.2.2 **WORD ORDER**

Word order is one of the commonly used linguistic devices to differentiate Given and New information in production. Some psycholinguistic studies of English have investigated how it is used as ways to convey the information structure of the speaker's intended message, and how it is reflected in the production of an utterance.

Bock (1977) employed a question-answering paradigm to investigate whether people prefer to place Old information before New. It was hypothesized that subjects would prefer to answer questions with sentences in which word order conformed to the topic and comment relations in the question. In the experiment, subjects were first presented with a question, and later with a sentence which contained the target answer. Following the sentence, the question was read a second time. Within the list of sentences, some answers were in an appropriate form (New information was placed later), while others were in an inappropriate form (New information was placed early). The subjects were required to answer each question based on the previously heard sentence after they heard the question the second time. For example, subjects first heard a question such as *The minister's face suddenly blushed a deep red. What had happened?* Under one condition, they then heard the sentence *The minister blushed when the streaker ran through the church,* which encoded the answer in its final part (the New position). After subjects heard the question the second time, they most frequently answered the question with the original sentence, which indicated Given-and-New ordering appropriately. Under a second
condition, subjects were presented with incongruently ordered sentences, for example, *When the streaker ran through the church, the minister blushed*, where the answer was placed early. When they answered the question, they gave shifted responses by moving the answer (New information) to the end, i.e., *The minister blushed when the streaker ran through the church*. In other words, the order of New and Given information was changed to Given and New, showing that subjects prefer to place Given information in the early part of a sentence and New information in its later part.

Bock (1982) proposed a hypothesis which accounts for these Given and New effects in sentence production. According to the hypothesis, Given information is more often temporally assembled before New information, because a previously-mentioned concept is more accessible to the reader or the listener, and the processing of a lexical representation for the concept can be quickly facilitated. Speakers plan a sentence by choosing a familiar term to use as conceptual base, and then turn full attention to the less familiar facts which the sentence connects with that base. Given-then-New ordering can be accounted for "as one consequence of a system that structures sentences in such a way that information lexicalized earlier may be produced earlier" (Bock 1982:37).

In sum, studies in English have shown that people perceive sentences as containing Given and New information. In production, Given information is placed earlier, while New information is placed later in sentences.

4.1.2.3 **MARKED GRAMMATICAL SENTENCE FORMS**

From a functionalist viewpoint, sentences with different syntactic forms, such as active and passive, may reflect functional differences. The employment of different marked syntactic structures is influenced by focus of attention, as well as by the Given and New information structure of the message that is being planned.

Tannenbaum & Williams (1968) reported that the placement of the conceptual focus on the actor subject or on the acted-upon object affected subjects' readiness to describe a
situation either in active or passive sentence forms. In their experiment, subjects were first presented with a drawing featuring an actor acting upon an element. A preamble was used to manipulate the conceptual focus onto either the subject or the object, or neither. When the focus was on the actor, the preamble was in the active voice, while when the focus was on the patient, the preamble was passive. The subjects were then required to generate a prescribed active or passive sentence to describe the stimulus situation. Their reaction time was assessed both in terms of time to the initiation and time to the completion of appropriate response. It was found that both active and passive generation latencies vary as a function of the focus manipulation. The difference in latency between the generation of active and passive sentences increased when the conceptual focus was put on the actor subject, while the difference markedly decreased when the focus was on the acted-upon object. The word order difference in active and passive sentence forms reflects functional differences in encoding situations where attention is focused on different elements.

A text analysis done by Abraham (1991) showed that the usage of causal alternatives such as because and because of in spoken/written discourse is constrained by pragmatic constraints regarding the management and assessment of Given and New information (See discussion in Section 2.4.1.3). It was found that in spoken discourse, the clausal link because is more frequently used to encode New information while because of is used to encode Given information.

In sum, speakers' focus of attention and the Given-New information structure of the message being planned can affect choices of different marked syntactic structures.

4.1.3 CROSSLINGUISTIC DIFFERENCES

Crosslinguistic studies of the production of utterances in discourse have shown that there are language-specific differences in encoding Given and New information. Hence, different linguistic devices are preferred as ways to realize the information structure of an
intended message in different languages. Speakers of different languages implement message packaging during sentence formulation in different ways.

MacWhinney & Bates (1978) did crosslinguistic studies on English, Hungarian, and Italian speakers to examine the use of sentential devices for conveying Givenness and Newness. In the experiment, subjects were asked to describe nine triplets of pictures whose elements varied along the pragmatic dimension of Given to New. Three operations that were involved in the modification of information included addition, contrast, and replacement. These are illustrated in the following sentences:

(5) a. A rat crawled through the gate.
   b. Then the rat ran into the strawberry patch.

(6) a. A dog and a cat fell into the hole.
   b. The dog fell into the hole.
   c. Then the cat fell into the hole.

(7) a. The cat, I mean, the dog fell into the hole.

The speaker of (5a) presupposes that the listener needs to add information about a rat to her/his consciousness, whereas the speaker of (5b) presupposes that information about the identity of the rat is already present and need not be added in to the listener's consciousness. In example (6b), the New relation between the cat and fell into the hole places the cat into contrast with the information dog that had already been linked with fell into the hole. In example (7), the dog was used to replace the cat.

The result showed that in the use of pronouns for conveying Given information, English uniformly uses significantly more subject pronouns than Italian or Hungarian. The differences can be attributed to the fact that Italian and Hungarian seem to use subject pronouns mostly when expressing information that is contrastive or replacive. If the subject is not contrastive or replacive, Hungarian and Italian tend to omit it, rather than use a pronoun. In the use of articles to convey Given vs. New, Hungarians and Italians make
far more use of definite articles than English-speakers. This can be attributed to the specific function of the indefinite in Hungarian and Italian. In both these languages, the indefinite article has somewhat the sense of a numeral which identifies a single member of a larger class which is already Given. This restriction on the use of the indefinite article seems to encourage use of the definite whenever possible. When an object is exophorically (contextually) Given but has not yet been mentioned in discourse, Hungarian and Italian speakers are more likely to mark it as definite than are English speakers. This is an example of a quantitative difference in how the functions served by articles can vary across languages. In the use of emphatic stress, it was found that English speakers use emphatic stress more than Italian ones, and that Italian speakers use more than Hungarian speakers, who use virtually no emphatic stress at all to mark Newness. Where Hungarian and Italian appear to employ word order or other devices to mark Newness, English more often uses stress.

Holmes (1995) did a study comparing the production of utterances in discourse between French and English speakers. One of his research interests was to examine how different languages provide different solutions for speakers in responding to message packaging. In the experiment, the speech of French and English students talking informally about topics of interest was recorded. Utterances were encoded in terms of clauses, phrases, and hesitations, and were later analyzed in terms of output units, and ways to introduce the focus of discourse entities. It was found that: (1) English speakers use lexical items as the syntactic subjects of sentences more often than French speakers. French speakers reserve lexical items for a small range of expressions that comprise central topic items almost exclusively, while English speakers use a much broader set of terms, including some which are being introduced into the discourse for the first time; (2) French speakers are more likely than English speakers to introduce lexical expressions into discourse by means of presentational and existential clefts; (3) cleft constructions are used
more often by French than by English speakers as devices for focusing on discourse entities. French speakers also make greater use of pseudocleft sentences than English speakers. While French speakers produce some identificational clefts, English speakers do not use any at all. This suggests that speakers of different languages rely on different linguistic devices to produce information packaging.

To summarize, psycholinguistic studies provide strong evidence that the marking of the Given and new information of a sentence at different levels influences people's comprehension, perception, recall and production. In comprehension, on the one hand, linguistic devices are utilized by the listener to guide the search for a Given antecedent established in shared knowledge structure, to anticipate incoming New information to be integrated into old memory representation, and to retrieve the relevant information of its context. There is empirical evidence that when surface marking in a preceding sentence is not congruent with that in the following context, comprehension and recall will be hampered. In perception and verification, Given information tends to be assumed to be true, while New information will be verified. All these findings indicate that adults must be able to exploit the surface marking of information structure encoded in sentences. In speech production, speakers' determination of the information structure of a message during conceptualization affects the choice of syntactic and phonological devices for appropriately representing this information structure. For example, it has been found that in English Given information tends to be encoded by the use of definite articles, systematic destressing of old words, pronouns etc., while New information tends to be encoded by the use of indefinite articles, stress, and marked structures. Crosslinguistic studies on production of utterances in discourse have also shown that languages have qualitative and quantitative differences in that speakers of different languages prefer to rely on different linguistic devices to convey the information structure of an intended message. However, no studies have been done on Mandarin speakers in productions. Mandarin Chinese is an
isolating language which is distinctive from English, French etc. It will be interesting to investigate how Mandarin-speakers use linguistic devices in different ways than speakers of other languages.

In the following, we will review some empirical studies on how children develop strategies for locating Given and New information.

4.2 ACQUISITION OF DEVICES FOR GIVEN AND NEW IN CHILD LANGUAGE

Previous research focusing on children’s development of pragmatic abilities to encode or decode Given and New information reveals that as a function of development/age and/or crosstlinguistic differences, children may differentially exploit sentence structure cues such as referential expressions, word order, marked grammatical structure and stress to encode or decode Given and New information (Hornby & Hass 1970; Hornby 1971; Warden 1976; Maratsos 1976; Ervin-Tripp & Mitchell-Kernan 1977; MacWhinney & Bates 1978; Karmiloff-Smith 1979; MacWhinney & Price 1980; Solan 1980; Wykes 1981; Emslie & Stevenson 1981 MacWhinney, Pléh & Bates 1985; Paul 1985; Clancy 1985, 1992; Bamberg 1986, 1987; Cutler & Swinney 1987; Hickmann & Liang 1990; Hickmann et al. in press). In the following, we will review some psycholinguistic studies that have investigated these issues, proceeding from the lexical level to the predication level. The review will be limited to the discussion of devices that are directly relevant to our present study, namely referential expressions, stress, and marked syntactic structures.

4.2.1 REFERENTIAL EXPRESSIONS

Some languages, such as English, utilize the local marking devices of definite and indefinite articles to encode Given and New information. Both comprehension and production studies of English-speaking children’s use of definite and indefinite articles suggest that children acquire the functions of articles as early as three/four years (Brown 1973; Maratsos 1976; Warden 1976). In studies of the use of pronouns, it has also been found that young children can use them very early; however, the textual uses of pronouns

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are not developed before eight years, especially anaphoric strategies similar to those used by adults (Karmiloff-Smith 1981, 1986; Bamberg 1986). Recently, there have been some studies that have been done on non-Indo-European languages which do not employ articles, such as Mandarin Chinese, Cantonese, and Japanese, to investigate how children develop strategies for maintaining reference and introducing new referents in narratives. Since the use of articles and pronouns is not relevant to our present study, the following review will be limited to a discussion of NP types used to indicate Given and New information in those languages that do not employ a system of articles.

A study by Hickmann & Liang (1990) investigated Chinese children's ability to use appropriate devices for referent introduction and reference maintenance. In Mandarin Chinese, appropriate referring expressions for first mentions are characterized by indefinite NPs (indefinite determiners and bare NPs in postverbal position). In their experiment, children between four and ten years were asked to narrate cartoon stories to a blindfolded listener. They found that children begin to mark Newness with both indefinite NPs and postverbal position at five. However, they tended to rely more on NP type than on word order. Even the older children did not use the postverbal position to mark New information as frequently as did the adults, consequently producing both postverbal and preverbal indefinite NPs. This indicates that Chinese children do not fully master the combined use of indefinite NPs and postverbal position to code Given and New information before the age of eight years.

By means of a longitudinal study, Szeto (1993) studied three Cantonese-speaking children aged 1;10 to 2;11,6 to investigate the development of their abilities to use appropriate devices to refer to Given and New information. As in Mandarin Chinese, in Cantonese, there is reliance on both NP type and word order for indicating Given and New information. The slight differences between the two are that in Cantonese, nouns with only classifiers and no determiners can be used to refer to Given information when
they occur preverbally or to New referents when they occur postverbally. In contrast, NPs without determiners are not allowed to occur preverbally in Mandarin, and can only be used postverbally to denote New referents. It was found that Cantonese children often used bare nominals in preverbal position for Given referents whereas adults typically used nouns with classifiers and no determiners. Sometimes children omitted the referents completely, making it difficult for hearers to identify the intended referents. The use of nouns with only classifiers and no determiners in preverbal position to mark Givenness is not acquired before the age of three. A further study showed that even five-year-old Cantonese-speaking children sometimes failed to take the listener's perspective into account. It was concluded that Cantonese-speaking children have not fully mastered adult linguistic devices to code Given and New information before the age of five. Table 4.1 lists NP types that adults and children use in these two studies in Mandarin and Cantonese:

Table 4.1
Comparison of NP types and Given and New in Mandarin and Cantonese used by children and adults

<table>
<thead>
<tr>
<th></th>
<th>Adult Given</th>
<th>Adult New</th>
<th>Child Given</th>
<th>Child New</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandarin</td>
<td>preverbal</td>
<td>(Definite) NP</td>
<td>Indefinite NP</td>
<td></td>
</tr>
<tr>
<td>postverbal</td>
<td>(Indefinite) NP</td>
<td>Indefinite NP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cantonese</td>
<td>preverbal</td>
<td>CL + N</td>
<td>N, Ø</td>
<td></td>
</tr>
<tr>
<td>postverbal</td>
<td>CL + N</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Clancy (1992) studied six groups of Japanese children aged from 3;8 to 7;4 to investigate their referential strategies. In Japanese, nominals are used to introduce referents into discourse while ellipsis is the predominant referential means for Given information. (Pronouns do exist but are fairly rare and are unnatural.) When ellipsis is used, no information about the person or number of the elided subjects is recoverable from the verb. Japanese speakers must rely heavily on the listener's contextual knowledge concerning an intended referent. In Clancy's experiment, two types of discourse tasks were used: narrating a cartoon story and retelling a video story. The picture-based narratives were
elicited with a set of seven cartoons. The cartoon stories were about one or two main
characters and one or more secondary characters. The child was asked to tell the stories to
a blindfolded listener. In the video-based narratives, children were shown a short
videotape and asked to retell the story to a listener. In both the picture-based and video-
based stories, at first mention referents were New to the listener. Clancy found that in
referent-introduction contexts, even the youngest age group (3;8) used more nominals in
the switch-subject contexts (when a mention of a referent in subject role was not preceded
by a coreferential expression in the immediately preceding utterance) than in the same-
subject contexts (when mention of a referent in subject role is preceded by a coreferential
expression in the immediately preceding utterance). Clancy claimed that Japanese children
at the age of about four years are able to take their listener's needs into consideration.
However, the two youngest groups of children used ellipsis for referent introductions in
the switch-subject context significantly more than the groups of children over five. She
concluded that Japanese children under five can not use appropriate referring expressions to
the same extent as adults, although all age groups do use a very low percentage of nominals
in the same-subject context.

The following section will discuss the phonological device of stress, another
commonly used means of information encoding at the lexical level in discourse.

4.2.2 STRESS

Studies of children's development of the ability to use stress to encode or decode
New information have provided some empirical evidence to show that the development of
comprehension is dissociated from that of production (Bates et al. 1995). Research has
shown that, although children are able to use stress to indicate new information in
production very early, they are unable to use it to identify New (Comment) information in
comprehension. This suggests that production skill outstrips comprehension skill in the
use of stress for pragmatic identification of the Given and New function.
Some studies have shown that children are capable very early of using emphatic stress to mark New and contrasting elements. Wieman (1976) and Greenfield (1979) reported that children at the two-word stage can use stress to indicate New information. Similar findings have been reported for older children as well. Hornby & Hass (1970) studied English-learning 4-year-olds and asked them to describe sequences of picture pairs. For example, picture A depicts a girl riding a bicycle, and picture B describes a boy riding a horse. They found that children tend to use stress in the part of the sentence which refers to the contrasting/New element in the second picture, e.g., boy, in the example. However, reliance on stress in comprehension as an encoder of New information seems not to be developed till very late.

Hornby (1971) reported that first- and third-graders performed essentially at chance level in interpreting stress cues to Topic and Comment (Given and New) structure when asked to point to the picture that sentence is talking about. There was a minimal effect of stress on judgments of topicality by the youngest subjects, with an increase in the reliance on stress with age. Interestingly, the results of a later study by Hornby (1973) suggested the opposite: with age there is a decrease in reliance on stress as a cue to the identification of Topic and Comment. In this study, Hornby used a sentence-picture verification task. His stimuli were standard active sentences with contrastive stress on either the subject or the direct object. The results showed that his second-graders had a strong tendency to interpret the stressed element as New. In fifth grade this tendency was weaker and by ninth grade it had disappeared altogether.

Paul (1985) also reported that, while her third- and fifth-graders paid attention to stress cues in active sentences, they misinterpreted the stressed element as the topic. In her experiment, subjects were asked to tell to which of two context stories the stimulus sentence went with. For example:
(8) Context story (a): *In this story, first a man climbs a fence.*

Context story (b): *In this story, first a boy climbs a tree.*

Stimulus: *And then, a man climbs a TREE.*

The expected choice of context sentence is (a), in which the Given element *a man* of the stimulus sentence matches a constituent of the context sentence (a). However, when children were asked to choose the context sentence for the stimulus sentence, they tended to choose (b). In other words, they tended to select stressed second elements in actives as topics.

MacWhinney & Price (1980) reported a similar finding, i.e., a decrease with age in reliance on stress as a cue to identify Topic and Comment. MacWhinney, Pléh & Bates (1985), in a study of sentence understanding in Hungarian, found that their 3- and 4-year-olds could not correctly make use of stress cues. Solan (1980) reported that his 5-year-olds failed to make correct use of stress as a cue to pronominal reference shift.

Cutler & Swinney (1987) did four word-monitoring experiments to test how accent and semantic focus affected children's response time in detecting a target word. In one experiment, children aged from 5;0 to 7;1 and ten undergraduates participated in the experiments. They were presented with a sentence, which they were instructed to understand. Their task was to listen for the designated target word in the sentence and to press the response button as soon as they heard the specified word. The results showed that response times were faster when the target word was accented as opposed to unaccented only for adults, but not for children under about six years of age. In the second experiment, Cutler & Swinney tested whether children were insensitive to stress effects as a whole or simply to accent effects in sentences. To them, the effect of varying accent position was strictly a manipulation of sentence semantics; lexical semantics will remain unaffected by such variation. When the test materials were recorded as ill-formed lists, sentence accent could not be used to predict semantic focus. In this second experiment, the
same materials used in the first experiment were thus reordered so that they formed lists rather than sentences. The list of words were read at a normal rate as unrelated elements without sentence prosody; each list occurred in two versions, in one of which the target word was stressed. The results showed that children of about five years of age, but not younger than five, showed an adult-like response time advantage. Cutler & Swinney pointed out that children about five years of age were sensitive to lexical stress per se, but they had not learned to use sentence prosody (accent) as part of processing semantics. Hence, they processed sentences as if they were lists of unrelated words. This explains why they could not show similar effects in processing sentences as adults in experiment 1. Previous research has shown that prosodic cue of accent provides an effective pointer to a sentence’s focus.

In Cutler & Swinney's other two experiments, the purpose was to test how the sentence semantic focus of a sentence might affect response times for finding target words. Children first listened to six stories, each of which contained two potential target words. They then heard a question, and then were told to press the button as quickly as they could whenever they heard a target name. Focus was manipulated by varying the question which preceded the sentence in which the target word occurred. The results showed that the focus effect was significant for the adult group, suggesting that the processing advantage for accented words reflects the semantic function of accent as an expression of sentence focus. However, children under about six years of age did not show an adult-like response time advantage for accented target words.

These psycholinguistic studies of children's abilities to use stress in production and comprehension of Given and New information suggest that production skill may outstrip comprehension skill in this area. We will devote the next section to a discussion of word order and its role in conveying the pragmatic function of Given and New.
4.2.3 *WORD ORDER*

The role of pragmatically-motivated ordering in children's language development has been one of the topics that have attracted attention from functionalist researchers of discourse pragmatics. A number of them are interested in investigating the way children utilize word order to interpret Given (Topic) and New (Comment) information in comprehension. Hornby, Hass & Feldman (1970) asked English-speaking kindergarteners and second graders to select the most important word, which tends to be the predicate, of a test sentence such as *She helped the lady*, or *The girl cried*. They found that kindergarteners rely on semantic features of the words rather than on a particular grammatical part of a sentence in choosing its most important element. For example, they have a tendency to choose those nouns that have a high degree of interest to them, e.g., *father, grown-ups, teacher, girl, ball, desk*, etc. as the most important elements of sentences. This suggests that the kindergarteners fail to consistently use word order as a cue to the identification of Topic and Comment. However, their second graders demonstrated a definite shift in processing strategies, and were able to employ structural information by choosing the predicate as the most important part.\(^9\) The authors claimed that there is a developmental shift from age 5 to age 7 in children's utilization of surface word order cues in the determination of the Topic and Comment distinction in a controlled setting.

Hornby (1971) conducted an experiment to investigate English-speaking first-, third-, and fifth-graders' use of surface structure cues to identify Topic and Comment. In one task, each sentence was presented by the experimenter with normal intonation and stress contour together with a pair of pictures. The subjects were instructed to tell the experimenter which picture he was talking about. It was found that first graders made little use of word order in active sentences as a cue to identify Topic and Comment. Third-
graders appeared to rely more heavily on word order and showed increases in correct interpretation. MacWhinney and Price (1980) modified Hornby's experiments and studied English-speaking first-, fourth-, and eighth-graders to examine the development of their abilities in the same respect. In their experiment, children were presented with 16 triplets of pictures, each followed by a test sentence. In eight of the 16 trials, one of the three pictures exactly matched the test sentence, while in the other eight trials, no picture exactly represented the sentence. The children were told that sometimes there would not be any picture that was just right for the sentence, but were asked to point to the picture that came closest to what the test sentence was talking about. The measure of interest was which of the two partial matches would be chosen in each non-veridical trial. For example:

(9) Picture 1: cook juggling plates.
Picture 2: cook juggling blocks.
Picture 3: soldier juggling plates.
Test sentence: *The soldier juggles the blocks.*

Overall, children did not show a significant tendency to point to the first element as the topic, and to choose picture 3 that contained the topic. The results suggested that all age groups perform close to chance in using word order cues to choose the first element as topic in actives (and passives).

Paul (1985) conducted an experiment to investigate English-speaking third- and fifth-graders' abilities to use linguistic cues to interpret Given and New information. In the experiment, two context sentences describing two pictures were presented before a stimulus sentence. Subjects were told that each context sentence was the first part of a different story, and were asked to choose the correct picture for the stimulus sentence. For example:
(10) Context sentence (a): *In this story, a woman cooks a pie.*

Context sentence (b): *In this story, a man cooks an egg.*

Stimulus: *Then, it's a woman who cooks an egg.*

The expected choice of the context sentence for the stimulus sentence is (b). Paul reported that her subjects perform significantly better with passives and clefts than with actives. Since word order is the only available cue that can be used in actives, the result implies that her subjects can not use word order cue to interpret Given and New information in actives.

Functionalist researchers have also been interested in investigating the role of pragmatically-based word ordering, i.e., placing Given before New, in children's production. In studies of early production of word combinations, some empirical evidence has been found which suggests that children tend to place first the element which conveys most informative information. For example, MacWhinney (1975) noted that Hungarian-learning children tend to initialize and stress the verb in spontaneous speech, even though the most frequent orders in the language are SOV and SVO. He suggested that children were often confronted with situations in which the objects such as familiar playthings, common foods, or close family members are often highly given things. The activities in which these well-known objects engage are often new and exciting. Clancy (1985) also reported similar phenomena in Japanese-learning children who tend to postpose sentence constituents that are highly presupposed in the speech context. After children reach MLU (Mean Length of Utterance) 3.0 when subject-verb agreement and subject pronouns appear, there have been diverging reports on the correlation between pragmatic ordering and word ordering. Fava & Tirondola (1977) studied six Italian children, and found that even past the point at which subject-verb agreement and subject pronouns were acquired, children continued to place New before Given, instead of basing word order on syntactic relations. Only when communication misfires (i.e., the adult fails to understand or answer appropriately), are children motivated to shift from comment fronting to topic fronting by
rephrasing their proposition. This finding is different from that of a study done by Bates (1974). Bates found that in imitation tests with Italian-learning children between two and six years of age most word order changes revert to standard syntactic order rather than placing Given before New. MacWhinney and Bates (1978) reported that their 3- to 6-year-old subjects did not show a significant tendency to initialize either New or Given information. They did not appear to use word order spontaneously to encode Topic and Comment roles.

Marked syntactic structure is another commonly used device for encoding Given and New information. The next section will present some studies investigating how children develop their abilities to use marked grammatical structure for the pragmatic function of differentiating Given from New.

4.2.4 *MARKED GRAMMATICAL SENTENCE FORMS*

Marked syntactic structures such as passives, clefts, pseudoclefts, etc., have been recognized by researchers of discourse pragmatics as means to denote information status (Prince 1985; Gundel 1988). Psycholinguistic studies of children's language use have investigated how and when children are able to exploit syntactic structures to encode Given and New information. In studies of children's use of syntactic structures, Tannenbaum & Williams (1968) found that, when context conditions set up the appropriate Given and New relations for a passive sentence, junior high school students showed shorter production latencies when asked to form passive sentences. Turner & Rommetveit (1967) reported that the focus of attention affected the voice in which sentences are recalled by English-speaking pre-schoolers. When the focus of attention was placed on the subject, active forms were recalled easily, whereas passive forms were recalled more easily when the focus of attention was on the object.

Hornby (1970) conducted a task to test English-speaking first-, third-, and fifth-graders' use of syntactic structures to identify Topic and Comment. Children were shown
pairs of pictures and then read a sentence which matched neither picture exactly. They were asked to pick the picture the sentence "was talking about." He found that first graders did better with cleft and pseudocleft sentences than with actives. In other words, they were able to use certain syntactic structures to interpret Topic and Comment. Third-graders did better than first-graders in correct interpretation of actives, passives, and pseudoclefts in which topics preceded comments. MacWhinney & Price (1980), in replicating Hornby's study with first-, fourth-, and eighth-graders, found that all age groups performed close to chance in using syntactic structures to interpret Topic and Comment.

Paul (1985) constructed a task in which two context sentences describing two pictures were presented before a stimulus sentence; subjects were told that each context sentence was the first part of a different story, and were then asked to choose the correct context sentence for the stimulus. Two types of syntactic structures used in her study are passives and clefts, for example:

(11) Context sentence (a): *In this story, a man drops a key.*

Context sentence (b): *In this story, a girl drops an ice cream.*

Stimulus: *And then, an ice cream is dropped by a man.*

The expected context sentence for the stimulus sentence is (b). Paul found that her third- and fifth-graders performed significantly better in these two sentence types than with actives, implying that her subjects are able to use structural cues to interpret Given and New information.

4.2.5 CROSSLINGUISTIC STUDIES

There have been some crosslinguistic studies which have been done to investigate how children learning different languages develop strategies to mark Newness in narratives. Hickmann et al. (in press) did a crosslinguistic study of the development of cohesion by examining children's productions of referring expressions (local devices) and utterance structures (global devices) to mark newness in narratives. Narratives were
elicited from preschoolers, seven-year-olds, and ten-year-olds in Mandarin Chinese, English, French, and German. The children were asked to narrate two picture stories to a blindfolded listener, who had to tell the stories back. Although some aspects of the development of Newness markers are similar across these languages, some results also indicate the influence of factors that are specific to particular languages.

There are three characteristics that were found to be universal across these four languages. First, although different languages rely differentially on local and global devices as obligatory markers for New referents, data from all languages showed that the acquisition of obligatory devices in each language, such as indefinite determiners in the Indo-European languages, and postverbal position in Chinese, occurs relatively late (around seven years). This finding diverges from those of studies reporting much earlier acquisition of nominal determiners. Hickmann et al. argued that, despite the early emergence of the formal indefinite/definite opposition, the discourse-internal functions of determiners to mark Given and New function are acquired late. Second, local marking emerges first in all languages. Third, from seven years on, local and global markings of Newness attract each other in all languages. For example, indefinite/numeral determiners (local marking of Newness) tend to occur in postverbal position (global marking of Newness). This is consistent with the universal pragmatic principle of information flow, according to which speakers should prefer to place New information towards the end of the sentence.

On the other hand, language-specific variation leads to crosslinguistic differences in children's performance. First, local markings such as indefinite/numeral determiners in referring expressions are least frequent in English-speaking preschoolers, while global markings are most frequent in French-speaking children of all ages as well as Chinese-speaking children by seven years. French children from preschool on systematically use postverbal position to mark Newness, even though this type of marking is not strictly
obligatory. Second, in comparison to Chinese and French, English word order is less frequently exploited as a marking of information status. Third, postverbal position is not contrastive for marking New information for German children, who tend to use postverbal NPs independently of information status.

In sum, in studying children's development of linguistic marking for Given and New information, the nature of the tasks (simple or complex), the presence of referents in the physical context, the criteria for coding, the deictic or anaphoric functions of language use, children's cognitive strategies, the comprehension of sentence in isolation or in context, and language-specific factors are all potential factors that may influence children's performance. There have been diverging results with regard to when children have acquired linguistic devices for marking Given vs. New information. More crosslinguistic studies and better control of the potential influential variables are needed before the conclusion can be reached.
NOTES TO CHAPTER 4

Stress was found to be more effective for agent stressing than for patient stressing with the proportion of 75.8% vs. 60.5%. This might also indicate that subjects are more attentive to a stressed agent than to a stressed patient.

Presupposition was first defined by Strawson as the relation between two statements A and B, where the truth of A is a necessary condition for the truth or falsity of B. Two kinds of presupposition have been proposed: lexical and grammatical (Morgan 1969). In the former, the meaning of certain lexical item determines the content of presupposition, while in the latter, the presupposition is attributed to the particular grammatical structures exploited.

Hornby himself pointed out that it was still not possible to determine whether a subject failed to detect a discrepancy between the presupposition and the picture because the presupposed part was taken for granted or because the focal part caught his/her attention. Unless it could be found that particular combinations of surface structure features did not affect the tendency to detect discrepancy between the focus and the picture, he could not be certain that differential marking of presupposition rather than focus was the key factor in generating perceptual errors.

Bock constructed sentences with different syntactic structures: Adverb Preposing, Cleft, Conjunct Movement, Dative, Equative, Particle Movement, Passive, Phrasal Conjunct Reversal, Pseudocleft, and Subject-Object Reversal. The only sentence type which did not demonstrate the ordering of Given before New was the clefts, where New information was placed before Given. When the original sentence placed Given information in the clefted position, subjects reordered information by placing New information in the clefted position.

Here are some examples of cleft constructions in the order pseudocleft, identificational cleft, presentative cleft, and existential types in French as provided by Holmes (1995):

(a) Ce que j'apprécie le plus, c'est quatre mois de vacances.

What I appreciate the most is four months of holiday.

(b) C'est mon frère qui est arrivé.

It is my brother who has arrived.

(c) 'Ya un camarade qui me ramène jusqu'aux Quatre Routes.

There is a friend who drives me back to Quatre Routes.

(d) C'est une femme qui est très dynamique.

It is a woman who is very dynamic.

In (a), the first subordinate clause begins with **ce que** (what), and the whole clause is detached syntactically from the main clause. The subordinate clause conveys information...
which is presupposed in the discourse (I appreciate something), and the main clause introduces New information. In (b), the subordinate clause beginning with qui (who) contains presupposed information, and the main clause identifies and focuses on the particular individual satisfying the presupposition. While the qui clause in sentence (c) looks like a relative clause, the cleft is assumed to present a New referent into the discourse, with the subordinate clause providing a comment on it. The NP in such constructions is assumed to be typically indefinite, though definite NPs may be used where the referent has been introduced earlier but is no longer active in the interlocutors' consciousness. In (d), as in presentational clefts, the qui clause introduces New information, but the difference is that the referent in the existential cleft is already known and active within the discourse.

6 Age is given in year, month.
7 Cantonese is a dialect of Chinese, spoken in South China and Hong Kong.
8 The capitalized word indicates that it is stressed.
9 In their experiment, all test sentences have subject preceding predicate.
10 In children's early word combinations, there has been further suggestive evidence from French, German, and English that children tend to order first the element which conveys most informative information. See Slobin (1985) for review.
CHAPTER 5
THE PRESENT STUDY

5.1 THE GOAL AND THE PREDICTIONS

From functionalist perspectives, child language development involves the acquisition of strategies for utilizing surface forms, including syntactic, semantic, prosodic, and morphological, to interpret the meanings and functions of sentences. This includes the ability to interpret information as Given or New. The present study investigates how Mandarin-speaking children utilize surface cues of word order, syntactic structure, and stress to determine which information is Given and which is New in both isolated (IC) and contextualized conditions (CC). In IC, the determination of Given and New has to be made within isolated sentences, while in CC, the determination of Given and New has to be made across sentences. Four sentence types were used in each condition: actives, passives, clefts and pseudoclefts. In both conditions, stress was manipulated on each sentence type in three ways: normal stress on the element associated with New, emphatic stress on the element associated with New, and emphatic stress on the element associated with Given. Subjects' choice and description of pictures in IC, and choice of context sentence in CC were considered to be measures of their comprehension of the Given and New distinctions implied in a particular stimulus. It was hypothesized that: (1) in IC, subjects would assume Given information to be true, and would focus their attention on New information; (2) in CC, subjects would choose the picture that included the Given information in the stimulus sentence.

These hypotheses were tested with two tasks, verification/correction and picture-choice, modeled after Hornby (1974) and Paul (1985). In IC, subjects first heard a yes-no question in one of the four sentence types, and were then presented a pair of pictures, each of which contradicted either the Given or the New information in the stimulus question.
They were told in advance that although there were something wrong with the pictures, they should choose one, and then correctly describe the selected picture. In CC, each of a pair of pictures was first labeled with an accurate contextualizing sentence. Subjects were then presented a stimulus sentence. Their task was to choose that one of the two pictures that the stimulus went with. Subjects' responses were recorded on scoring sheets for further analysis. Five groups of Mandarin-speaking children and adults (N=15 in each group) participated in the two tasks. Children's developmental progression is traced by examining performance across different age groups. Our results will be used both to validate hypotheses, such as those proposed by Hornby and by the Competition model, as well as to examine crosslinguistic differences. The specific major questions that are being addressed in the present study are:

1. How do Mandarin-speaking children (aged 5, 7, 9, 11, and 13) employ surface cues across four sentence types—unmarked (active) and marked (active, passive, cleft, and pseudo-cleft)—to identify Given and New relations?

2. How might the manipulation of emphatic stress affect Mandarin-speaking children's processing strategies in identifying Given and New information? Can stress override syntactic form when they are in conflict? Will there be a converging effect when they converge? Do children adopt different strategies as a function of development/age?

3. Do children demonstrate different developmental patterns for isolated sentences and contextualized sentences? Are there individual differences?

4. Are there similar developmental changes between Mandarin-speaking children and children speaking other languages in using linguistic devices to decode the pragmatic function of Given and New relations?

Several predictions are made in the present study:

1. Younger children will rely more on stress than older children and adults for interpreting Given and New information.
2. Performance will be better when structural and prosodic cues converge than when the cues are placed in conflict or when fewer cues are available.

3. The use of any given cue to interpret Given and New information will vary as a function of context.

Before I discuss the main study, I will present a pilot study, on the basis of which some modifications were made to the methods used in the main study.

5.2 PILOT STUDY

PILOT STUDY

The goal of this pilot experiment was to test whether the proposed method could elicit reliable responses from Mandarin-speaking subjects and tap their processing strategies for Given and New interpretation. The second goal was to determine optimal age groups.

5.2.1 METHOD

5.2.1.1 SUBJECTS

A total of 12 Mandarin-speaking children and 6 Mandarin-speaking adults participated in this experiment. The young subjects were 6 first-graders (3 girls and 3 boys) and 6 fifth-graders (3 girls and 3 boys) who were selected from An-Ting Primary School in the Yünnlin area in Taiwan. Only those who were identified by teachers as having no language, learning or emotional problems were chosen as subjects. The six Mandarin-speaking adults (3 women and 3 men) were well-educated people, with at least a Bachelor's degree. No subjects declined to participate.

5.2.1.2 STIMULI

In the experiment, each subject heard sentences of four types—active, passive, cleft, and pseudocleft. Within each type, stress was manipulated in three ways: normal stress on the element associated with New information, emphatic stress on the element associated with New information, and emphatic stress on the element associated with Given information.
In Chinese, there are no definite or indefinite articles. The definiteness of a noun phrase is indicated by using definite determiners, such as a demonstrative determiner, while indefiniteness of a noun phrase is generally indicated by using a numeral determiner such as yi-CL 'one-classifier,' or the existential marker you-CL 'there-classifier' (Li & Thompson 1981). In Mandarin Chinese, local marking for Given and New is optional while global marking of New information in postverbal position is obligatory (Hickmann 1990). None of these local markers were used to avoid providing overt local clues for Given and New distinctions. Only bare nominals were used. The vocabulary used in the test sentences involved frequent words for children. The nouns were: wugui 'turtle,' mao 'cat,' tuzi 'rabbit,' and houzi 'monkey;' nühai 'girl,' nanhai 'boy,' chuanghu 'window,' and chabei 'cup.' The transitive verbs used were zhui 'chase,' and dapo 'break.' Two pairs of pictures were used. One pair of pictures depicted a turtle chasing a rabbit and a monkey chasing a cat while the other pair showed a boy breaking a window and a girl breaking a cup. These pictures are shown in the following:
Figure 2
Pictures used in pilot study
Figure 2 (continued)
The test sentences appear in Appendixes I & II, where an underlined element carried normal stress and a capitalized element carried emphatic stress. The test sentences were interrogatives, formed by attaching a sentence-final particle *ma* 'question marker' to their declarative counterparts. In one example pair, the test sentences were: *Does a turtle chase a cat? or Does a monkey chase a rabbit?* There were a total of 64 test sentences, of which 48 were non-veridical (neither of the two pictures matched the representation of the sentence), while 16 were veridical (one of the pictures matched the representation of the test sentence). All the questions were randomly ordered, and positioning of the pictures was changed each time they were presented to minimize response biases due to order of arrangement and habitual focus on the picture in a certain position.

Test materials were audio-recorded by the experimenter. To judge stress assignments, two Mandarin-speaking adults were asked to listen to the tapes and identify emphatically stressed words. They all agreed on the location of stress.

5.2.1.3 **PROCEDURES**

The experimental period was divided into two sessions. Subjects were first tested on the meaning of the two verbs (*zhui* 'chase' and *dapo* 'break,'), and the eight nouns (*wugui* 'turtle,' *mao* 'cat,' *tuzi* 'rabbit,' *houzi* 'monkey,' *nanhai* 'boy,' *nühai* 'girl,' *chuanghu* 'window,' and *chabei* 'cup') before the verification/correction test in each session. Each subject was shown the pair of pictures, which displayed a turtle chasing a rabbit and a monkey chasing a cat. They were asked to point to the picture of the animal after hearing its name or point to the picture after hearing the sentence. All of the subjects passed this test and participated in the experiment.

Before the actual test, subjects were given 6 demonstration trials to familiarize them with the procedures. After the demonstration trials, a sequence of nonveridical test sentences, which misrepresented what the pictures depicted, were presented in isolation, each followed by a pair of pictures. Subjects were told in advance that there was
something wrong with what was said in the test sentence; however, s/he should choose that one of the two pictures that s/he thought the sentence was talking about when the two pictures were shown and correctly describe that picture.

5.2.2 RESULTS

An Analysis of Variance was conducted on the obtained data, which were treated as three factors (age, stress, and sentence type), with repeated measures on two factors (stress and sentence type). The goal was to evaluate the effects of age, stress and sentence type. Probabilities up to 0.05 were considered to be significant. The test showed that all three effects, i.e., age, stress and sentence type, and the interactional effect between stress and sentence type reached significance, as shown in Table 5.1.

Table 5.1

Analysis of Variance in results of the interpretation test for Given and New (pilot) (N=6 in each age group)

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>age</td>
<td>2</td>
<td>4.778</td>
<td>2.389</td>
<td>2.15</td>
<td>7.522</td>
<td>0.0055</td>
</tr>
<tr>
<td>sentence type</td>
<td>3</td>
<td>10.125</td>
<td>3.375</td>
<td>3.45</td>
<td>6.779</td>
<td>0.0007</td>
</tr>
<tr>
<td>stress</td>
<td>2</td>
<td>161.583</td>
<td>80.792</td>
<td>2.30</td>
<td>110</td>
<td>0.0001</td>
</tr>
<tr>
<td>sentence type x age</td>
<td>6</td>
<td>2.556</td>
<td>0.426</td>
<td>6.45</td>
<td>0.856</td>
<td>NS</td>
</tr>
<tr>
<td>stress x age</td>
<td>4</td>
<td>5.556</td>
<td>1.389</td>
<td>4.30</td>
<td>1.892</td>
<td>NS</td>
</tr>
<tr>
<td>sentence type x stress</td>
<td>6</td>
<td>101.750</td>
<td>16.958</td>
<td>6.90</td>
<td>17.027</td>
<td>0.0001</td>
</tr>
<tr>
<td>sentence type x stress x age</td>
<td>12</td>
<td>16.778</td>
<td>1.398</td>
<td>12.90</td>
<td>1.404</td>
<td>NS</td>
</tr>
</tbody>
</table>

5.2.2.1 MAIN EFFECTS

AGE. Differences between the age groups were found to be significant (F (2,15) = 7.522, p ≤ 0.0055). To examine the difference source, Scheffé (1953) tests were performed on all possible age pairs. The result showed that there was a significant difference between seven-year-olds and adults (p < 0.05). Figure 3 shows the mean scores (out of 4 total) and standard deviations at three age levels.
Mean scores (out of 4) and standard deviations at three age levels (pilot)

SENTENCE TYPE. The effect of sentence type also reached significance ($F(3,45) = 6.779, p \leq 0.0007$). A contrast test was performed on all possible sentence type pairs, by applying Bonferroni procedures ($p$ value times the number of planned contrasts). The result showed significant differences between actives and passives ($F(1,17) = 13.559, p < 0.05$) and between actives and pseudoclefts ($F(1,17) = 13.559, p < 0.05$), but not between any other possible pairs of sentence types. The mean scores of passives and pseudoclefts were higher than those of clefts and actives, with actives the lowest. Figure 4 shows the mean scores and standard deviations of the performances on the four sentence types.
Mean scores (out of 4) and standard deviations for four sentence types (pilot).

STRESS. The main effect of stress was significant ($F(2,30) = 110, p \leq 0.0001$).

Subjects performed best when New information was emphatically stressed. To identify the source of difference, contrast tests were performed on all possible stress pairs, by applying the Bonferroni procedure (the original significance level 0.05 was readjusted to 0.02, i.e., 0.05 divided by the number of planned contrasts (3)). The result showed that although there was a difference between the two sentence conditions when New information was normally stressed and when New information was emphatically stressed, the difference did not reach significance ($p > 0.02$). Significant differences were found only between conditions with normal stress on the New element and emphatic stress on the Given element ($F(1,17) = 157.387, p \leq 0.0009$), and between conditions with emphatic stress on the New element and emphatic stress on the Given element ($F(1,17) = 172.368, p \leq 0.0009$). Figure 5 shows the mean scores and standard deviation for the three stress conditions.
5.2.2.2 INTERACTION EFFECTS

SENTENCE TYPE x STRESS. The interactional effect of sentence type x stress was also significant (F (6,90) = 17.027, p ≤ 0.0001), indicating that different stress conditions affected interpretation of different sentence types in different ways. Table 5.2 shows the percentage of correct responses, and the mean scores for the 3 age groups under three stress conditions for the four sentence types. The mean scores and standard deviations appear in APPENDIX III. It can be seen that for the children, no converging effect of structural cue and stress was found for actives or passives, but was present for clefts and pseudoclefts. When structural cues were in competition with stress, it was found that stress overrode only word order, but not marked syntactic structure. For adults, the cumulative effect of structure and stress was found only in the actives. When in competition, the syntactic structural cue was preferred over stress for all sentence types. Figures 6-8 show the performance under three stress conditions.
Table 5.2

Percentage of correct responses (pilot) (N=6 in each age group)

<table>
<thead>
<tr>
<th>age</th>
<th>stress</th>
<th>active</th>
<th>passive</th>
<th>cleft</th>
<th>pseudocleft</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>normal/N</td>
<td>46</td>
<td>88</td>
<td>58</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td>emphatic/N</td>
<td>42</td>
<td>83</td>
<td>67</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>emphatic/G</td>
<td>50</td>
<td>13</td>
<td>33</td>
<td>13</td>
</tr>
<tr>
<td>11</td>
<td>normal/N</td>
<td>46</td>
<td>91</td>
<td>46</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>emphatic/N</td>
<td>46</td>
<td>88</td>
<td>67</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>emphatic/G</td>
<td>78</td>
<td>21</td>
<td>42</td>
<td>0</td>
</tr>
<tr>
<td>AD</td>
<td>normal/N</td>
<td>67</td>
<td>100</td>
<td>71</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>emphatic/N</td>
<td>75</td>
<td>94</td>
<td>71</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>emphatic/G</td>
<td>29</td>
<td>13</td>
<td>58</td>
<td>9</td>
</tr>
</tbody>
</table>

Figure 6

Normal stress on New (pilot)
Figure 7
Emphatic stress on New (pilot)

Figure 8
Emphatic stress on Given (pilot)
5.2.3 DISCUSSION

Overall, the children in the two age groups did not utilize word order effectively, although the utilization of the (marked) syntactic structures in passives and pseudoclefts was well in place. The converging and competing effects of stress and structural cues varied across sentence types. The findings are as follows:

First, in view of the significant difference between the two groups, seven-year-olds have not acquired adult abilities to use surface cues to identify Given and New information. Secondly, the children did not utilize word order effectively to interpret Given and New information in active sentences. Thirdly, the children could utilize marked grammatical structure in passive and pseudocleft sentences, but only barely in cleft sentences. The 7-year-olds appeared better able than 11-year-olds to use the cleft structure to interpret Given versus New information. It was suspected that a U-shaped pattern of learning strategies might be involved. Fourthly, although the cumulative effect of stress and structure varied across sentence types, the effect did not reach significance. Fifthly, the mean scores in the condition where the Given information received emphatic stress were significantly higher than those in the condition where the New information received normal stress; this indicates that a structural cue is preferred over stress when they are in competition. Sixthly, when a prosodic cue was in conflict with word order in actives, stress was preferred over word order. But, when stress was in conflict with marked structural cues in passive and pseudoclefts with stress imposed on the Given noun, structural cues were preferred over stress. On the basis of the findings of the pilot study, we modified the methods for the main study in several ways, which will be discussed next.

The range of age groups to be tested and number of subjects in each group were modified in view of the findings from the pilot study:

First, the pilot results suggested that our subjects relied more on structural cues than on prosodic cues in identifying Given versus New information, especially when stress was
placed in competition with marked grammatical structure. In order to test whether younger children relied more on stress than on structure, we decided to include five-year-olds as subjects. In Hornby's (1973) experiment, it was shown that first graders had a strong tendency to treat stressed information as New, and that this tendency decreased with age until it disappeared by ninth grade. Hornby's 1973 result was consistent with the results found by MacWhinney & Price (1980). However, these two results were opposite to the findings of Hornby's 1971 experiment which showed a minimal effect of stress on judgments of Topic-Comment by first graders, but reliance on stress to identify Topic and Comment increasing with age. It seems impossible to reconcile these findings without further data. We decided to use even younger Mandarin-speaking children to investigate whether they would rely more on stress as an encoder of New information.

Secondly, in our pilot study, subjects performed better in passives and pseudoclefts than in actives and clefts. It was surprising to find that 11-year-olds did not fully demonstrate the ability to identify a clefted element as encoding New information, and performed worse than seven-year-olds. In order to test whether even older children would be better able to use cleft structural cues to identify Given and New information, thirteen-year-olds were included in the main study. Thirdly, nine-year-olds were included as one age group to better track children's development of processing strategies in this respect. Fourthly, a larger number of subjects was used and more test sentences were constructed to increase the reliability of the experimental results.

Fifthly, the construction of the stimuli in the main study was slightly different from that used in the pilot study. In the pilot, a pair of pictures, which, for example, depicted a turtle chasing a rabbit and a monkey chasing a cat, went with variations of sentence conditions revolving around two discrepant descriptions, e.g., Does the turtle chase the cat? and Does the monkey chase the rabbit?. In the main study, since more stimulus
sentences were added, each pair of pictures went with variations of sentence conditions revolving around only one discrepant description, e.g., *Does the turtle chase the cat?*

Sixthly, in the pilot study, only isolated sentences were used as stimuli. Since we suspected that context might affect processing strategies for interpretation of Given and New, we decided to add a set of contextualized stimuli.

5.3 THE MAIN STUDY

In the main study, two experiments were designed to test Mandarin-speakers' strategies for interpreting Given and New information in isolated (IC) and contextualized (CC) conditions. In IC, a verification/correction task was used, where each stimulus sentence was presented in isolation, while in CC, a picture-choice task was used, where each stimulus sentence was presented in a verbal context. In IC, subjects first heard a yes-no question, and then were presented a pair of pictures, each of which contradicted either the Given or the New information in the stimulus question. They were told in advance that although there was something wrong with the pictures, they should nevertheless choose one, and then correctly describe the selected picture. In CC, each of a pair of pictures was first labeled with an accurate contextualizing sentence. Subjects were then presented a stimulus sentence. They were asked to choose that one of the two pictures that the stimulus went with. Subjects' choices and descriptions of pictures in IC, and choices of context sentence in CC were considered to be measures of their comprehension of the Given and New distinctions implied by a particular stimulus. In addition, children's developmental progression can be traced by examining performance under different conditions across the age groups.

5.3.1 EXPERIMENT I: VERIFICATION/CORRECTION EXPERIMENT

EXPERIMENT I

To elicit responses from our subjects, a verification/correction task similar to that used in the pilot study was used. The first goal of this verification/correction experiment
was to investigate Mandarin-speaking children's and adults' processing strategies in using surface cues to interpret Given and New information in sentences presented in isolation. The second goal was to trace children's developmental progression by examining their performance across age groups. The rationale for the employment of the sentence-verification test was based on the hypothesis that when asked to verify, people assume the presupposed Given information to be true, and will focus on New information. By recording subjects' responses under different sentence conditions, we would be able to explore how they utilized the surface cues present in a particular stimulus sentence.

5.3.1.1 Method

5.3.1.1.1 Subjects

Subjects participating in the present study were 15 5-year-olds, 15 7-year-olds, 15 9-year-olds, 15 11-year-olds, 15 13-year-olds and 15 adults. In each age group, there were eight males and seven females. Children were selected from Yü-Te Kindergarten, An-Ting Primary School, Hsilo & Tung-Nan Middle School in the Yünlin area in Taiwan. Only those who were identified by teachers as having no language, or emotional problems were chosen as subjects. The 15 adult subjects were undergraduates, at least 20 years old, from the Yünlin Institute of Technology in Taiwan. No subjects declined to participate.

5.3.1.1.2 Stimuli

Stimulus sentences were of four types, active, passive, cleft, and pseudo-cleft. Within each type, stress was manipulated in three ways: normal stress on the element associated with New information, emphatic stress on the element associated with New information, and emphatic stress on the element associated with Given information. The effect of stress could thus be measured in conditions when it was both in convergence and in conflict with word order and marked structure.

For each sentence structure there were eight sentences with three stress conditions imposed, as in the pilot study (Appendixes I and II). A total of 96 nonveridical randomly-
arranged test sentences were presented with no context given. The sentences were constructed around two commonly-used semantic types: semantically reversible (both agent and object are animate) and semantically irreversible (only agent is animate). The nouns and verbs used are listed as follows:

**Nouns**

- wugui 'turtle'
- mao 'cat'
- laoying 'hawk'
- xiaoniao 'little bird'
- gongji 'cock'
- xiaoxia 'little shrimp'
- daxiang 'elephant'
- hezi 'box'
- haibau 'seal'
- nüren 'woman'

- tuzi 'rabbit'
- yelang 'wolf'
- xiaoji 'chicken'
- nühai 'girl'
- xiaochong 'worm'
- chuanghu 'window'
- yizi 'chair'
- xiaogou 'dog'
- Ügang 'fish bowl'
- chezi 'car'

- houzi 'monkey'
- xiaoya 'duckling'
- nanhai 'boy'
- hudie 'butterfly'
- emama 'mother goose'
- chabei 'cup'
- xingxing 'gorilla'
- huapin 'vase'
- nanren 'man'
- bingxiang 'refrigerator'

**Verbs**

- zhui 'chase'
- fangzou 'release'
- nongdau 'knock over'

- zhuazhu 'catch'
- dapó 'break'
- xiuli 'fix'

- yaozhu 'bite into'
- caihuai 'trample'

The stimulus sentences were in interrogative form with sentence conditions similar to those used in the pilot study. An example of the test sentences for a pair of pictures appears in APPENDIX IV. Descriptions of the eight pairs of pictures appear in Appendix V. (What have been translated as definite noun phrases in English are bare nominals in Mandarin.). Eight pairs of pictures were used in the experiment, including the two pairs used in the pilot study (as shown on pages 101 and 102). The other six pairs appear in Appendix VI.
5.3.1.1.3 PROCEDURES

Subjects were visited on a regular schedule at predetermined times for a predetermined amount of time in the library of their school. Interpretation tests for Given and New distinctions in four types of isolated sentences were conducted in one session, which lasted for about 30 minutes per subject.

The procedures were the same as in the pilot study.

5.3.1.2 CODING AND ANALYSIS

Subjects' scores consisted of the number of times that the element conveying New information in each nonveridical sentence was corrected. For the purpose of scoring, the determination of the information status of elements in each of the four sentence types was based on the following criteria. The elements that occur in the following positions denote New information: the later part of a sentence under normal intonation (Halliday 1967), the element occurring after the preposition by in the passive voice (Fillmore 1968); the phrase containing the locus of heaviest stress (Chomsky 1971); and the element occurring in the post-copular position in cleft and pseudocleft sentences (Akmajian 1969). In Mandarin Chinese, the postverbal element in an active sentence, the elements occurring after bei 'by,' and the element occurring after shi 'is' in cleft and pseudocleft sentences denote New information when they receive normal stress. In sentences employing emphatic stress, the stressed part of the sentence is considered to be the New information. In order to correct information in the stimulus sentence that is misrepresented in a given pair of pictures, subjects first need to identify the Given and New information in the stimulus sentence, then to select that one of the two pictures that contains the Given information, and then to correct the nonveridical New information against the chosen picture. Table 5.3 lists scoring rules for the Verification/Correction Task.

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Table 5.3
Scoring rules for the Verification/Correction Task

<table>
<thead>
<tr>
<th>condition</th>
<th>sentence type</th>
<th>stress type</th>
<th>stress placement</th>
<th>subjects’ response</th>
<th>score</th>
</tr>
</thead>
<tbody>
<tr>
<td>active</td>
<td>normal</td>
<td>New</td>
<td>patient corrected</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>emphatic</td>
<td>New</td>
<td>patient corrected</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>emphatic</td>
<td>Given</td>
<td>agent corrected</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>passive</td>
<td>normal</td>
<td>New</td>
<td>agent corrected</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>emphatic</td>
<td>New</td>
<td>agent corrected</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>emphatic</td>
<td>Given</td>
<td>patient corrected</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>cleft</td>
<td>normal</td>
<td>New</td>
<td>agent corrected</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>emphatic</td>
<td>New</td>
<td>agent corrected</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>emphatic</td>
<td>Given</td>
<td>patient corrected</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>pseudocleft</td>
<td>normal</td>
<td>New</td>
<td>agent corrected</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>emphatic</td>
<td>New</td>
<td>agent corrected</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>emphatic</td>
<td>Given</td>
<td>patient corrected</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

For example, suppose a pair of pictures depicting a boy releasing a bird and a girl releasing a butterfly were used to verify the stimulus. For an active stimulus question such as *Nanhai fangzou hudie ma* 'Does the boy release the butterfly?' where the patient (New) *hudie* 'butterfly,' received normal or emphatic stress, subjects scored one point by answering *Bushi, nanhai fangzou xiaoniao* 'No, the boy releases the bird,' where the patient (New) in the stimulus was replaced. When the agent *nanhai* 'the boy,' received emphatic stress, subjects would score one point by answering *Bushi, nühai fangzou hudie* 'No, the girl releases the butterfly,' where the agent in the stimulus was corrected. For a passive stimulus sentence such as *Hudie bei nanhai fangzou ma* 'Is the butterfly released by the boy?,' where the agent (New) *nanhai* 'the boy' was normally- or emphatically-stressed, subjects would get one point by answering *Bushi, hudie bei nühai fangzou* 'No, the butterfly is released by the girl,' where the agent (New) in the stimulus was corrected. When the patient *hudie* 'the butterfly' was emphatically-stressed, subjects would obtain one point by answering *Bushi, Xiaonao bei nanhai fangzou* 'No, the bird is released by the boy,' where the patient in the stimulus was corrected. For a cleft stimulus sentence structure such as *Shi nanhai fangzou hudie ma* 'Is it the boy that releases the butterfly?,'
where the agent (New) nanhai 'the boy' received normal or emphatic stress, subjects would get one point by answering Bushi, shi nūhai fangzou hudie 'No, it is the girl that releases the butterfly,' where the agent (New) in the stimulus was corrected. When the patient hudie 'the butterfly' was emphatically-stressed, subjects would score one point by answering Bushi, shi nanhai fangzou xiaonao 'It is the boy that releases the bird,' where the patient in the stimulus was corrected. For a pseudocleft stimulus sentence structure such as Fangzou hudie de shi nanhai rna 'Is what releases the butterfly the boy?,' where the agent (New) nanhai 'the boy' was normally or emphatically stressed, subjects would score one point by answering Bushi, fangzou hudie de shi nūhai 'What releases the butterfly is the girl,' where the agent (New) in the stimulus was corrected. When the patient hudie 'the butterfly' was emphatically-stressed, subjects would score one point when the patient in the stimulus was corrected. Answers which involved correction to the Given information or unanswered questions were excluded from scoring. After all responses were checked as correct or incorrect, the number of correct choices was recorded into a two-dimensional matrix. The full score for each cell was 8. Statistical analyses were conducted on the results to test the main effects of the factors.

5.3.2 EXPERIMENT II: PICTURE-CHOICE EXPERIMENT

EXPERIMENT II

The goal of this experiment was to investigate the role of context in how Mandarin-speaking children exploit surface cues of stimulus sentences to interpret Given and New information. A picture-choice task was designed to elicit subjects' responses. In the experiment, subjects were first shown a pair of pictures, each of which was first labeled with an accurate contextualizing sentence. When the pictures were presented, subjects heard context sentences which represented the beginning parts of each story. They were then presented a stimulus sentence, and were asked to choose that one of the two pictures that the stimulus sentence went with. The rationale for the employment of picture-choice
task was based on the hypothesis that listeners would first identify the Given and New information in the stimulus sentence in order to relate it to the antecedent of the Given information in the previous context. The procedures were modified versions as those used by Paul (1985) in her Given/New Interpretation Test.

5.3.2.1 METHOD

5.3.2.1.1 SUBJECTS

The subjects consisted of the same groups of subjects who participated in the previous experiment (15 5-year-olds, 15 7-year-olds, 15 9-year-olds, 15 11-year-olds, 15 13-year-olds, and 15 adults). They were tested a few weeks after they finished the decontextualized task.

5.3.2.1.2 STIMULI

The same eight pairs of pictures used in the isolated condition were used again. The stimulus sentences, however, were different although the construction method was similar. Let's call each pair of pictures the X picture and the Y picture. In the isolated condition, the stimulus sentence contained an agent depicted in the X picture of the pair but a patient depicted in Y picture. However, in the contextualized picture-pointing task, the stimulus sentence contained an agent depicted in the Y picture but a patient depicted in the X picture. For example, for the pair of pictures depicting a turtle chasing a rabbit (X) and a monkey chasing a cat (Y), a stimulus sentence in active voice in the isolated context was *Wugui zhui mao ma?* 'Does the turtle chase the cat?' while a stimulus sentence in the contextualized picture-choice task was *Ranhou, houzi zhui tuzi* 'Then, the monkey chases the rabbit.' The set of test stimulus sentences used with this pair of pictures appears in APPENDIX VII.

There were a total of 96 randomly-arranged target sentences presented with previous context sentences, with 48 in each of the semantically-reversible and semantically-irreversible conditions. The stimulus sentences were of four sentence types--active,
passive, cleft, and pseudocleft. Within each type, stress was manipulated in three ways: normal stress on the element associated with New information, emphatic stress on the element associated with New information, and emphatic stress on the element associated with Given information. Each pair of pictures was labelled with a different title (a sun story and a moon story, a tree story and a flower story, a forest story and a lawn story, a ranch story and a yard story, a master story and an apprentice story, a mountain story and a sea story, a school story and a home story, a circus story and a zoo story). The descriptions of the eight pairs of pictures with labelled titles appear in APPENDIX VIII. To increase the story-like character, each audio-recorded stimulus sentence was preceded by the two relevant context sentences. For example, the two pictures of a pair were labeled 'a sun story' and 'a moon story' with the symbols of sun and moon present in the pictures. A representative set of context sentences and its stimulus sentence are as follows:

(1) Zai taiyang de gushi, shouxian yi-zhi wugui zhui yi-zhi tuzi.
   'In the sun story, first a turtle chases a rabbit.'

(2) Zai yueliang de gushi, shouxian yi-zhi houzi zhui yi-zhi mao.
   'In the moon story, a monkey chases a cat.'

(3) Stimulus: Ranhou, shi houzi zhui tuzi.
    'Then, it is the monkey that chases the rabbit.'

The expected choice is context sentence (1), which contains the Given information 'tuzi' 'rabbit' of the stimulus sentence. Verbs for both context sentences matched; agents and objects differed. The stimulus sentence always replaced either the agent or the object of the context sentence to be chosen with that of the context sentence not to be chosen.
5.3.2.1.3  PROCEDURE

Subjects were visited on a regular schedule at predetermined times for a predetermined amount of time in the library of their school. The Given and New interpretation test for the four sentence types in the contextualized condition was conducted in two sessions. In the first session, half of the randomized stimulus sentences were presented, while in the second session, the other half were presented. The first and second sessions lasted for about 40 minutes each.

On each trial, the two context pictures were presented simultaneously side by side. Subjects were told that each context sentence was the first part of a different story. They were told to repeat each context sentence after they heard it in order to aid memory. The experimenter pointed to each context picture while its sentence was being played. Subjects were then instructed to choose the context story that went with the stimulus sentence was by choosing the appropriate context picture.

5.3.2.2  CODING AND ANALYSIS

Subjects' scores consisted of the number of times that the context sentence containing the Given information of the stimulus was chosen. To choose a correct context sentence story, subjects first needed to identify the Given information in the stimulus sentence, then select the context sentence containing the Given element. Under normal stress, the determination of information structure could be based solely on the surface structure, as discussed in 5.3.1.2. The elements that occur in the following positions denote New information: the later occurring part of a sentence under normal intonation (Halliday 1967), the element occurring after the preposition by in the passive voice (Fillmore 1968); the phrase containing the locus of heaviest stress (Chomsky 1971); and the element occurring in the post copular position in cleft and pseudocleft sentences (Akmajian 1969). These criteria apply in Mandarin Chinese as well. The postverbal element in an active sentence, the element occurring after bei 'by,' and the element
occurring after *shi* 'is' in a cleft and pseudocleft sentence denote New information when they receive normal stress. In the sentences employing emphatic stress, the stressed part of the sentence is considered to denote New information. The elements occupying positions other than the above-mentioned tend to denote Given information. For example, in Mandarin Chinese, for an active sentence such as *Wugui zhui mao* 'The turtle chases the cat,' the preverbal element, i.e., *wugui* 'the turtle,' is considered to be the Given information. For a passive sentence such as *Mao bei wugui zhui* 'The cat is chased by the turtle,' the noun *mao* 'the cat' is the Given information. For a cleft sentence structure such as *Shi wugui zhui mao* 'It is the turtle that chases the cat,' and pseudocleft sentence structure such as *Zhui mao de shi wugui* 'What chases the cat is the turtle,' the noun *mao* 'the cat' is the Given information in both sentences, and the element occurring after the copula *shi* 'is,' i.e., *wugui* 'the turtle,' is considered to be New information. In sentences employing emphatic stress, the unstressed part of the sentence is considered to be the Given information. Table 5.4 lists the set of scoring rules for the Picture-Choice Experiment.
Table 5.4
Scoring rules for the Picture-Choice Task

<table>
<thead>
<tr>
<th>condition</th>
<th>sentence type</th>
<th>stress type</th>
<th>stress placement</th>
<th>subjects' response</th>
<th>score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 active</td>
<td>normal</td>
<td>New</td>
<td>choice of the context sentence containing the agent</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>emphatic</td>
<td>New</td>
<td>choice of the context sentence containing the agent</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>emphatic</td>
<td>Given</td>
<td>choice of the context sentence containing the patient</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2 passive</td>
<td>normal</td>
<td>New</td>
<td>choice of the context sentence containing the patient</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>emphatic</td>
<td>New</td>
<td>choice of the context sentence containing the patient</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>emphatic</td>
<td>Given</td>
<td>choice of the context sentence containing the agent</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3 cleft</td>
<td>normal</td>
<td>New</td>
<td>choice of the context sentence containing the patient</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>emphatic</td>
<td>New</td>
<td>choice of the context sentence containing the patient</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>emphatic</td>
<td>Given</td>
<td>choice of the context sentence containing the agent</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4 pseudocleft</td>
<td>normal</td>
<td>New</td>
<td>choice of the context sentence containing the patient</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>emphatic</td>
<td>New</td>
<td>choice of the context sentence containing the patient</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>emphatic</td>
<td>Given</td>
<td>choice of the context sentence containing the agent</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
For example, subjects were first presented a pair of pictures depicting a turtle chasing a rabbit and a monkey chasing a cat, and the two labeled accurate contextualizing sentences which represented the first parts of the two stories. Then, they heard a stimulus sentence, and were asked to choose that one of the context sentences the stimulus sentence went with. For an active stimulus sentence such as *Ranhou, houzi zhui tuzi* 'Then, the monkey chases the rabbit,' where the patient (New)*tuzi* 'the rabbit' received either normal or emphatic stress, subjects scored one point if the context sentence *houzi zhui mao* 'The monkey chases the cat,' containing the agent (Given) *houzi* 'the monkey,' was chosen. When *houzi* 'the monkey' received emphatic stress, subjects scored one point if the context sentence *wugui lizui tuzi* 'The turtle chases the rabbit,' which contained the patient (Given) in the stimulus *tuzi* 'the rabbit,' was selected. For a passive sentence such as *Ranhou, tuzi bei houzi zhui* 'Then, the rabbit is chased by the monkey,' in which *houzi* 'the monkey' received either normal or emphatic stress, subjects scored one point if the context sentence *wugui zhui tuzi* 'The turtle chases the rabbit,' which contained the patient (Given) in the stimulus *tuzi* 'the rabbit' was selected. When the patient *tuzi* 'the rabbit' in the stimulus received emphatic stress, subjects scored one point if the context sentence *houzi zhui mao* 'The monkey chases the cat,' which had the agent (Given) in the stimulus *houzi* 'the monkey' was chosen. For a cleft sentence such as *Ranhou, shi houzi zhui tuzi* 'Then, it is the monkey that chases the rabbit,' where the agent (New) *houzi* 'the monkey' received either normal or emphatic stress, subjects obtained one point if the context sentence *wugui zhui tuzi* 'The turtle chases the rabbit,' which contained the patient (Given) in the stimulus *tuzi* 'the rabbit,' was chosen. When the patient *tuzi* 'the rabbit' in the stimulus was emphatically-stressed, subjects would score one point if the context sentence *houzi zhui mao* 'Then, the monkey chases the cat,' which contained the agent (Given) *houzi* 'the monkey,' was selected. For a pseudocleft sentence such as *Ranhou, zhui tuzi de shi houzi* 'Then, what chases the rabbit is the monkey,' where the agent (New) *houzi* 'the monkey'
received either normal or emphatic stress, subjects scored one point if the context sentence "wugui zhui tuzi 'the turtle chases the rabbit,' which contained the patient (Given) tuzi 'the rabbit' was chosen. When the patient tuzi 'the rabbit' received emphatic stress, subjects scored one point if the context sentence "houzi zhui mao 'The monkey chases the cat,' which contained the agent (Given) in the stimulus houzi 'the monkey' was chosen. Each expected answer earned one point. The choice of the context sentence containing the New information in the stimulus sentence, and unanswered questions were excluded from scoring. All responses were noted as correct or incorrect. The obtained scores were recorded into a two-dimensional matrix. The full score for each cell was 8. Statistical analyses were conducted on the data to test the main effects of factors of age, sentence type and stress.
CHAPTER 6
RESULTS

6.1 RESULTS OF VERIFICATION/CORRECTION EXPERIMENT

An Analysis of Variance was run on the whole set of scores to determine whether there was any sex difference (with equal number of subjects in each age group). The results showed that sex was not a significant factor ($p > 0.05$). The data were then pooled for subsequent analyses, which treated the data as three factors (age, stress, sentence type), with repeated measures on two factors (stress and sentence type). ANOVAs were applied to the data to evaluate the main effects of age, stress, and sentence type as well as interactional factors. Probabilities up to 0.05 were considered as significant. Table 6.1 presents the results of the ANOVA:

Table 6.1
Analysis of Variance in results of the interpretation test for Given and New (isolated) (N=15 in each age group)

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F(df)</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
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<td>5.84</td>
<td>9.739</td>
<td>0.0001</td>
</tr>
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<td>84.569</td>
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<td>60.905</td>
<td>0.0001</td>
</tr>
<tr>
<td>stress</td>
<td>2</td>
<td>3256.096</td>
<td>1628.048</td>
<td>2.168</td>
<td>461</td>
<td>0.0001</td>
</tr>
<tr>
<td>sentence type x age</td>
<td>15</td>
<td>50.715</td>
<td>3.381</td>
<td>15.252</td>
<td>2.435</td>
<td>0.0025</td>
</tr>
<tr>
<td>stress x age</td>
<td>10</td>
<td>279.893</td>
<td>27.989</td>
<td>10.168</td>
<td>7.920</td>
<td>0.0001</td>
</tr>
<tr>
<td>sentence type x stress</td>
<td>6</td>
<td>2293.726</td>
<td>382.288</td>
<td>6.504</td>
<td>88.025</td>
<td>0.0001</td>
</tr>
<tr>
<td>sentence type x stress x age</td>
<td>30</td>
<td>423.085</td>
<td>14.103</td>
<td>30.504</td>
<td>3.247</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

6.1.1 MAIN EFFECTS

AGE. The main effect of age reached significance ($F (5,84) = 9.739, p \leq 0.0001$). To examine the difference source, Scheffé (1953) tests were performed on all possible age pairs. The results showed that there was a significant difference between five-year-olds and each of the other age groups, and between seven-year-olds and adults ($p < 0.05$). This suggests that the five- and seven-year-olds did not employ surface cues for Given and New
functions in the same way as the adults. Figure 9 presents the mean scores and standard deviations for each age group:

![Chart showing mean scores and standard deviations for each age group.](chart)

**Figure 9**

Mean scores (out of 8) and standard deviations at six age levels (isolated)

**SENTENCE TYPE.** The main effect of sentence type was significant \( F(3,252) = 60.905, p \leq 0.0001 \). Contrast tests were performed on all possible sentence type pairs with the original \( p \) value 0.05 reset to 0.0028 by applying Bonferroni procedures (the original \( p \) value 0.05 divided by the number of planned contrasts 18, i.e., number of pairs of planned contrast between different sentence types 6 times number of pairs of planned contrast between different stress conditions 3). The result showed significant differences between actives and passives \( F(1,89) = 138.280, p < 0.0028 \), between actives and clefts \( F(1,89) = 20.177, p < 0.0028 \), between actives and pseudoclefts \( F(1,89) = 114.494, p < 0.0028 \), between passives and clefts \( F(1,89) = 52.815, p < 0.0028 \), between clefts and pseudoclefts \( F(1,89) = 38.543, p < 0.0028 \), but not between passives and pseudoclefts. This indicates that overall performances on passives and pseudoclefts
were better, while those on actives were the poorest. Figure 10 presents the mean scores and standard deviations for each sentence type:

![Graph showing mean scores and standard deviations for four sentence types](image)

**Figure 10**

Mean scores (out of 8) and standard deviations for four sentence types (isolated)

STRESS. The main effect of stress was significant ($F(2,168) = 461, p \leq 0.0001$). Contrast tests were performed on all possible stress pairs with the original p value 0.05 reset to 0.0028 by applying Bonferroni procedures (the original p value 0.05 divided by the number of planned contrasts 18, i.e., number of pairs of planned contrast between different sentence types 6 times number of pairs of planned contrast between different stress conditions 3). The result showed significant differences between all pairs: between normal stress on New and emphatic stress on New ($F(1,89) = 11.093, p < 0.0028$), normal stress on New and emphatic stress on Given ($F(1,89) = 598.489, p < 0.0028$), and emphatic stress on New and emphatic stress on Given ($F(1,89) = 772.542, p < 0.0028$). Figure 11 presents the mean scores and standard deviations for the three types of stress:
Mean scores (out of 8) and standard deviations for three stress conditions (isolated)

6.1.2  *INTERACTION EFFECTS*

  SENTENCE TYPE $\times$ AGE. The interaction effect for sentence type $\times$ age also reached significance ($F (15, 252) = 2.435, p \leq 0.0025$). Figure 12 illustrates the interaction effects:
The performance by five-year-olds on different sentence types did not vary as greatly as for other age groups. By nine years, performance on passives and pseudoclefts had improved sharply, while performance on actives had declined. The performance on actives did not improve until thirteen years. An interpretation should be made with caution, however, because the three-way interaction of stress x sentence type x age was also significant.

**STRESS x AGE.** The different age groups did not respond to stress systematically. The two-way interaction of stress x age was significant (F (10,168) = 7.920, p ≤ 0.0001). The results show a cumulative effect of stress and structure as manifested by better performance when New information received emphatic stress (i.e., stress converged with word order and structural cues). When Given information received emphatic stress (i.e., stress was in competition with other cues), there was a decrease in the performance with age. Figure 13 presents the interactional effect of stress and age:
Figure 13

Interaction between stress and age (isolated) (cell mean = 8)

**SENTENCE TYPE x STRESS.** There was also significant interactional effect of sentence type x stress ($F(6,504) = 88.025, p \leq 0.0001$), indicating that the effect of stress on different sentence types was not uniform. Figure 14 shows that the effect of stress on actives was different from that on passives, clefts, and pseudoclefts. In particular, performance on actives when Given information was emphatically stressed was better than in the other two stress conditions, while the performance in passives, clefts, and pseudoclefts dropped sharply.
Interaction between sentence type and stress (isolated) (cell mean = 8)

SENTENCE TYPE x STRESS x AGE. The three-way interaction of sentence type x stress x age was also significant (F (30,504) = 3.247, p ≤ 0.0001), indicating that different age groups responded in different ways to different sentence types under different stress conditions. In other words, the combined set of surface cues was exploited differently as a function of age/development. The interpretation of these single- and two-way effects should thus be taken with caution. Table 6.2 records the results by percentage of correct responses. A Table recording the mean scores and standard deviation of twelve sentence conditions at six age levels appears in Appendix IX. Figures 15-17 show the performance on different sentence types under different stress conditions across different age groups:

Figure 14

Interaction between sentence type and stress (isolated) (cell mean = 8)
Table 6.2

Percentage of correct responses (isolated) (N=15 in each age group)

<table>
<thead>
<tr>
<th>age</th>
<th>stress</th>
<th>active</th>
<th>passive</th>
<th>cleft</th>
<th>pseudocleft</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>normal/N</td>
<td>38</td>
<td>70</td>
<td>56</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>emphatic/N</td>
<td>57</td>
<td>70</td>
<td>60</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>emphatic/G</td>
<td>66</td>
<td>70</td>
<td>63</td>
<td>26</td>
</tr>
<tr>
<td>7</td>
<td>normal/N</td>
<td>28</td>
<td>88</td>
<td>63</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>emphatic/N</td>
<td>49</td>
<td>96</td>
<td>67</td>
<td>93</td>
</tr>
<tr>
<td></td>
<td>emphatic/G</td>
<td>69</td>
<td>96</td>
<td>77</td>
<td>97</td>
</tr>
<tr>
<td>9</td>
<td>normal/N</td>
<td>29</td>
<td>93</td>
<td>59</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>emphatic/N</td>
<td>53</td>
<td>96</td>
<td>77</td>
<td>97</td>
</tr>
<tr>
<td></td>
<td>emphatic/G</td>
<td>63</td>
<td>96</td>
<td>77</td>
<td>97</td>
</tr>
<tr>
<td>11</td>
<td>normal/N</td>
<td>24</td>
<td>98</td>
<td>83</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>emphatic/N</td>
<td>39</td>
<td>98</td>
<td>82</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>emphatic/G</td>
<td>76</td>
<td>98</td>
<td>82</td>
<td>100</td>
</tr>
<tr>
<td>13</td>
<td>normal/N</td>
<td>38</td>
<td>94</td>
<td>74</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>emphatic/N</td>
<td>48</td>
<td>89</td>
<td>85</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td>emphatic/G</td>
<td>68</td>
<td>89</td>
<td>85</td>
<td>95</td>
</tr>
<tr>
<td>AD</td>
<td>normal/N</td>
<td>76</td>
<td>93</td>
<td>77</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>emphatic/N</td>
<td>67</td>
<td>97</td>
<td>73</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>emphatic/G</td>
<td>28</td>
<td>97</td>
<td>73</td>
<td>100</td>
</tr>
</tbody>
</table>

Figure 15

Normal stress on New (isolated)
Figure 16
Emphatic stress on New (isolated)

Figure 17
Emphatic stress on Given (isolated)
As can be seen, the pattern of performance across the different age groups was not consistent, suggesting that surface cues were employed differently in the following ways:

5-7 years (Figures 18 and 19): From five to seven years, performance on the passive, cleft, and pseudocleft sentence structures improved when New information received normal and emphatic stress. Performance on the active sentences, however, failed to show a similar trend, and was low, especially when New information was normally stressed. When Given information received emphatic stress, the active sentence produced an increase in the number of times that the first stressed noun was focused. But, the passive, cleft, and pseudocleft sentence structures showed the opposite tendency.

7-9 years (Figures 19 and 20): From seven to nine years, there was an increase in performance on the active, passive, and pseudocleft sentences when New information received normal stress. The cleft sentences, however, showed a slight decrease. When New information received emphatic stress, the four sentence types showed some increase. When Given information was emphatically-stressed, the passive, and pseudocleft sentence structures showed an increase in the tendency to focus and verify New information, but, the active and cleft sentences produced a decrease.

9-11 years (Figures 20 and 21): From nine to eleven years, the actives showed a little decline in correct responses, but, the passives, clefts and pseudoclefts yielded an increase when New information was normally-stressed, especially the clefts. When New information received emphatic stress, performance on active sentences decreased, while other sentence types yielded an increase in correct responses. When Given information received emphatic stress, only the actives showed an increase in the number of times that stressed elements were treated as New information, while other sentence types produced a decline.

11-13 years (Figures 21 and 22): From eleven to thirteen years, the actives, and the pseudoclefts produced a little increase, while the passives and the clefts produced a little
decline when New information was normally-stressed. When New information received emphatic stress, the performances in the actives and the clefts improved, while those in the passives, and the pseudoclefts became worse. When Given information received emphatic stress, the reliance on stress was low for all sentence types.

13 to adults (Figures 22 and 23): When New information received normal stress, adults performed far better than thirteen-year-olds in the active sentences. In the passive, cleft, and pseudocleft sentences, adults performed worse than thirteen-year-olds. When New information received emphatic stress, there was an increase of mean scores in the active, passive, and pseudocleft sentences in adults, while there was a decline in the cleft sentences. When Given information received emphatic stress, there was a decline in the active sentences for adults, while there was an increase in the other three sentence types.

In sum, the development of reliance on word order, syntactic structures and stress varied unevenly across the age groups. Figures 18-23 were presented by age for clearer display:
Figure 18
Five years (isolated) (cell mean = 8)

Figure 19
Seven years (isolated) (cell mean = 8)
Figure 20
Nine years (isolated) (cell mean = 8)

Figure 21
Eleven years (isolated) (cell mean = 8)
Figure 22

Thirteen years (isolated) (cell mean = 8)

Figure 23

Adult (isolated) (cell mean = 8)
We also conducted ANOVA tests on the data for each age group. To do this, the original p value (0.05) was reset to 0.0083 by applying the Bonferroni procedure (the original p value 0.05 divided by the number of age groups 6). The ANOVA showed that for five-year-olds, the main effect of stress was significant (p ≤ 0.0037). The interaction effect between sentence type and stress also reached significance (p ≤ 0.0015). For seven-, nine-, eleven-, and thirteen-year-olds, the ANOVA tests showed that both stress (p ≤ 0.0001) and sentence type (p ≤ 0.0001) effects were significant, and that there were interactions between sentence type and stress (p ≤ 0.0001). For adults, the main effect of stress and sentence type reached significance (p ≤ 0.0001). There was also a significant interaction effect of stress with sentence type (p ≤ 0.0006). Table 6.3 lists the results of significant factors for each age group:

Table 6.3
Significance of factors for each age group (isolated)

<table>
<thead>
<tr>
<th>age</th>
<th>stress</th>
<th>sentence type</th>
<th>stress x sentence type</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>significant</td>
<td>nonsignificant</td>
<td>significant</td>
</tr>
<tr>
<td>7</td>
<td>significant</td>
<td>significant</td>
<td>significant</td>
</tr>
<tr>
<td>9</td>
<td>significant</td>
<td>significant</td>
<td>significant</td>
</tr>
<tr>
<td>11</td>
<td>significant</td>
<td>significant</td>
<td>significant</td>
</tr>
<tr>
<td>13</td>
<td>significant</td>
<td>significant</td>
<td>significant</td>
</tr>
<tr>
<td>AD</td>
<td>significant</td>
<td>significant</td>
<td>significant</td>
</tr>
</tbody>
</table>

In the following, the results for performance in the contextualized condition will be presented.

6.2 RESULTS OF PICTURE-CHOICE EXPERIMENT

An Analysis of Variance was run on total scores to determine whether there was a sex difference (with equal numbers of subjects in each age group), and whether there was an animacy effect. The results showed that neither of these two factors was significant (p > 0.05). The data were therefore pooled for subsequent analysis to determine the extent to which factors relevant to the present study were responsible for the variations in scores. They were treated as three factors (age, stress, sentence type), with repeated measures on
two factors (stress and sentence type). ANOVAs were applied to the data to evaluate the main effects of age, stress, and sentence type as well as interactional factors. Probabilities up to 0.05 were considered to be significant. Table 6.4 presents the results of the ANOVA:

Table 6.4

Analysis of Variance in results of Given and New interpretation test (contextualized) (N=15 in each age group)

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>age</td>
<td>5</td>
<td>38.033</td>
<td>7.607</td>
<td>5.84</td>
<td>2.159</td>
<td>NS</td>
</tr>
<tr>
<td>sentence type</td>
<td>3</td>
<td>20.189</td>
<td>6.730</td>
<td>3.252</td>
<td>2.358</td>
<td>NS</td>
</tr>
<tr>
<td>stress</td>
<td>2</td>
<td>419.017</td>
<td>209.508</td>
<td>2.168</td>
<td>41.165</td>
<td>0.0001</td>
</tr>
<tr>
<td>sentence type x age</td>
<td>15</td>
<td>60.722</td>
<td>4.048</td>
<td>15.252</td>
<td>1.419</td>
<td>NS</td>
</tr>
<tr>
<td>stress x age</td>
<td>10</td>
<td>373.450</td>
<td>37.345</td>
<td>10.168</td>
<td>7.338</td>
<td>0.0001</td>
</tr>
<tr>
<td>sentence type x stress</td>
<td>6</td>
<td>209.094</td>
<td>34.849</td>
<td>6.504</td>
<td>6.205</td>
<td>0.0001</td>
</tr>
<tr>
<td>sentence type x stress x age</td>
<td>30</td>
<td>342.661</td>
<td>11.422</td>
<td>30.504</td>
<td>2.034</td>
<td>0.0012</td>
</tr>
</tbody>
</table>

6.2.1 **Main Effects**

The table shows no significant difference in the main effects of age and sentence type, or in interaction between these two factors. However, the effects of stress, stress x age, sentence type x stress, and sentence type x stress x age reached significance. This indicates that changes in response as a function of stress were not consistent for each sentence type, and/or for each age group. More detailed descriptions of the effect of each factor are provided in the following.

**Stress.** The overall main effect of stress reached significance (F (2,168) = 41.165, p \leq 0.0001). Figure 24 presents the overall mean scores and standard deviations under each stress condition:
Mean scores (out of 8) and standard deviations for three stress conditions (contextualized)

As noted above, when New information received emphatic stress, the mean score was slightly lower than when it received normal stress. The mean score when Given information received emphatic stress was by far the lowest among the three stress conditions. Contrast tests were performed on all possible stress pairs with the original p value 0.05 reset to 0.0028 by applying Bonferroni procedures (the original p value 0.05 divided by the number of planned contrasts 18, i.e., number of pairs of planned contrast between different sentence types 6 times number of pairs of planned contrast between different stress conditions 3). The results revealed significant differences between the normal stress on New and emphatic stress on Given conditions (F (1,89) = 63.663, p ≤ 0.0001), and between the emphatic stress on New and emphatic stress on Given conditions (F (1,89) = 59.770, p ≤ 0.0001), but not between the normal stress on New and emphatic stress on New conditions (p > 0.0028). However, this main effect of stress must be interpreted in the light of the significant interactions, which are described in the following.
6.2.2 *INTERACTION EFFECTS*

**STRESS x AGE.** The interaction of stress x age was significant ($F (10,168) = 7.338, p \leq 0.0001$). Different age groups responded in different ways to different stress conditions. Figure 25 illustrates the interaction of these two factors. It can be seen that five- and nine-year-olds did not utilize the converging cues of structure and prosody to interpret New information, while the other age groups did. When Given information received emphatic stress, five- and nine-year-olds relied more on stress than the other age groups, even when overall structural cues should have overridden prosodic cues. After nine years, reliance on prosodic cues decreased with age.

![Figure 25](image)

Interaction between stress and age (contextualized) (cell mean = 8)

**SENTENCE TYPE x STRESS.** The interactional effect of sentence type x stress was significant ($F (6,504) = 6.205, p \leq 0.0001$). As shown in Figure 26, the effect of stress on passives and clefts was similar, while that on pseudoclefts and actives demonstrated different patterns.
Interaction between sentence type and stress (contextualized) (cell mean = 8)

In passives and clefts, performance was a little better when New information received emphatic stress than when it received normal stress. But, when Given information received emphatic stress, performance dropped sharply over that in the other two stress conditions. In pseudoclefts, performance when New information received normal stress was better than when it received emphatic stress on either New or Given information. In actives, performances under the three stress conditions were approximately equal and near chance.

**STRESS x SENTENCE TYPE x AGE.** The three-way interaction of stress x sentence type x age was also significant (F(30,504) = 2.034, p ≤ 0.0012). Table 6.5 tabulates the percentages of correct responses for the four sentence types under the three stress conditions across the six age groups. (A table showing the mean scores and standard deviations appears in APPENDIX X). Figures 27-29 depict performance under each of the three stress conditions.
Table 6.5

Percentage of correct responses (contextualized) (N=15 in each age group)

<table>
<thead>
<tr>
<th>age</th>
<th>stress</th>
<th>active</th>
<th>passive</th>
<th>cleft</th>
<th>pseudocleft</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>normal/N</td>
<td>64</td>
<td>55</td>
<td>49</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>emphatic/N</td>
<td>56</td>
<td>50</td>
<td>33</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>emphatic/G</td>
<td>50</td>
<td>50</td>
<td>57</td>
<td>58</td>
</tr>
<tr>
<td>7</td>
<td>normal/N</td>
<td>28</td>
<td>68</td>
<td>62</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>emphatic/N</td>
<td>40</td>
<td>69</td>
<td>67</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>emphatic/G</td>
<td>68</td>
<td>34</td>
<td>33</td>
<td>37</td>
</tr>
<tr>
<td>9</td>
<td>normal/N</td>
<td>58</td>
<td>46</td>
<td>53</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>emphatic/N</td>
<td>50</td>
<td>55</td>
<td>46</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>emphatic/G</td>
<td>46</td>
<td>51</td>
<td>53</td>
<td>58</td>
</tr>
<tr>
<td>11</td>
<td>normal/N</td>
<td>49</td>
<td>72</td>
<td>50</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>emphatic/N</td>
<td>45</td>
<td>63</td>
<td>58</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>emphatic/G</td>
<td>53</td>
<td>35</td>
<td>50</td>
<td>26</td>
</tr>
<tr>
<td>13</td>
<td>normal/N</td>
<td>50</td>
<td>77</td>
<td>55</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>emphatic/N</td>
<td>58</td>
<td>78</td>
<td>65</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>emphatic/G</td>
<td>55</td>
<td>36</td>
<td>38</td>
<td>21</td>
</tr>
<tr>
<td>AD</td>
<td>normal/N</td>
<td>63</td>
<td>66</td>
<td>66</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>emphatic/N</td>
<td>68</td>
<td>75</td>
<td>78</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>emphatic/G</td>
<td>43</td>
<td>35</td>
<td>28</td>
<td>17</td>
</tr>
</tbody>
</table>

Figure 27

Normal stress on New (contextualized)
Figure 28

Emphatic stress on New (contextualized)

Figure 29

Emphatic stress on Given (contextualized)
Table 6.5 shows that changes in response as a function of age were not consistent for each type of sentence structure under each stress condition.

5-7 years (Figures 30 and 31): From five to seven years, the passive, cleft, and pseudocleft sentence structures produced an increase in the number of times that the New information was focused and verified when New information received normal and emphatic stress. The active sentences failed to show a similar trend, and produced a decline, especially when New information received normal stress. When Given information received emphatic stress, the active sentence produced an increase in the number of times that the first stressed noun was focused. The passive, cleft, and pseudocleft sentence structures, however, showed the opposite tendency.

7-9 years (Figures 31 and 32): From seven to nine years, the passive, cleft, and pseudocleft sentences produced a decline in the number of times that New information was focused. The actives showed an increase, especially when New information received normal stress but also when it received emphatic stress. When Given information received emphatic stress, the passive, cleft, and pseudocleft sentence structures showed an increase in the tendency to focus on New information, while the actives produced a decrease.

9-11 years (Figures 32 and 33): From nine to eleven years, the active, and cleft sentence structures showed a little decline in percentage of correct responses when New information received normal stress, while the passives, and pseudoclefts yielded an increase. Performance on passives increased dramatically. When New information was emphatically-stressed, the active sentences produced a decrease, while other sentence types yielded an increase. When Given information received emphatic stress, only the actives showed an increase in the number of times that stressed elements were treated as New information, while other sentence types produced a decline.

11-13 years (Figures 33 and 34): From eleven to thirteen years, the active, passive, and cleft sentence structures produced a little increase in the percentage of correct responses
when New information received normal and emphatic stress, while the pseudocleft sentences produced a little decline. When Given information was emphatically-stressed, the active and passive sentence structures showed a little increase, while the cleft, and pseudocleft structures showed a decline.

13-adults (Figures 34 and 35): From thirteen-years to adults, the active, cleft, and pseudocleft sentences produced an increase in the number of times that New information was focused when it received normal and emphatic stress. The passive sentences, however, showed a decrease. When Given information was emphatically-stressed, all sentence types showed a decline in the percentage of correct responses.

Figures 30-35 present the results by age group for clearer display:

![Figure 30](image)

Five years (contextualized) (cell mean = 8)
Figure 31
Seven years (contextualized) (cell mean = 8)

Figure 32
Nine years (contextualized) (cell mean = 8)
Figure 33
Eleven years (contextualized) (cell mean = 8)

Figure 34
Thirteen years (contextualized) (cell mean = 8)
We also conducted ANOVA tests on the data within each age group. To do this, the original p value (0.05) was reset to 0.0083 by applying the Bonferroni procedure (the original p value 0.05 divided by the number of age groups 6). The ANOVA test showed that for the five-year-olds, none of the main effects including stress reached significance, nor were there interactions between sentence type and stress. For the seven-year-olds, none of the main effects reached significance, but a sentence type x stress interaction did (p ≤ 0.0025). For the nine-year-olds, none of the main effects of either sentence type or stress reached significance, nor was there a significant interaction between sentence type and stress, suggesting that the nine-year-olds did not particularly rely on either stress or sentence structure for Given and New interpretation. For the eleven-year-olds, the main effect of stress reached significance (p ≤ 0.0023). There were no significant interactions between sentence type and stress. For the thirteen-year-olds, there was a significant main effect of stress (p ≤ 0.0001), and a significant interaction between sentence type and stress.
(p ≤ 0.0015). For the adults, there was a significant effect of stress (F (2,28) ≤ 0.0001). The interactional effect of sentence type and stress also reached significance (F (6,84) = 3.498, p ≤ 0.0039). Table 6.6 lists the results of significant factors for each age group:

Table 6.6
Significance of factors for each age group (contextualized)

<table>
<thead>
<tr>
<th>age</th>
<th>stress</th>
<th>sentence type</th>
<th>stress x sentence type</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>significant</td>
<td>nonsignificant</td>
<td>nonsignificant</td>
</tr>
<tr>
<td>7</td>
<td>nonsignificant</td>
<td>nonsignificant</td>
<td>nonsignificant</td>
</tr>
<tr>
<td>9</td>
<td>nonsignificant</td>
<td>nonsignificant</td>
<td>nonsignificant</td>
</tr>
<tr>
<td>11</td>
<td>significant</td>
<td>nonsignificant</td>
<td>nonsignificant</td>
</tr>
<tr>
<td>13</td>
<td>significant</td>
<td>nonsignificant</td>
<td>significant</td>
</tr>
<tr>
<td>AD</td>
<td>significant</td>
<td>nonsignificant</td>
<td>significant</td>
</tr>
</tbody>
</table>

In sum, in the isolated condition, all the three main factors of age, stress and sentence type reached significance, and the two-way and three-way interactions also reached significance. In the contextualized condition, however, only the main effect of stress reached significance, and its interactions with the other factors were all significant. Since the main effects enter into significant complex interactions, they should be interpreted with caution. In the following, we will examine the performance under each specific condition in order to address issues relevant to our research focus.
7.1 DISCUSSION OF THE RESULTS OF THE VERIFICATION/CORRECTION EXPERIMENT

Our research questions focus on how Mandarin-speaking children utilize word order, marked grammatical structures, stress as well as their interactional sources to interpret Given and New information in isolated and contextualized conditions. The following discussion first addresses these issues for the isolated condition.

7.1.1 WORD ORDER

Word order is an important surface cue for the interpretation of Given and New information which children need to learn to utilize in the course of developing their pragmatic competence. In Mandarin Chinese, SVO is the basic word order. Preverbal position tends to be used to encode Given information, while postverbal placement is obligatory for New information. When New information receives normal stress, word order is probably the only surface cue that subjects can rely on to distinguish Given from New information in active NVN sentences. In order to examine when children are able to use the structural cue inherent in word order, and better to trace the course of its development, we have graphed children's scores under this normal stress condition in isolated and contextualized conditions. Figure 36 shows the scores in the conditions when New information receives normal stress. In this section, we will first discuss children's use of word order in the isolated condition.
It can be seen that in isolated sentence conditions, the children were unable to utilize word order to identify Given and New information as effectively as adults did. The percentage of correct responses was very low across all five age groups of children because the earlier element was most frequently treated as New information, even at the age of thirteen. The result suggests that Mandarin-speaking children have not yet fully acquired the ability to utilize postverbal position to identify New information in isolated conditions by the age of thirteen years. This is partly consistent with Hornby's findings (1971). In Hornby's studies of English-learning children's abilities to distinguish Topic (Given) from Comment (New), his first-graders did not show any tendency to select the picture containing the earlier mentioned element in a sentence as the topic, although his third-graders did show a developmental change and appeared to employ word order for this purpose. However, in our study none of the age groups seemed to use word order to identify Given and New information, as can be seen from the percentage of correct responses, which was far below 50%.
Several explanations for children's poor use of word order can be offered. First, it is possible that the poor performance might be related to their frequent exposure to narratives. Although in Mandarin Chinese, postverbal position is generally obligatory for New information, preverbal position can be used to introduce New referents at the beginning of a narrative. According to the Competition model, any cue that consistently signals a particular meaning or function is reliable. If children are very frequently exposed to narratives, the weight of the postverbal cue for indicating New information would be relatively weaker, particularly in isolated conditions. That could be why the children did not rely on postverbal position to identify New information. However, we felt that it would be necessary to do a text analysis of materials children are often exposed to before relying on this speculation.

Secondly, as claimed by Most & Saltz (1979), active sentences perhaps do not have as clear an indication of information status as do more marked sentence structures. As children develop their abilities to use surface cues to identify Given and New information, active sentences might be hard for them for this reason. However, the hypothesis that there is less clear indication of information status in the active voice is not confirmed by the adults' performance; they did show a tendency to utilize word order to identify New information. From this observation, it is more plausible to say that children's development of word order processing strategies might continue until very late.

Thirdly, we speculate that an animacy contrast (in semantically-irreversible constructions) where animacy is placed into competition with word order might lower performance. In the semantically-reversible constructions (animate subject and animate object), no contrast was found between semantic and syntactic strategies, while there was a contrast between the two strategies in semantically-irreversible constructions. For example, in one of the stimulus questions in the active voice *nanhai dapo chabei ma* 'Does the boy break the cup?' the preverbal element *nanhai* 'boy' is animate, while the postverbal
element is inanimate. If animacy was the attentional focus, the preverbal animate element might be focused, and corrected, when people verified the question against two pictures depicting a boy breaking a window and a girl breaking a cup. Their answer to the above question and the accurate description of the chosen picture would then be *No, the girl breaks the cup*. In this case, animacy would have overridden word order as the preferred cue. Since preverbal animate subjects tended to be focused and corrected in semantically-irreversible constructions, the children's performances on actives in semantically-irreversible constructions would be worse than in semantically-reversible constructions. (Note that postverbal position is generally obligatory for New information.) The overall combined score would be lowered because of poorer performance in semantically-irreversible constructions. Figure 37 compares children's use of word order in semantically-reversible and semantically-irreversible constructions in active sentences under normal stress conditions.

![Figure 37](image.png)

**Figure 37**

Use of word order in two semantic conditions (isolated)
In semantically reversible constructions (upper curve) where there is no animacy contrast, word order is the only available cue. In semantically irreversible constructions (lower curve), word order and animacy (preverbal animate agent and postverbal inanimate patient) are both available cues. Performance in semantically reversible constructions is better than in semantically-irreversible constructions for children. In semantically-irreversible constructions, the poor performance suggests that animacy overrides word order and is children's preferred cue for the interpretation of New information. Because of the overriding strength of animacy over word order in semantically-irreversible constructions, the overall tendency to use word order was lowered. Contrast tests were conducted to check whether there was a significant difference between the two semantic conditions for each age group. The p value of 0.05 was reset to 0.008 by applying the Bonferroni procedure (0.05 divided by the number of age groups 6). It was found that there was significant difference for seven-year-olds ($F(1,14) = 3.452, p \leq 0.0039$). However, adults relied more on word order than on animacy in semantically irreversible constructions. This suggests the existence of a developmental shift from reliance on animacy to reliance on word order after thirteen years of age.

We will next discuss children's ability to utilize marked grammatical structures, i.e., passives, clefts, and pseudoclefts, for interpretation of Given and New information.  

7.1.2 MARKED SYNTACTIC STRUCTURE

Marked grammatical structures (passive, cleft and pseudocleft) are commonly used devices to indicate information status of Given and New. As our statistical results show, there was a significant difference between active and other marked grammatical structures ($p < 0.05$). This suggests that our subjects were better able to utilize marked grammatical structures than word order to identify Given and New information. However, among the three marked grammatical structures, cleft sentences were harder for children to process.
than passive or pseudocleft sentences. Explanations for better performances on passives and pseudoclefts can be offered from the following two perspectives.

First, in the literature on English, there are four different surface cues proposed as indicators of what is focused or New: the later-occurring part of a sentence under normal intonation (Halliday 1967); the object occurring after the preposition by in the passive voice (Fillmore 1968); the phrase containing the locus of heaviest stress (Chomsky 1971), and the post copular position in cleft and pseudocleft sentences (Akmajian 1969). According to Hornby (1974), these surface cues may work in combination to indicate Given and New information. Hornby's hypothesis is in line with the prediction from the convergence principle of the Competition model (Bates and MacWhinney 1982) that sentences with less information (fewer surface cues) would produce less consistent results across groups, and result in lower scores. For example, in a pseudocleft sentence such as Zhui mao de shi wugui 'What chases the cat is the turtle,' the New information is indicated by the second noun, which occurs after the copular shi-'is.' In a passive sentence, such as Mao bei wugui zhui 'The cat is chased by the turtle,' the New information is indicated by the second noun, which occurs after the preposition by. In a cleft sentence, the New information is marked by the first postcopular noun. In other words, the marked cleft structure operates together with word order. Since there are two marking devices for Given and New in passives and pseudoclefts, but only one in clefts, performance in the former is expected to be more consistent and better. Our overall results seemed to confirm Hornby's hypothesis as well as the predictions of the Competition model regarding the converging effects of sentence structure cues.

Secondly, better performance in pseudocleft than in cleft sentences can be further deduced from Prince's (1978) analysis of presupposition properties in the two sentence structures. According to Prince, the presupposed parts in these two types of structures differ in their assumptions. The presupposed part (Wh- clause) of a pseudocleft sentence
represents information assumed by the speaker already to be in the hearer's consciousness, i.e., Given information by Chafe's definition, while the presupposed part (that/Wh-clause) in cleft sentences represents information that the speaker assumes the hearer can deduce from the context, but need not have in his/her consciousness (Prince 1978:888). Since Given information tends to be assumed to be true, subjects will focus on the asserted part for verification. It can be said that in Mandarin Chinese, the element that occurs after the copula shi 'is' in pseudocleft sentences was corrected more frequently than in cleft sentences because the presupposed part in the pseudocleft sentences was Given and assumed to be true, while in the cleft sentences, the presupposed part might not be treated as Given information, and would thus be available to be verified as New. This would decrease the probability for correction of the asserted part. Thus, different degrees of presupposition for information treated as Given between the pseudocleft and cleft structures provide an alternative explanation for why performance on the pseudocleft was better than on the cleft sentences.

As to developmental patterns, there was an interesting change in the use of marked structural cues. Our finding is partly consistent with Hornby's findings. Hornby found that English-speaking children between the first- and fifth-grades demonstrated an increase in the tendency to use marked structural cues. Our Mandarin-speakers also demonstrated such a tendency between first and fifth grades, but only in the passive and pseudocleft sentences, not for the cleft sentences. Figure 38 graphs the results of performances on the three marked grammatical structures when New information was normally stressed.
It is also important to note that animacy might be a potential factor affecting our results. In our analysis, we pooled the data from the semantically-reversible and semantically-irreversible constructions. However, we noted that when New information receives normal stress in semantically-irreversible constructions, the semantic strategy may be confounded (converged) with the syntactic strategy in marked grammatical structures. It would be interesting to check whether animacy played an observable role in Given and New interpretation in marked grammatical structures. According to the Competition model, performance in semantically-irreversible constructions, where animacy operates together with any syntactic structural cue, should be better than in semantically-reversible constructions where any syntactic structural cue operates alone (with no animacy contrast).

In passive and pseudocleft sentences, animate elements occur in the latter parts of the sentences after the preposition *bei* 'by' or copular *shi*-'is.' In cleft sentences, animate elements occur in clefted position. In other words, animate elements are occupying the positions which tend to be used for New information. Even though the children were
unable to utilize marked syntactic structure in semantically-reversible constructions, it might be more available for interpretation of New information in semantically-irreversible constructions. This would enhance performance if animacy was the attentional focus. The overall performance could thus not be attributed solely to a syntactic strategy of utilizing marked grammatical structure, since semantic and syntactic cues converge in semantically-irreversible constructions. By comparing performances in both semantic conditions, we were able to check for an animacy effect. The evidence for such an effect can be adduced when subjects are unable to use a structural cue in semantically-reversible constructions, but do well in semantically-irreversible constructions, where animacy is available. Figures 39-41 graphically represent the performances on marked grammatical structures under both semantic conditions.

![Graph showing performance on passives in two semantic conditions](image)

**Figure 39**

Performance on passives in two semantic conditions (isolated)

Figure 39 shows that performance on passive sentences in semantically-irreversible constructions, where animacy converges with marked structure, is generally better than in semantically-reversible constructions, especially for the younger children. This suggests
that animacy enhances performance in passive structures. However, a contrast test for each age group showed that the difference did not reach significance for any age group for passives (significance level 0.05 was reset to 0.0028 by applying the Bonferroni procedure, i.e., 0.05 divided by 18, the number of age groups 6 times the number of marked structure 3). Figure 40 shows performance on cleft structures:

![Figure 40](image-url)

**Figure 40**

Performance on clefts in two semantic conditions (isolated)

The percentage of correct responses in cleft sentences shows that five-, seven- and nine-year-olds did not utilize clefted structure effectively in semantically-reversible constructions, but did much better in semantically-irreversible constructions. A contrast test showed that there was a significant difference between the two semantic conditions for five-, seven- and nine-year-olds ($p < 0.05$). This suggests that they utilize animacy rather than clefted structure for Given and New interpretation. As for older children at eleven and thirteen years, they were able to make use of clefted structures under both semantic conditions, although performance in semantically-irreversible sentences was better. This indicates a developmental shift from using a semantic strategy to a syntactic strategy by
eleven years for cleft sentences. Figure 41 compares performance on pseudocLEFTs in both semantic conditions.

![Graph showing performance on pseudocLEFTs in two semantic conditions](image)

**Figure 41**

Performance on pseudocLEFTs in two semantic conditions (isolated)

Although all subjects could use pseudocLEFT structure in reversible constructions, performance in the irreversible condition was better, especially for five- and seven-year-olds. A contrast test showed that there was a significant difference between the two semantic conditions for five-year-olds \(t(1,14) = 3.674, p \leq 0.0025\), implying that younger children were more influenced by animacy than older children and adults in interpreting Given and New in pseudocLEFT sentences.

The results from the comparisons of performances on marked grammatical structures in both semantically-reversible and semantically-irreversible conditions shows that animacy does enhance performance in utilizing marked structure for Given and New interpretation, especially in clefts. This confirms what is predicted by the Competition model for the converging and conspiring effects.
In sum, despite the potential influence of animacy, it is fair to say that overall, children were able to utilize marked grammatical structures in passives and pseudoclefts. Animacy affected performance in clefts only for younger children (five-, seven-, and nine-year-olds). Younger children (five-, seven- and nine-year-olds) also did not utilize clefted structure effectively in semantically-reversible conditions (where there was no animacy contrast). Performance in semantically-irreversible conditions, where animacy converges with the cue of clefted structure, was much better. This suggests that the younger children relied more on animacy than the older children.

7.1.3 Stress

We are also interested in investigating the extent to which Mandarin speakers rely on emphatic stress to identify New information. Two kinds of emphatic stress were imposed on each sentence type: emphatic stress on New, and emphatic stress on Given. To assess the role of stress, we need to compare performance under these two conditions. In the former condition, the stress cue converges with structural cues such as word order and marked grammatical structure, while in the latter, the stress cue is in conflict with the structural cues. Our results show that reliance on stress decreases with age for Mandarin speakers. These results are in agreement with those from an unpublished study by Hornby (1973), where he used a sentence-picture verification task to measure the interpretation of sentence elements as either Topic or Comment. His results showed that English-speaking second-graders had a strong tendency to treat the stressed element as New. For fifth-graders, this tendency was weaker and by ninth grade it had disappeared altogether.

In the following, we will discuss the interaction of stress and structure in the light of the Competition model, which is concerned with convergence and competition effects between cues, including stress, word order and marked grammatical structure.
7.1.3.1 **CONVERGENCE OF STRESS AND WORD ORDER**

When New information is emphatically stressed, stress converges with word order in active sentences (e.g., the turtle chases the rabbit vs. the turtle chases the rabbit). Children responded to converging stress and word order in different ways from adults. Figure 42 shows that performance when New information is emphatically stressed is better than when it received normal stress for children, but not for adults.

![Figure 42](chart.png)

**Figure 42**

Convergence of stress and word order in actives (isolated)

Scores for the five child groups are higher when stress and word order work together to highlight New information than when only the word order cue is available. This suggests that in active sentences children pay more attention to stress than adults do. A Tukey-Kramer post hoc test shows that the difference between performance when New information is (only) normally-stressed and when it is emphatically-stressed is significantly different only between nine-year-olds and adults ($F(5,84) = 2.503, p < 0.05$). This suggests that converging cues enhance performance more greatly for nine-year-olds than for adults (in interpreting Given and New information in active sentences).
We conducted further contrast tests to see whether the difference between the two stress conditions (when New information received normal and emphatic stress) was significant for each child group. We first readjusted the original level of significance (0.05) to 0.00208 by applying the Bonferroni procedure (0.05 divided by 24, number of age groups 6 times number of sentence types 4). The results of the univariate ANOVA tests show that the converging effect of stress and word order in active sentences does not reach significance for any child age group. Although there is an observable increase when New information is emphatically-stressed for child groups, the converging effect of stress and word order does not reach significance.

Unless otherwise specified, we will adopt the same levels of significance as readjusted above in the following ANOVA and contrast tests to check converging and competing effects of structural and prosodic cues unless otherwise specified.

7.1.3.2 COMPETITION BETWEEN STRESS AND WORD ORDER

When Given information is emphatically-stressed in an active sentence (e.g., the turtle chases the rabbit), stress is placed into competition with word order for denoting New information. The children had a strong tendency to treat the stressed element in an active sentence as New, even when it was the preverbal element. In other words, stress overrode word order for the children, although not for the adults. A Tukey-Kramer post hoc test shows that the difference in reliance on stress over word order is significant between all child age groups and adults ($F (5,84) = 6.237, p \leq 0.0001$), confirming our prediction that children rely more on stress than word order in active sentences. Figure 43 shows the competitive effect between stress and word order in active sentences.
Figure 43

Competition between stress and word order in actives (isolated)

We conducted further contrast tests to see whether the overriding effect of stress over word order was significant within each child group. The tests show that the performance when Given information receives emphatic stress (e.g., the turtle chases the rabbit) is significantly higher than when New information receives normal stress (e.g., the turtle chases the rabbit) only for the eleven-year-olds ($F(1, 14) = 33.903, p \leq 0.0001$), but not for the other child groups. Although there is an increase in the performance when Given information receives emphatic stress for other child groups, the overriding effect of stress is not significant.

As we have discussed in section 7.1.1, word order in active sentences is not a reliable cue for distinguishing Given and New information, especially for children. When word order is placed into competition with stress, children utilize the stress to locate the New information. However, for adults, the prosodic cue is less important than the word order. There seems to be a developmental shift after thirteen years when the role of word order becomes the major cue to Given vs. New information.

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7.1.3.3 CONVERGENCE OF STRESS AND MARKED SYNTACTIC STRUCTURE

As discussed above, even five-year-old children have acquired some ability to utilize marked grammatical structure to locate Given and New information, especially in passive and pseudocleft sentences. It can be seen in Figure 44 that there is little difference in performance when New information receives normal stress and when it receives emphatic stress. This can largely be attributed to the minimal role of stress in interpretation of passive and pseudocleft sentences.

Figures 45 shows that the converging effect of stress and marked structure in cleft sentences is stronger than in passive (Figure 44) or pseudocleft (Figure 46) sentences for all child groups (especially for nine- and thirteen-year-olds), but not for adults. Contrast tests, however, show that the difference is not significant for any group, i.e., there is no significant converging effect of stress and marked structure.

![Figure 44](image)

**Figure 44**

Convergence of stress and structure in passives (isolated)
Figure 45
Convergence of stress and structure in clefts (isolated)

Figure 46
Convergence of stress and structure in pseudoclefts (isolated)
7.1.3.4 **COMPETITION BETWEEN STRESS AND MARKED SYNTACTIC STRUCTURE**

When stress is in competition with marked syntactic structure for the encoding of Given and New information, structural cues override stress as preferred cues for identification of Given and New across all age groups. As can be seen in Figures 47, 48, and 49, the difference in the performance between normal stress on New and emphatic stress on Given is smallest for five-year-olds, implying that five-year-olds do not rely on marked syntactic structure as much as the other age groups, i.e., five-year-olds pay most attention to stress. Contrast tests reveal that: in passives, performance in the condition when New information receives normal stress is significantly higher than when Given information receives emphatic stress for seven- (F (1,14) = 148.135, p ≤ 0.0001), nine- (F (1,14) = 287.787, p ≤ 0.0001), eleven- (F (1,14) = 1366.074, p ≤ 0.0001), and thirteen-year-olds (F (1,14) = 277.446, p ≤ 0.0001), and for adults (F (1,14) = 84.339, p ≤ 0.0001); in clefts, the performance when New information receives normal stress is significantly higher than when Given information receives emphatic stress for nine- (F (1,14) = 11.643, p ≤ 0.002), eleven- (F (1,14) = 78.451, p ≤ 0.0001), and thirteen-year-olds (F (1,14) = 84.931, p ≤ 0.0001); in pseudoclefts, the performance when New information receives normal stress is significantly higher than when Given information receives emphatic stress for seven (F (1,14) = 368.438, p ≤ 0.0001), nine- (F (1,14) = 465.396, p ≤ 0.0001), eleven- (F (1,14) = 619.756, p ≤ 0.0001), and thirteen-year-olds (F (1,14) = 569.762, p ≤ 0.0001), and for adults (F (1,14) = 83.192, p ≤ 0.0001). In a word, the overriding strength of marked structure over stress is significant for all marked structures in most age groups. Table 7.1 lists the results of differences between the conditions when New information received normal and emphatic stress for three marked sentence types:
Table 7.1

Differences between the conditions when New information receives normal and emphatic stress for three marked sentence structures at six age levels (isolated)

<table>
<thead>
<tr>
<th>age</th>
<th>passive</th>
<th>cleft</th>
<th>pseudocleft</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>norm/N vs. emp/G</td>
<td>norm/N vs. emp/G</td>
<td>norm/N vs. emp/G</td>
</tr>
<tr>
<td>5</td>
<td>nonsignificant</td>
<td>nonsignificant</td>
<td>nonsignificant</td>
</tr>
<tr>
<td>7</td>
<td>significant</td>
<td>nonsignificant</td>
<td>significant</td>
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<tr>
<td>9</td>
<td>significant</td>
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<tr>
<td>11</td>
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<td>13</td>
<td>significant</td>
<td>significant</td>
<td>significant</td>
</tr>
<tr>
<td>AD</td>
<td>significant</td>
<td>nonsignificant</td>
<td>significant</td>
</tr>
</tbody>
</table>

Figure 47

Competition between stress and structure in passives (isolated)
Figure 48
Competition between stress and structure in clefs (isolated)

Figure 49
Competition between stress and structure in pseudoclefs (isolated)
To summarize, for passives and pseudoclefts, there was only a minimal converging effect of stress and marked grammatical structure. The converging effect of stress was strongest in cleft structures. The effect of stress, however, varied across sentence types for different age groups. In passive and pseudocleft structures, the converging effect of stress and marked structure did not contribute to better performance for five- or thirteen-year-olds. In clefts, adults' performance was worse when New information received emphatic stress than when it received normal stress. There was an overriding effect of marked structure over stress revealed by the result that when Given information received emphatic stress performance was poor. Five-year-olds seemed to rely less on marked structure than other age groups, suggesting that they were more influenced by stress. However, the overriding effect reached significance only for some age groups.

Another important point to note concerns the potential effect of animacy, although it is not our main research focus. In semantically-irreversible constructions, animacy is a potential variable that might affect performance in several ways. When stress is also taken into consideration, there are more than two variables manipulated in any sentence: animacy, word order, and stress in actives, and animacy, marked structure, and stress in nonactives. Next, we will look for evidence of: (1) any conspiring effect of word order and stress over animacy in active sentences; (2) any converging effect of animacy, structure, and stress in marked grammatical structures.

7.1.3.5 CONSPIRACY OF STRESS AND WORD ORDER OVER ANIMACY

According to the Competition model, when more than two variables are manipulated in the same sentence, "relatively weak sources of information may ally with the loser of a close race to throw the outcome in a different direction" (Bates et al. 1982:260). This is the conspiracy effect. For example, in a situation where order and animacy are in competition, an alliance with contrastive stress may change the outcome. As we have discussed above, in semantically-irreversible constructions, animacy competes
with word order in actives; moreover animacy overrides word order as a preferred cue, and word order loses. By comparing performance when New information receives normal vs. emphatic stress, we can look for any conspiring effect, to see whether and when stress might conspire with word order (the loser) to throw the outcome in a different direction. If the performance when emphatic stress falls on New is better than when normal stress falls on New, we can infer that there is a conspiracy between word order and stress. Figure 50 shows that the performance when New information receives emphatic stress is better than when New information receives normal stress for younger children. It implied that younger children relied on the converging cues of word order and stress over animacy, but not thirteen-year-olds and adults. However, the difference does not reach significance for any of the younger child groups.

![Figure 50](image)

**Figure 50**

Performance on actives in semantically-irreversible constructions under two stress conditions (isolated)
7.1.3.6 **Convergence of Animacy, Marked Syntactic Structure and Stress**

According to the Competition model, a convergence effect means that in a sentence where all surface sources of information converge (i.e., a prototypical or best input), the most consistent decisions will be produced across a group of subjects (Bates et al. 1982). Sentences with less information are expected to produce less consistent decisions. Since in semantically-irreversible constructions, all surface cues (animacy, marked structure, and stress) converge when emphatic stress is placed on New (e.g., The window is broken by the boy; it is the boy that breaks the window; what breaks the window is the boy), it is predicted that performance under this condition will be the best. Within semantically-irreversible constructions, if performance when emphatic stress falls on New is better than when normal stress falls on New or when emphatic stress falls on Given, we can say that there is a converging effect. In semantically-reversible constructions, there is no animacy cue available (e.g., the rabbit is chased by the turtle; it is the turtle that chases the rabbit; what chases the rabbit is the turtle). If performance in marked structures in semantically-irreversible constructions with emphatic stress on New is better than in semantically-reversible constructions (where there is no animacy cue), a converging effect is also indicated. Figures 51-53 show that within semantically-irreversible constructions, predictions of the convergence principle are only partly confirmed, in that performance when emphatic stress falls on New is better than when it falls on Given, but is indistinguishable from the normal stress on New condition. This is true for all three marked syntactic structures. We conducted a univariate ANOVA (where the p value of 0.05 was reset to 0.0028, i.e., 0.05 divided by the number of age groups and the number of sentence types), and contrast tests (where the p value of 0.05 was readjusted to 0.025, i.e., 0.05 divided by the number of the number of pairs of contrast between different stress conditions). It was found that the difference between the conditions when New information received normal stress and when New information received emphatic stress
was not significant for any age group in any marked sentence type. However, the difference between the conditions when New information received normal stress and when Given information received emphatic stress is significant for most age groups. In clefts, the difference was significant for all age groups (p ≤ 0.0001), except for five-year-olds and for adults. In passives and pseudoclefts, the difference is significant for all age groups (p ≤ 0.0001).

![Performance on passives in semantically-irreversible constructions under three stress conditions (isolated)](image)

Figure 51

Performance on passives in semantically-irreversible constructions under three stress conditions (isolated)
Figure 52
Performance on clefts in semantically-irreversible constructions under the three stress conditions (isolated)

Figure 53
Performance on pseudo-clefts in semantically-irreversible constructions under the three stress conditions (isolated)
Figures 54, 55, and 56 compare performance on the three marked structures between semantically-irreversible and semantically-reversible constructions when emphatic stress falls on New information. They generally confirm the prediction of the convergence principle that optimal input, where all surface sources of information converge, produces the most consistent results in sentence interpretation. Performance on all three marked syntactic structures is better in semantically-irreversible than in semantically-reversible constructions. We conducted t-tests (in which the p value 0.05 was readjusted to 0.0028, i.e., 0.05 divided by the number of age groups and the number of marked sentence types) to check if the difference was significant in each marked sentence type for each age group. The results show that there was a significant difference between the two semantic conditions when New information receives emphatic stress. The significant difference is found only in clefts (t (1,14) = 4.561, p ≤ 0.0004) and pseudoclefts (t (1,14) = 3.674, p ≤ 0.0025) and only for five-year-olds.

![Graph showing performance on passives with emphatic stress on New in two semantic conditions (isolated)](image)

**Figure 54**

Performance on passives with emphatic stress on New in two semantic conditions (isolated)
Figure 55
Performance on clefts with emphatic stress on New in two semantic conditions (isolated)

Figure 56
Performance on pseudoclefts with emphatic stress on New in two semantic conditions (isolated)
To summarize, children were generally able to utilize marked grammatical structures, especially passives and pseudoclefts. Five-year-olds, however, were unable to utilize cleft structures in semantically-reversible structures (where cleft structure was the only available cue), but performed well in semantically irreversible constructions (where the clefted element was animate). It is noted that animacy seems to be a potential factor producing different outcomes in clefts.

7.2 DISCUSSION OF THE RESULTS OF THE PICTURE-CHOICE EXPERIMENT

Our second set of research questions focuses on how Mandarin-speaking children utilize surface cues of word order, syntactic structure, and stress, as well as on their interactional effects for Given and New interpretation in contextualized sentence conditions. In this experiment, eight pairs of pictures were used. Each of a pair of pictures was first labeled with an accurate contextualizing sentence. Subjects were then presented a stimulus sentence. Their task was to choose that one of the two pictures that the stimulus went with. In the previous verification/correction experiment, the stimulus sentence was presented out of context, while in this picture-choice experiment the stimulus was presented within a context. In the following, we will give a detailed discussion of each relevant issue: word order, syntactic structure, stress, effects of convergence and competition, and the effect of context.

7.2.1 WORD ORDER

Word order plays a determining role in the development of pragmatic competence for marking Given and New distinctions. We have already noted that when normal stress falls on New information, word order is probably the only surface cue that subjects can rely on to distinguish Given from New in active sentences. Here, the second noun usually denotes the New information. To the extent that children are able to utilize word order cues in actives, they should choose the context story that contains the Given information in such stimulus sentences. The children's responses were presented in Figure 57.
The 5-year-olds and nine-year-olds and adults did show a tendency to interpret the earlier elements in the active sentences as Given, and to select the context sentences containing the Given information. Turning to the seven-year-olds, we observe a change in their pattern of responses, in that their reliance on word order declines considerably. This can be seen by the fact that the later occurring element is now more frequently treated as Given. The percentage of correct responses dropped significantly from 64% to 28% (refer to Table 6.4). By nine years, however, children had regained the tendency to rely on word order to identify Given and New information, with percentage of correct response now at 58%. The differences between five-year-olds and seven-year-olds, and between seven-year-olds and nine-year-olds are statistically significant (p < 0.05). A U-shaped developmental curve, a pattern of acquisition in which performance is initially adult-like, then deteriorates, and then improves again, is evident.

We speculate that this may be due to overgeneralization of processing strategies from clefts to actives. In cleft sentences, the early occurring clefted element identifies New
information. At age five, our subjects were not yet able to use the marked cleft structure very effectively. By age seven, however, the children demonstrated an increased ability to select the clefted element as New information, as evidenced by their increasing percentage of correct responses from 49% to 62% (refer to Table 6.4). Their better control of structure can also be seen from their production data, in that they often used cleft sentences to describe their chosen pictures in sentence-picture verification tasks, even when the stimulus sentence was of another type. They placed the corrected part of the stimulus sentence in clefted position. We speculate that, because acquisition of clefted structure was more advanced, 7-year-olds overgeneralized this strategy to active sentences by identifying the first element as New. This could cause their performance in actives to drop significantly. However, from nine years, children performed close to chance, with a slight drop at eleven years. This result is partly consistent with that reported in the study by MacWhinney & Price (1980), where first-, fourth-, and eighth-graders were presented with a triplet of pictures, followed by a stimulus sentence. The pictures differed from the stimulus in that one picture had the same agent, another had the same patient, and the third had both different agent and patient. Their subjects were told in advance that although there would be no picture that was just right for the sentence, they should point to the picture that the sentence was talking about. To do this, their subjects needed to identify the topic in the stimulus sentence and look for the picture containing that topic. It is often the case that topic occurs in the position which denotes Given information. The strategy for determining the topic is similar to that for determining Given information. Their study showed that their English-speaking fourth- and eight-graders performed at chance by using word order to choose the topic, which tended to be Given information. Our result shows that from nine years, children also performed close to chance, with a slight drop at eleven years. The comparison of these two studies shows crosslinguistic similarities between children speaking English and Mandarin Chinese.
7.2.2 Marked syntactic structure

Overall, when New information received normal stress, performance on marked syntactic structures (passives, clefts, and pseudoclefts) was better than that on (unmarked) actives, both for children (with combined mean scores of 4 out of 8 in actives, 5.067 in passives, 4.307 in clefts, and 5.08 in pseudoclefts) and adults (with the mean scores of 4.933 in actives, 5.267 in passives, 5.267 in clefts, and 7.200 in pseudoclefts). Readers can refer back to Table 6.10. When we compare our studies with those of Paul (1981) and MacWhinney & Price (1980), there are similarities and differences. Paul reports that her English-speaking third-, and fifth-graders did not perform at chance on marked syntactic structures. MacWhinney & Price (1980), however, report that their English-speaking subjects (first-, fourth-, and eighth-graders) performed at chance on marked sentence forms. The results of our present study show our child subjects performing above chance on passives and pseudoclefts, and slightly above chance on clefts, and adults performing above chance on all marked syntactic structures. Figure 58 graphs performance on passives, clefts, and pseudoclefts in the condition when New information received normal stress.
Marked syntactic structure with normal stress on New (contextualized)

For passives, there is improvement between five and seven years. Between seven and eleven years, a U-shaped developmental curve is found. The performance of seven- and nine-year-olds is significantly different ($F (1,28) = 6.377, p \leq 0.0175$), as is the performance of nine and eleven-year-olds ($F (1,28) = 9.128, p \leq 0.0053$). This suggests that reliance on the syntactic structure of passives declines sharply for nine-year-olds. There is a subsequent increase in utilizing syntactic structures for the identification of Given and New information. However, it is interesting to find that adults do not use the syntactic structure in passives as effectively as eleven-, and thirteen-year-olds.

For clefts, reliance on this structural cue increases from five to seven years, and then decreases for nine- and eleven-year-olds. There is another, more gradual, increase for thirteen-year-olds and adults.

For pseudoclefts, there is an increase between five and seven years. As processing strategies develop, there is a sharp decrease for nine-year-olds, with a resurgence at eleven. From these developmental changes in the processing strategies for utilizing marked
syntactic structures, we can see that the performance in all three marked sentence types deteriorates for nine-year-olds. It is likely that there is some sort of reorganization period during which children attempt to cope with all kinds of structural cues, and to formulate a comprehensive set of strategies for Given and New interpretation. Before the reorganization is complete, performance is poor. The ability to utilize syntactic structures such as clefts seems to mature later than for passives or pseudoclefts; this can be seen when the performance in passives and pseudoclefts improves after nine years, while the performance in clefts does not return to the 7-year level until thirteen years of age.

7.2.3 STRESS

We are also interested in examining the converging and competing effects of stress in contextualized conditions. Overall, no converging effect of stress and structural cue was found. This is consistent with the reports of some studies on sentence interpretation of grammatical relations that prosody is seldom a most preferred cue for the identification of function. Prosody is, however, often jointly interpreted with other cues (Bates et al. 1984).

To gain a clearer picture, we must make three comparisons across age groups: (1) between normal and emphatic stress on New (for converging effects), (2) between normal stress and emphatic stress on Given (for competitive effects), and (3) between normal stress and emphatic stress on Given (for competitive effects). As we saw in Table 6.5, there was an observable converging effect of structure and emphatic stress at seven and thirteen, and for adults, while none was found at five, nine, and eleven. As for a competitive effect between stress and structure, the results of our study show that reliance on stress over structure decreases with age, except for an increase in nine-year-olds. In other words, a decrease in the preference for stress over structure was found after age nine. Except for the nine-year-olds, our findings are in agreement with the results of MacWhinney & Price (1980), in that with age there is a decrease in reliance on stress as a
cue to identify Given (Topic) and New (Comment). This implies that when stress and structural cues were in competition, the older the children, the less likely they were to rely on stress to locate the New information.

7.2.3.1 CONVERGENCE OF STRESS AND WORD ORDER

In the light of the significant interaction of age x stress x sentence type, we need to discuss the converging and competitive effects between stress and structure across age groups. As shown in Figure 59, performance in active sentences when New information receives emphatic stress looks better than when it receives normal stress for seven-, and thirteen-year-olds, and for adults. However, univariate ANOVA and contrast tests show that the increase in the performance when stress and word order converge is not significant for any of these age groups.

![Figure 59](image)

Convergence of stress and word order in actives (contextualized)

7.2.3.2 COMPETITION BETWEEN STRESS AND WORD ORDER

Figure 60 shows that when stress and word order are placed in competition (when Given is emphatically-stressed), only seven-, eleven-, and thirteen-year-olds seem to rely
more on stress than word order to interpret New information, while five-, and nine-year-olds, and adults seem to rely more on word order than stress. However, univariate ANOVA and contrast tests show that the overriding effect of stress was not significant, nor was the overriding effect of word order.

Figure 60

Competition between stress and word order in actives (contextualized)

7.2.3.3 CONVERGENCE OF STRESS AND MARKED SYNTACTIC STRUCTURE

When New information receives emphatic stress in marked syntactic structures (passives, clefts, and pseudoclefts), there is convergence of stress and structure. By comparing performance when New information receives normal stress with when it receives emphatic stress, we can examine whether the convergence of stress and structure can enhance performance. A significant converging effect of stress and marked syntactic structure was not found for any sentence type or any age group. In passives, a slight enhancing effect was seen at seven, nine, and thirteen years, and for adults. In clefts, there was some increase when New information received emphatic stress for seven, eleven, thirteen years, and for adults. In pseudoclefts, a slight enhancing effect was found only at
eleven years. However, univariate ANOVA and contrast tests show that the differences were not significant for any marked sentence type or for any age group. Figures 61, 62, and 63 show the scores for each marked sentence type, contrasting normal stress with emphatic stress on New information.

![Figure 61](image)

**Figure 61**

Convergence of stress and structure in passives (contextualized)
Figure 62
Convergence of stress and structure in clefts (contextualized)

Figure 63
Convergence of stress and structure in pseudoclefts (contextualized)
7.2.3.4 \textbf{COMPETITION BETWEEN STRESS AND MARKED SYNTACTIC STRUCTURE}

When stress is placed in competition with marked structure to indicate Given and New information, marked structure is generally a stronger cue than stress. However, the relative strength of marked structure over stress is not consistent across age groups and/or sentence types. Figures 64, 65, and 66 show the following:

For passives, performance when New information receives normal stress (neutral condition) looks better than when Given information receives emphatic stress (competitive condition) for all age groups, except for nine-year-olds. This suggests that the marked passive structure overrides stress, except for nine-year-olds. Univariate ANOVA and contrast tests, however, show that the performance when New information receives normal stress is significantly higher than when Given information receives emphatic stress only for eleven-year-olds ($F(1,14) = 12.268, p \leq 0.0016$), thirteen-year-olds ($F(1,14) = 31.973, p \leq 0.0001$) and adults ($F(1,14) = 14.911, p \leq 0.0006$), i.e., not for five- or seven-year-olds.

For clefts, performance when New information receives normal stress looks better than when Given information receives emphatic stress only at seven, and thirteen years, and for adults. This suggests that cleft structure overrides stress for these groups. However, univariate ANOVA tests and contrast tests show that the performance when New information receives normal stress is significantly higher only for adults ($F(1,14) = 9.422, p \leq 0.025$). For five-year-olds, stress slightly overrides cleft structure (performance when Given information receives emphatic stress is better than when New information receives normal stress). For nine- and eleven-year-olds, the strength of cleft structure and stress is nearly equal.

For pseudoclefts, performance when New information receives normal stress looks better than when Given information receives emphatic stress at seven, eleven, and thirteen years, and for adults, suggesting that pseudocleft structure overrides stress. Univariate
ANOVA and contrast tests show that the performance in the former condition is significantly better at eleven years ($F_{91,14} = 15.791, \ p \leq 0.0005$) thirteen years ($F_{1,14} = 33.009, \ p \leq 0.0001$), and for adults ($F_{1,14} = 70.339, \ p \leq 0.0001$). For five-year-olds and nine-year-olds, the strength of pseudocleft structure and stress is nearly equal. In sum, marked structure generally overrides stress when they are placed in competition. However, the significant overriding strength of marked structure does not show uniformly across all age groups and/or all marked structures and is strongest for the older groups.

![Diagram](image)

Figure 64

Competition between stress and structure in passives (contextualized)
Figure 65

Competition between stress and structure in clefts (contextualized)

Figure 66

Competition between stress and structure in pseudoclefts (contextualized)
7.3 CONTEXT AS A VARIABLE PRODUCING VARIATIONS IN PROCESSING STRATEGIES

Researchers in discourse pragmatics have been interested in investigating the ways in which sentential devices are used to convey Givenness of information, on the one hand, and Newness of information on the other hand. The characterization of the discourse relations of Given and New can be made both within a sentence and across sentences. In psycholinguistic studies of how people utilize surface cues to interpret Given and New information, there have been different reports. One of the key factors that may help account for the diverging results of those studies is that in some studies target sentences were presented in isolation, while in other studies, target sentences were presented within a context. In the former case, interpretation of Given (Topic) and New (Comment) had to be made within individual sentences, while in the latter case, it had to be made across sentences. Our study employed both isolated and contextualized sentences to investigate the development of Mandarin-speaking children's processing strategies. Comparison of the performances under both conditions confirms our speculation that context is a variable producing variations in processing strategies. This suggests that the development of processing strategies may vary as a function of context, as evidenced by different performances within the same group (employing a within-subject design). Figures 67 to 71 compare isolated and contextualized developmental patterns of processing success, both overall and for each sentence type.
Figure 67
isolated vs. contextualized

Figure 68
Actives: isolated vs. contextualized
Figure 69
Passives: isolated vs. contextualized

Figure 70
Clefts: isolated vs. contextualized
In sum, the developmental patterns of processing strategies for Given and New interpretation do vary as a function of context, particularly for passives and pseudocLEFTs. It should be noted that when comparing similarities or differences of processing strategies within the same language or crosslinguistically, we should consider context as one potential variable that may contribute to differences.

7.4 INDIVIDUAL DIFFERENCES IN PROCESSING STRATEGIES

In the literature on language acquisition, individual difference has been an important research focus which tries to explain why children seem to take different routes and demonstrate different rates of language development, e.g., referential vs. expressive children (Nelson 1973; Peters 1983). However, there has been a paucity of data dealing with individual differences in processing strategies. There have been a number of crosslinguistic studies reporting that speakers of different languages do rely on different surface cues (word order, animacy, morphological marking, etc.) to interpret grammatical subject and object, and providing empirical evidence for language-specific relativism (Bates
et al. 1984). The studies seem, however, to imply that within a particular language there is homogeneity in the reliance for one type of information over another. Our present study shows that processing strategies for interpretation of Given and New can also vary across individuals, suggesting that there is heterogeneity in reliance on one type of cue over another within the same language.

To assess processing strategies in terms of utilization of structural or prosodic cues, we checked the obtained scores for each sentence type under each stress condition. The full score for each cell was 8. If the score was above 4, the performance was rated as good and was considered as an indication of the application of a certain strategy. If a score was 4, the performance was rated as at-chance performance. If the score was less than 4, the performance was rated as poor, and was considered as an indication of non-use of that strategy. In isolation, the most commonly adopted strategy across age groups of children was nonuse of word order in actives, and use of structure for other sentence types. For children who adopted this strategy, an early occurring element was treated as New in actives, while it was the clefted element and the element occurring after the copula shi- 'is' (with either normal or emphatic stress) that was treated as New in passives and pseudoclefts. The percentage of children using this strategy in each age group is as follows: 47% for five-year-olds, and seven-year-olds, 53% for nine-year-olds, 80% for eleven-year-olds, 47% for thirteen-year-olds, and 33% for adults. Figure 72 graphs this homogeneity measure on the application of the above strategy across different age groups.
Despite this relatively homogeneous group, the strategies adopted by the rest of the subjects varied across individuals. For example, one child adopted a second noun strategy, in which a later occurring noun was interpreted as the element conveying New information, ignoring stress and marked syntactic structure. In actives, passives, and pseudoclefts, where the second noun does indicate New information, the performances were perfect when New information received either normal or emphatic stress. But when the Given information received emphatic stress, performance was poor because the second noun was focused despite the stress on the first noun. And in clefts, where the first noun indicates New information, the performance was poor when New information received either normal or emphatic stress because the second noun was focused in disregard of both syntactic structure, and stress. When Given information received emphatic stress, however, the second noun was focused.

A second child used emphatic stress in actives, but structural cues in other sentence types. In actives, the element which carried stress in actives was treated as New, as were
the clefted element and the element occurring after the copula *shi*- 'is' with either normal or emphatic stress in passives and pseudoclefts.

A third child used word order in actives, but abandoned structural cues in other sentence types. The child who adopted this strategy did well in actives by interpreting the postverbal element as New, while she did poorly in marked structures. The second element in clefts associated with Given and the first element in passives and pseudoclefts associated with Given were focused.

Ad hoc strategies were employed by some children with no clear processing pattern, particularly in contextualized conditions, even within the same age group. The wide range of ad hoc variations of strategies goes beyond our ability to classify at present. In the course of language development, individual children may differentially exploit different strategies at any point in the process, as noted by Bates et al. (1988). It is likely that children of different ages employ word order, marked structural or prosodic cues nonuniformly across sentence types. The implication of this finding for theories of child language acquisition is that the existence of individual differences can not be ignored while we attempt to account for language acquisition. Disregard of individual differences will bias us toward seeing only shared patterns of development, and ignoring the ranges of heterogeneous patterns children demonstrate. Crosslinguistic studies of children's strategies in sentence interpretation should also take individual differences into consideration while determining or assessing relative strength of linguistic cues across languages.
CHAPTER 8
GENERAL SUMMARY AND CONCLUSION

Functionally, child language development involves acquiring the abilities to map linguistic forms, including syntactic, prosodic, semantic and morphological cues, onto meaning and functions. The development of the abilities to utilize surface cues to identify Given and New information is one of the most important processing strategies that children need to acquire. This present study investigates how Mandarin-speaking children develop their abilities to use various cues to map linguistic forms onto the Given and New function under both isolated and contextualized conditions. These linguistic cues include word order (in actives), emphatic stress and marked syntactic structures (in passives, clefts, and pseudoclefts), as well as the interactions of prosodic and structural cues (convergence and competition). The findings have been discussed in terms of age, word order, marked syntactic structures, stress, interactions of prosodic and structural cues, context, and individual differences.

8.1 GENERAL SUMMARY

The main findings of this study can be summarized as follows:

(1) Overall, there is a significant difference in the processing of isolated sentences between five-year-olds and the other age groups, and between seven-year-olds and adults. The implication of this finding is that development of pragmatic competence for interpretation of Given and New in IC continues to develop past age 7. However, no significant age differences were found for contextualized sentences.

(2) With regard to the use of word order, in IC, children of all age groups do not demonstrate the ability to effectively utilize postverbal position in active sentences. When New information receives normal stress, the second noun in NVN active sentences is generally not interpreted as New information. A developmental shift is seen from reliance
on animacy to reliance on word order after thirteen years of age. In CC, five- and nine-year-olds seem to utilize word order effectively, but not the other age groups of children. A U-shaped developmental curve is found between five and nine years. It is likely that seven-year-olds overgeneralize strategies from clefts to actives. In cleft sentences, New information occurs earlier in the sentence, while in active sentences, New information occurs later in the sentence. Overgeneralization results in poor performance by the seven-year-olds. Spontaneous production data show that the seven-year-olds use a lot of cleft sentences to answer questions originally posed in other syntactic structures by placing corrected elements in the clefted position.

(3) With regard to marked syntactic structural cues, children are generally able to use syntactic structures in passives and pseudoclefts. They are more able to utilize marked grammatical structures than word order to identify Given and New information. Among the three marked grammatical structures, cleft sentences are the hardest for children to interpret. Five-, seven-, and nine-year-olds can not utilize cleft structures effectively in semantically-reversible constructions, although they perform above chance in semantically-irreversible constructions. However, older children can utilize cleft structures even in semantically-irreversible constructions. This indicates a developmental shift for cleft sentences from using a semantic strategy to a syntactic strategy by eleven years for cleft sentences. A U-shaped developmental curve between seven- and eleven-year-olds is found in processing strategies for Given and New in passives.

(4) When emphatic stress is imposed, an overall converging effect of stress and structure is found in IC, but not in CC. When emphatic stress is placed in competition (i.e., on Given), structural cues generally override stress in both IC and CC. With increasing age, stress is increasingly overridden by other cues, and is no longer the predominant cue that is utilized. This partly confirms our prediction that younger children rely more on stress than older ones. Nevertheless, a significant interactional effect
indicates that different age groups do not respond uniformly to either the converging and competitive effects of stress and word order, or to stress and marked syntactic structure.

In IC, some results confirm the presence of converging effects as predicted by the convergence principle of the Competition model, while other results do not. We found converging effects of stress and word order in actives for all age groups of children, especially for nine-year-olds, but not for adults. However, the converging effect does not reach significance for actives when we compare performance when New information receives normal stress and when it receives emphatic stress. There is minimal convergence of stress and marked structure in view of the small improvement when New information receives emphatic stress. The converging effect of stress and syntactic structure in clefts is stronger than in the other two marked structures for all age groups of children. However, the difference between the condition where New information receives normal stress and where it receives emphatic stress is not significant. With regard to a possible competitive effect between stress and word order in IC, children, but not adults, rely more on stress than on word order to interpret Given and New information. In other words, stress overrides word order for children, but not for adults. The difference between the performance of each group of children and adults reaches significance. Children have a strong tendency to treat the stressed element in an active sentence as New, even if it is preverbal. The result implies that a developmental shift has been made from a stress strategy to a word order strategy after 13 years. However, the overriding effect of stress over word order in actives reaches significance only for eleven-year-olds, but not for other age groups of children. When stress is placed into competition with marked structure, structural cues override stress for all age groups. However, the overriding effect reaches significance only at some ages. Reliance on marked structure is the least for five-year-olds, suggesting that five-year-olds pay more attention to stress than other age groups.
In CC, a converging effect of stress and word order as well as of stress and syntactic structure is not consistently found across age groups. The results only partly support the prediction of the convergence principle of the Competition model that sentences with more information will yield more consistent decisions. In other words, performances in the conditions where surface cues converge (e.g., emphatic stressed on New), are not necessarily better than conditions where less information is available (e.g., normal stress on New). Even when performance when New information receives emphatic stress is better than when it receives normal stress, the difference does not reach significance. When stress is placed in competition with word order, stress overrides word order for certain age groups, while word order overrides stress for other age groups, but none of the overriding effects reaches significance. When stress is placed in competition with marked syntactic structures, marked structural cues generally override stress. All age groups rely on syntactic cues in passives; in clefts and pseudoclefts seven-, and thirteen-year-olds, and adults rely on marked syntactic cues; in pseudoclefts there is a tendency toward an increase in reliance on marked syntactic structures with age. However, the overriding effect reaches significance only for some age groups and for some sentence types.

(5) Processing strategies vary as a function of individual differences. Some previous crosslinguistic studies on identification of grammatical subject and object show that one language may rely more on one type of cue than another, suggesting a homogeneity of reliance priority within a particular language. The results of the present study reveal that even within a particular language, reliance priority on a given cue varies across individuals, even within the same age group. As can be seen from the discussion in 7.4, the tendency to use a homogeneous strategy hovers around 50% for all age groups, except for the eleven-year-olds (80%). This suggests a lack of homogeneity of reliance on one type of information within a particular language. As language acquisition researchers consider how children acquire their particular languages by different paths as a function of
language typology, variations of strategies from child to child with the same language should not be ignored. Studies of individual differences can provide us with valuable insights as we turn to language universals and language relativism to account for patterns children demonstrate in the course of developing language. The present study provides empirical evidence that the role of individual differences in studies of child language development should not be dismissed (Peters 1994).

(6) There are variations of developmental patterns as a function of context, as shown from the differing results in isolated and contextualized conditions. When we compare studies from different researchers and/or from different languages to investigate the development of children's processing strategies in sentence interpretation, the variable of context should not be ignored.

(7) There are crosslinguistic similarities and differences between the present study and studies of English. However, due to the paucity and diverging reports of previous limited research, and to employment of different tasks, it is too soon to draw implications for language universals or language relativism. It is, however, fair to say crosslinguistically that children's development of processing strategies for Given and New interpretation seem to continue developing till relatively late.

In sum, the results of our study suggest that surface cues are exploited differentially as a function of age/development, and of context as well as of individual and crosslinguistic differences.

8.2 LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

There are, of course, limitations to the present study. The following research directions for future study are proposed. First, in our study, only receptive comprehension skill was directly investigated. Previous literature has shown that the development of comprehension may be dissociated from that of production. It will be interesting to investigate how processing strategies in comprehension are similar to or different from
those in production in the development of pragmatic ability for processing Given and New information. For example, during the course of development, when reliance on word order declines sharply, is there also evidence for this in production? Secondly, other sentence structures relevant to the marking of Given and New information, such as adverbials, can be explored. Thirdly, it will be interesting to explore the interaction between tone and stress in Mandarin Chinese, and examine whether there is correlation at a point when stress can override other structural cues and be utilized more frequently. This requires sophisticated experimental equipment, and more rigorous phonetic analysis. Fourthly, more crosslinguistic studies in other languages will be needed in order to better understand children's development of pragmatic abilities for interpretation of Given and New information. Fifthly, studies targeting individual differences within and across languages are needed so that the extent and the type of individual differences can be assessed more fully.
APPENDIX I: STIMULI: ANIMATE AGENT AND PATIENT (PILOT)

Pictures used: The turtle chases the rabbit.

The monkey chases the cat.

Actives

1. Wugui zhui mao ma?
turtle chase cat question marker

'Does the turtle chase the cat?'

2. Does the turtle chase THE CAT?

3. Does THE TURTLE chase the cat?

4. Houzi zhui tuzi ma?
monkey chase rabbit question marker

'Does the monkey chase the rabbit?'

5. Does the monkey chase THE RABBIT?

6. Does THE MONKEY chase the rabbit?

Passives

1. Mao bei wugui zhui ma?
cat by turtle chase question marker

'Is the cat chased by the turtle?'

2. Is the cat chased by THE TURTLE?

3. Is THE CAT chased by the turtle?

4. Tuzi bei houzi zhui ma?
rabbit by monkey chase question marker

'Is the rabbit chased by the monkey?'

5. Is the rabbit chased by THE MONKEY?

6. Is THE RABBIT chased by the monkey?
Clefts

1. Shi wugui zhui mao ma?
   it-is turtle chase cat question marker
   'Is it the turtle that chases the cat?'

2. Is it THE TURTLE that chases the cat?

3. Is it the turtle that chases THE CAT?

4. Shi houzi zhui tuzi ma?
   it-is monkey chase rabbit question marker
   'Is it the monkey that chases the rabbit?'

5. Is it THE MONKEY that chases the rabbit?

6. Is it the monkey that chases THE RABBIT?

Pseudo-clefts

1. Zhui mao de shi wugui ma?
   chase cat NOM is turtle question marker
   'Is what chases the cat the turtle?'

2. Is what chases the cat THE TURTLE?

3. Is what chases THE CAT the turtle?

4. Zhui tuzi de shi houzi ma?
   chase rabbit NOM is monkey question marker
   'Is what chases the rabbit the monkey?'

5. Is what chases the rabbit THE MONKEY?

6. Is what chases THE RABBIT the monkey?
APPENDIX II: STIMULI: ANIMATE AGENT AND INANIMATE PATIENT (PILOT)

Pictures used: The boy breaks the window.

The girl breaks the cup.

**Actives**

1. Nanhai dapo chabei ma?
   boy break cup question marker
   'Does the boy break the cup?'

2. Does the boy break THE CUP?

3. Does THE BOY break the cup?

4. Nühai dapo chuanghu ma?
   girl break window question marker
   'Does the girl break the window?'

5. Does the girl break THE WINDOW?

6. Does THE GIRL break the window?

**Passives**

1. Chabei bei nanhai dapo ma?
   cup by boy break question marker
   'Is the cup broken by the boy?'

2. Is the cup broken by THE BOY?

3. Is THE CUP broken by the boy?

4. Chuanghu bei nühai dapo ma?
   window by girl break question marker
   'Is the window broken by the girl?'

5. Is the window broken by THE GIRL?

6. Is THE WINDOW broken by the girl?
Clefts

1. Shi nanhai dapo chabei ma?
   it-is boy break cup question marker
   'Is it the boy that breaks the cup?'
2. Is it THE BOY that breaks the cup?
3. Is it the boy that breaks THE CUP?
4. Shi nühai dapo chuanghu ma?
   it-is girl break window question marker
   'Is it the girl that breaks the window?'
5. Is it THE GIRL that breaks the window?
6. Is it the girl that breaks THE WINDOW?

Pseudoclefts

1. Dapo chabei de shi nanhai ma?
   break cup NOM is boy question marker
   'Is what breaks the cup the boy?'
2. Is what breaks the cup THE BOY?
3. Is what breaks THE CUP the boy?
4. Dapo chuanghu de shi nühai ma?
   break window NOM is girl question marker
   'Is what breaks the window the girl?'
5. Is what breaks the window THE GIRL?
6. Is what breaks THE WINDOW the girl?
APPENDIX III: MEAN SCORES (OUT OF 4) AND (STANDARD DEVIATIONS) FOR TWELVE CONDITIONS AT THREE AGE LEVELS (PILOT)

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APPENDIX IV: EXAMPLES OF STIMULI (ISOLATED CONDITION)

Pictures used: The turtle chases the rabbit.
The monkey chases the cat.

**Actives**

1. Wugui zhui mao ma?
turtle chase cat question marker
'Does the turtle chase the cat?
2. Does the turtle chase THE CAT?
3. Does THE TURTLE chase the cat?

**Passives**

1. Mao bei wugui zhui ma?
cat by turtle chase question marker
'Is the cat chased by the turtle?'
2. Is the cat chased by THE TURTLE?
3. Is THE CAT chased by the turtle?

**Clefts**

1. Shi wugui zhui mao ma?
   it-is turtle chase cat question marker
   'Is it the turtle that chases the cat?'
2. Is it THE TURTLE that chases the cat?
3. Is it the turtle that chases THE CAT?

**Pseudoclefts**

1. Zhui mao de shi wugui ma?
   chase cat NOM is turtle question marker
   'Is what chases the cat the turtle?'
2. Is what chases the cat THE TURTLE?
3. Is what chases THE CAT the turtle?
APPENDIX V: DESCRIPTIONS OF THE EIGHT PICTURES

Semantically-reversible constructions:

1. A: The turtle chases the rabbit.
   B: The monkey chases the cat.
2. A: The wolf catches the duckling.
   B: The hawk catches the chicken.
3. A: The cock bites into the worm.
   B: The goose bites into the little shrimp.
4. A: The boy releases the little bird.
   B: The girl releases the butterfly.

Semantically-irreversible constructions:

1. A: The boy breaks the window.
   B: The girl breaks the cup.
2. A: The elephant tramples the chair.
   B: The gorilla tramples the box.
3. A: The dog knocks over the vase.
   B: The seal knocks over the fish bowl.
4. A: The man fixes the car.
   B: The woman fixes the refrigerator.
APPENDIX VI: THE OTHER SIX PAIRS OF PICTURES
APPENDIX VII: EXAMPLES OF STIMULI (CONTEXTUALIZED CONDITION)

Pictures used: The turtle chases the rabbit.
The monkey chases the cat.

Actives
1. Houzi zhui tuzi.
   monkey chase rabbit
   'The monkey chases the rabbit.'
2. The monkey chases THE RABBIT.
3. THE MONKEY chases the rabbit.

Passives
1. Tuzi bei houzi zhui.
   rabbit by monkey chase
   'The rabbit is chased by the monkey.'
2. The rabbit is chased by THE MONKEY.
3. THE RABBIT is chased by the monkey.

Clefts
1. Shi houzi zhui tuzi.
   it is monkey chase rabbit
   'It is the monkey that chases the rabbit.'
2. It is THE MONKEY that chases the rabbit.
3. It is the monkey that chases THE RABBIT.

Pseudoclefts
1. Zhui tuzi de shi houzi.
   chase rabbit NOM it-is monkey
   'What chases the rabbit is the monkey.'
2. What chases the rabbit is THE MONKEY.
3. What chases THE RABBIT is the monkey.
APPENDIX VIII: DESCRIPTIONS OF THE CONTEXT STORIES
(CONTEXTUALIZED)

Animate agent and patient:

1. The turtle chases the rabbit. (a sun story)
   The monkey chases the cat. (a moon story)
2. The boy releases the bird. (a tree story)
   The girl releases the butterfly. (a flower story)
3. The wolf catches the duckling. (a forest story)
   The hawk catches the chicken. (a lawn story)
4. The cock bites into the worm. (a ranch story)
   The mother goose bites into the little shrimp. (a yard story)

Animate agent and inanimate patient:

5. The dog knocks over the vase. (a mountain story)
   The seal knocks over the fish bowl. (a sea story)
6. The boy breaks the window. (a school story)
   The girl breaks the cup. (a home story)
7. The man fixes the car. (a master story)
   The woman fixes the refrigerator. (an apprentice story)
8. The elephant tramples the chair. (a circus story)
   The gorilla tramples the box. (a zoo story)
APPENDIX IX: MEAN SCORES (OUT OF 8) AND STANDARD DEVIATIONS) OF
TWELVE CONDITIONS AT SIX AGE LEVELS (ISOLATED)

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