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An Investigation into Discourse Anaphoric Relations:

On The Role Of Contextual Information In Anaphor Resolution

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For my daughters

Maryam and Marzie

and

in memory of my father

Reza E. Rasekh

ABSTRACT OF THE THESIS

The research reported in this thesis examines at a fair level of detail the resolution of anaphoric coreference in English discourse. The central suggestion of this thesis is that discourse anaphoric relations are understood best if we examine the role of contextual information. Recognising that the referring expressions and the contextual sources are both necessary in a comprehensive theory of anaphora permits a clarification and simplification of each. The model adopted for this study maintains that the referential salience of characters is attained through the predications on them. It claims that anaphoric expressions are not the only means to guide discourse coreference and that their role is also to mark the personal and general pragmatic intents of the writer. This thesis develops a solution by modifying and extending the existing proposals in the literature, and then uses it to explore how, in discourse, coreference is maintained and ambiguity is removed. This comprehensive view of anaphora serves as a tool for the exploration of the phenomenon of discourse reference in all its aspects and in most environments.

The results of the research reported in chapter three show that discourse functional tendencies are recognised and are followed; but anaphoric patterning varies widely across individuals and is realised in differing degrees of strength, so that a statement of distribution that is based on one individual will not be accurate for another individual's written text. General statements must acknowledge that the linguistic coding system operates on the basis of optional discourse tendencies. The concatenation of referential items is patterned to display the cognitive tendencies of the individual writer to convey the personal and general pragmatic intents and the structure of the discourse. The types of anaphoric expressions used are predictable, but explanations can be proposed for why an individual writer prefers one option over others. In so doing, statistical data show that discourses display general referential tendencies but they do not support any strict rules of discourse coreference.

The second project undertaken in this study, reported in chapter four, evaluates two issues. First, that anaphoric expressions are arranged in discourse on the basis of some functional constraints and discourse structural and non-structural objectives, a belief common to a number of studies on discourse anaphora and supported by the results of the experiment reported in chapter three. Second, that anaphor resolution is largely dependent on context. The task of referring expressions is twofold: carrying out discourse general and personal pragmatic functions and maintaining clarity in reference. Organisational structure of discourse is explicated in terms of referential forms used, and clarity of reference is realised in terms of both linguistic coding system and context. Only an

integrative semantic view coupled with how the formal referential devices are arranged can account for the complete set of coreference possibilities.

In keeping with the findings of the experiments reported in chapters three and four, the research reported in chapter five tests the effect of ambiguity as opposed to the role of context. It is suggested that the salience of characters which is attained through the actions they perform influences both identifiability and referential choice. Through investigating the nature and the capabilities of context, we demonstrate that it is the function of a contextual network of information that counters the adverse effect of discourse ambiguity. The claim is that the effect of ambiguity is constrained to the environments where the events and actions constructing a given discourse file are not revealing of the identity of the referents associated with them.

STATEMENT

This thesis contains no material which has been accepted for the award of any other degree or diploma at any university and to the best of my knowledge and belief contains no material previously published or written by another person except where due reference is made in the text of the thesis and the bibliography.

Abbass Eslami Rasekh

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CHAPTER ONE

About Anaphora And This Thesis

1.0 Introduction

Anaphora has proved a major challenge for several related disciplines for the last two decades. This linguistic issue has received a great deal of attention from researchers in linguistics, computational linguistics, artificial intelligence and information retrieval, and many differing solutions have been proposed with varying success. Both sentence and discourse anaphora have been attractive linguistic issues which have proven to be rich areas within which to explore the complex relationships among syntax, discourse, semantics and pragmatics. One of the central concerns for the linguistic research has been to investigate the factors which influence the arrangement of anaphoric expressions. This thesis will contrast the existing approaches to discourse anaphor resolution and will try to introduce a new solution for this linguistic issue. The view of anaphor resolution maintained in this thesis is based on the function of context in identifying referents.

This chapter will touch upon the syntactic framework and some discourse semantic and functional investigations in order to identify issues arising from the findings and relate them to the objectives of this study. We begin with a general definition of discourse anaphora and a demonstration of some important aspects of the rich diversity in discourse coreference and finally the constraints on the use of discourse anaphoric expressions. We will further present an outline of the thesis and elaborate on the rationale and significance of this study. The hypotheses of this study reads: A) In addition to the constraints which determine the arrangement of anaphoric expressions in discourse, there is a difficult to measure but perceived degree of stylistic freedom in referential choice; this is clearly observable in a cross-comparison of individuals' performance in an experimental setting. B) Anaphor resolution is the result of processes which depend on both the employment of linguistic formal devices and the informativity of context. Through an integrative view of context in complement with the informativity of the referential devices, we can account for the long distance use of anaphoric expressions.

The topic of this thesis, *anaphora*, refers to either the linguistic referential device used, the extra-linguistic entity referred to, or the relation that can be assumed between coreferring pronouns and antecedents. The linguistic issue at hand has been subject to a variety of different terminologies, cf.

1

referential choice (Clancy 1980), continuity marking device (Givón 1983), the syntax of reference (Tomlin 1987), anaphora (Fox 1987), accessibility marker (Ariel 1990) and so forth; and the extra-linguistic referential concept has been referred to as topic (Givón 1983), referent (Clancy 1980), entity (Ariel), denotatum (Allan 1986 a and b) and so forth. This thesis will not stick to a particular terminology in making reference to this linguistic phenomenon. Different terms may be employed according to given contextual environments in which the term functions better in conveying a) the relation, b) the thing referred to, and c) the linguistic device used.

1.0.1 On The Scope of the Use of Anaphoric Expressions in Discourse

Anaphors are among the most frequent language forms in discourse. Allan (1986, 1995) defines anaphors as linguistic items which act as the formal alternatives to full forms. If anaphoric expressions are viewed as falling into three types: zero, pronoun and full NP, there will be nine (3 X 3) possibilities in which reference is diminished or embellished:

1. NP----- NP   2. NP----ZERO   3. NP----PRO   4. PRO----NP   5. PRO----PRO
6. PRO----ZERO   7. ZERO----NP   8. ZERO----PRO   9. ZERO----ZERO

However, the variation does not stop there, since even full NP's may be classified into different types and sizes which range from descriptions (e.g. *the player*) to names (first and last names) carrying differential degrees of informativity. Indeed, there are several ways that a referent can be referred to, the most obvious way to direct a reader to think of a certain character is when the discourse explicitly refers to that particular character. Allan (1995) addressed this rich diversity in referencing: "there are many, indeed innumerable, ways in which the same thing can be identified. For instance, just a handful of the expressions used to refer to me [Keith Allan] include *the author, Keith, Keith Allan, their son, my husband, her husband, dad, darling, scumbag, you, boring old fart, four-eyes, maniac, grey eminence, the tall guy, him, me, I, number 16, next*, and those are just in English" (Allan 1995:5).

In an early view of reference in discourse, Cummings, Herum, and Lybbert (1971) acknowledged that the accepted norms of discourse unity arise "from certain links, either explicit or implicit, among sentences in the discourse" (p. 195). They argue for different semantic links and particular recurrences which continue from sentence to sentence. Continuation is defined as recurrence that gives "a sense of controlled difference of rhemic material" (p. 196). As the first category of recurrence or continuation, the content of a word establishes the conceptual categories of that word.[1] The second category of

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[1] Such categories are extension, the set of constituting things; intension, the set of defining attributes; designation, the direct and literal intension and extension; and connotation, indirectly used extension and intension. (see Allan to appear, chapter 3 for a detailed analysis of conceptual categories).

semantic links and recurrences is reference and context. Reference means what a word points to within a particular context, and context comprises three distinct sources of information leading to a world spoken of (see section 1.4.1.1). Referential recurrence and unity make up the third category of semantic links and recurrence. Two types of recurrence are seen which contribute to the unity of a text: Repetition at the level of expression (example 1); and second, coreference among alternative forms (example 2):

1
My father$_i$ was a good Baptist. But my father$_i$ also enjoyed a good nip now and then .
2
Green Bay$_i$ played their$_i$ usual tough game. But the packers$_i$ were again short on the score.

In a fourth category of recurrence, the authors include types of referential recurrence. The substitute may be more general than the antecedent. The substitute may also be supplied elsewhere in the textual context or situational context. One such type is systematic substitution, a form of substitution found in pronouns and proverbs (examples 3&4). Thematic recurrence is also a type of near reiteration, especially in a shift from an indefinite article to a definite article. Allan (1986) calls this like-denoting; examples 5b, c, and d display the overriding importance of pragmatic inference in determining the like-denoting. Semi-systematic substitution is a rather large class of very general terms that function like pronouns; Allan believes that these are used when speaker has a very positive or very negative attitude to what is spoken of (1986:50) (example 6); these may also be used in a parallel substitution, when the postcedent abbreviates its antecedent (example 7):

3.
This is Frank's car$_i$. It$_i$ is very expensive.

4.
He said *he was going to town*. He *did*.

5.
a.
"Can you please help me? I am looking for a pen".

b. Last year in Trafalgar Square I saw *people* jumping in the fountains on new year's eve, and this year I saw *them* at it again.
c.
Janie wants a *new doll* for Christmas, and Ann wants *the same thing*.
d.
When a lizard loses its *tail*, *it* will often grow again.

6.
This is Frank's *car*. *The bastard* won't run.

3

7.
"*The University Faculty Senate* voted today". "*The Senate* voted today".   (Cummings, Herum, and Lybbert 1975:201-202)

Coherence can come from both referential recurrence (the categories enumerated above) and non-referential recurrence in which the referents are not repeated but instead certain attributes of the referents are. One type is specification where the postcedent falls completely within the extension of the antecedent (example 8). A second type is expansion where the extension of the antecedent falls completely within extension of the postcedent (example 9). Inclusion, a third type, is seen in cases in which the postcedent and antecedent share attributes that define a third category (example 10).

8. [My parents are vacationing.] $\Vdash^2$ [My father is vacationing.]
9. [My father works hard.] ⫤ [All men work hard.]
10. [My father was an immigrant.] & [My mother was an immigrant.] ⊩ [My parents were immigrants.]

In referring, the speaker conveys to the hearer who or what is being talked about and who or what is involved in the communication. Overspecifying by using names or descriptions more often than required makes a text awkward because it contravenes the conditions of economy and violates the cooperative maxim of manner[3] (Grice 1975, Levinson 1983). On the other hand, referential attenuation makes it more difficult for the readers to keep track of the referents specially if there are competing referents in the environment; however, economy in communication is a necessary condition for being cooperative, so this incentive motivates the use of a fairly wide range of anaphoric expressions.

Obviously, one reason that speakers use pronouns is because the intended referent is recognisable to the addressee and distinct from other possible referents; how and on what basis the speaker's intended referent is available is a significant issue which elucidates the objective of this study. Because some discourses may be long and may have more than one character and object to keep track of, processing anaphoric expressions is a complex task. So far as clarity in reference is concerned, two conditions should be fulfilled: first, clear identification of a referent; and second, the

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[2] A ⊩ B means "A entails B", or "for every possible world, if A is true then B is necessarily true."
[3] Grice's cooperative principle reads: 'Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose of direction of the talk exchange in which you are engaged' (1975:45). This principal operates through observing certain maxims. The maxim of manner dictates that one be perspicuous, avoid obscurity of expression, avoid ambiguity, be brief, and be orderly; maxim of relation demands that one be relevant. Maxim of quality requires that one makes one's contribution one that is true, and backed by adequate evidence. And maxim of quantity makes it necessary for the communicator to make his contribution as informative as required. Maxims of manner and quantity operate in the efficient and effective use of referring expressions. Avoiding ambiguity, being brief and avoiding redundancy are the requirements of a stylistically acceptable discourse.

adequate maintenance of the identification of a referent nearly as economically as possible. In this context, anaphoric expressions are perceived to be the common means of identifying the referents and maintaining the identification of the referents already introduced economically (Grimes 1975, Sperber and Wilson 1986). However, maintaining reference is not the only function of anaphoric expressions.

In this study we will argue that there are conditions for which referring expressions are employed in multiple references to the same entity. There are several motivations for speakers' selected styles of arranging the referring expressions; obviously, this is one of the reasons why a discourse contains a wide range of referential forms. These expressions display the textual connectedness and play a significant functional role; that is, they convey the writers' general cognitive tendencies and personal pragmatic intents. The function of a pronominal expression may be more than just to refer to a particular entity. Seeking a correlation between the choice of formal expressions and the identifiability of their referents excludes a considerable aspect of their use, which is to signal potentially unlimited types of pragmatic intents. We will elaborate on this important issue in chapters 4 and 5.

In this chapter, we will argue that attenuated forms may communicate a perspective on what is being talked about. People use pronouns frequently to refer to a character when they tell a story from the perspective of that character. A pronominal expression may convey information about what point of view is to be taken on the world a discourse expresses (Clancy 1980). It may be that using a pronoun to refer to an entity that is not already salient makes that entity more salient than it would be if a full NP were used. According to Gernsbacher (1989), reduced anaphoric devices enhance the activation of their antecedents; that is why concepts to which the reduced devices refer are identified more rapidly.

In addition to anaphoric reference, which is a backward looking relation, there are two types of forward looking reference. One type is syntactically bound forward looking anaphors. Syntactically bound cataphoric reference is a language specific phenomenon; some languages such as English allow its use, while other languages (e.g. Persian) do not. 11b below is the unmarked grammatically correct version of 11a; however, in 11c the pronoun and the co-occurring full NP are not coreferential; and 11d in which the pronoun and the co-occurring full NP are co-referential is not viewed as an acceptable utterance by Persian native speakers; although the semantic content of the sentence determines the most likely coreference, it is highly marked (Eslami Rasekh 1991).

5

11a
When he did at last get home, Ed fell asleep.[4]

b

vaghty Ed$_i$ saranjam ras-id   manzel, [Ø]$_i$ khab-ash   bord.

when Ed at last   got-3sg home [zero] asleep-3sg took.

c

vaghty ou$_i$ saranjam ras-id manzel, Ed$_j$ khab-ash bord.

when   he at last   got-3sg home, Ed asleep-3sg took.

but not

d

(?*) vaghty ou$_i$ saranjam ras-id manzel, Ed$_i$ khab-ash bord.

   when   he at last   got-3sg home, Ed asleep-3sg took.

The other use of the forward-looking relations is within discourse; a forward looking relation is created through the use of such linguistic elements as stress and indefinite *this* which are markers of discourse cataphoric salience. The term cataphora is used in discourse to indicate the future salience of a given focal discourse referent. Although the term 'cataphoric' is used with a different sense from the sense it is used in the syntactic studies, it is viewed to be connected with how salience is marked by the speaker to facilitate the hearer's forming of the structural organisation of the discourse. Upon introduction of a given discourse concept, the discourse cataphoric device is attached to the full NP to mark its future salience.[5] The concepts marked by the attention getting devices are likely to be mentioned again, are suppressing, and are resistance to being suppressed by other co-occurring concepts (Gernsbacher 1991). Gernsbacher reported the results of an experiment in which attention getting devices (salience markers) were used in order to show that concepts that are marked by cataphoric devices are more activated, are better at suppressing the activation of other concepts, and

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[4] This and many other examples in this chapter are taken from Allan (1995).

[5] In the beginning of a conversation, indefinite this, in sentences such as "*so, this man walks into a bar*" in contrast with "*so, a man walks into a bar*" is one means of expressing cataphoric prominence (Wald 1983, Wright and Givón 1987, Prince 1981b, Gernsbacher and Shroyer 1989). In addition to indefinite article this spoken contrastive stress on prominent or focal concepts is used to mark them as cataphorically salient. However, Allan (p.c.) believed discoursal attention getting devices which are used in English spoken genre of discourse should be distinguished from the syntactically bound forward looking devices used in creating cataphoric links within sentences. The discoursal attention getting devices help the allocation of focus of attention on focal concepts upon their introduction in a given discourse file.

are more resistant to being suppressed by other concepts. Short spoken narratives, (cf. example 12) were selected for the purpose:

12
I swear, my friend Vicky, every time we go to a garage sale, she just, uh, she just goes crazy. I mean like last Saturday we went to one near campus, 'n she just had to buy *AN ASHTRAY*, n y'know, ...

In 12, the experimental concept, ashtray, was manipulated by stress (or indefinite *this*) and then its accessibility was estimated. After exposing the name *ASHTRAY* (or alternatively *this ashtray*) to the subjects, it was estimated how rapidly and accurately subjects verified that the concept had occurred in the narrative. It was presumed that the more rapidly and accurately subjects responded, the more activated the concept would be. When the referent of *ashtray* was pronounced with stress; or when indefinite *this* was attached to *ashtray*, the concept in question (ashtray) remained more activated than the other concepts which were presented to them without a cataphoric device; the activation of the concept *ashtray* did also last longer in subjects' mental representations of the discourse (Gernsbacher 1989b). Listeners benefit from cataphoric salience markers by using them as key clues for establishing a mental representation (Gernsbacher 1990). The use of discoursal cataphoric devices helps the speaker in making explicit the manner in which the current sentence is tied to later discourse; the addressee's attention is also engaged to focus on that particular part of the discourse that is tied to it which is also, as a result, highlighted for prominence (e.g. 13). Working within the framework of distance theory (see chapter 2), Brown (1983) also observed that referents marked by demonstrative + NP (*this, these* + NP) gain a more prominent status in the following discourse (e.g. 14). In example 13, the pronoun *it* is used by the writer to draw the readers' attention to what will happen later in the story.

13
One thing was certain, that the white kitten had nothing to do with *it*; it was the black kitten's fault entirely.

14
...Cayman Islanders, least of all Puarrel, did not scare easily. And why had Doctor No got *this mania* for privacy? Why did he go to such expense and trouble to keep people away from his guano island?

A reduced anaphoric expression may be used to pick out an entity, location, or time in the common ground of the speaker and addressee (Clark and Marshall 1981). The common ground can be the textual record of previous discourse; this reference type is known as endophoric reference. It may be something in the physical environment; this reference type is known also as exophoric reference (Halliday and Hassan 1976). In addition to linguistic referential items including pronouns, demonstratives, and descriptions, locatives (eg. *there* referring to an already mentioned place) and

time adverbials (eg. *then* referring to an already mentioned date) can be used with an anaphoric sense. Anaphors may also be used to allude to a non-extensional referent (15 and 16) or to refer to entities in hypothetical worlds (17).

15
If there is *someone* who knows the answer, will *they* please raise their hand?

16
Ed is not going to wear *a kilt* because *it* wouldn't suit him.

17
Every farmer who owns *a donkey* beats *it*.

An entity in the common ground of the partners of a communication can attract focus and hence gain salience. In a highway where one pedestrian is standing on a corner waiting for the cars to pass before crossing the street, another pedestrian comes up and utters sentences 18 or 19. In 18, the speaker relies on the addressee's obvious attention to the cars. It is clear to both parties that *the cars*, though unmentioned, are the most salient objects of the situation to the addressee. In 19, the speaker chooses to talk not about the *cars*, but about a closely related entity, *the drivers*. This works because the addressee is attending to *the cars* and can pragmatically infer the existence of *drivers* for those *cars*. This type of resolution is dependent on the speaker and addressee's shared semantic knowledge. Such inferences, based on common sense or schematic knowledge are common[6] (Haviland & Clark 1974, Prince 1981a, Schank and Abelson 1977).

18
Aren't *they* moving too fast? Fortunately there aren't many of *them* in this city.

19
Don't you think *they* are driving too fast.

Some personal pronouns are used exophorically. The exophoric use applies to the speaker, addressee and entities that are situationally salient. If used anaphorically, a pronoun is applied to refer to individuals or things that have been mentioned somewhere in the text. Under unmarked conditions, the reflexives are used anaphorically;[7] first and second person pronouns are used

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[6] This type of referential link may well be defined in Fauconnier's terms as mental constructs built up in any discourse according to "guidelines provided by the linguistic expressions" (1985:16). Mental spaces are built up during ongoing discourse; such spaces can be realised through time changes, space changes, or hypothetical changes in space, etc.

[7] Reflexives may also be used to refer to the speaker or the addressee; while it is used in informal usage of language, prescriptively, such usage is viewed as grammatically marked:

    A: Who is going?
    B: *Myself* and Jane.

exophorically; demonstratives are used both deictically and endophorically; and the third person pronouns are used both exophorically and anaphorically (examples 20-22). The following statements each represents one of the above reference types. Reference with a third person pronoun can carry both an endophoric and exophoric sense simultaneously; in a situation where an interlocutor utters 24, s/he is obviously pointing to a previously mentioned person who is being alluded to in the situation, i.e. reference is made to an entity who has been mentioned before and is also deictically salient.

> 20
> You wanted to lend *Jane* a book on linguistics but *she* had already bought it herself (third person pronoun used anaphorically).

> 21
> The speaker pointing to a statue of a king and talking to an addressee: "There he is standing proudly" (third person pronoun used exophorically).

or when someone says of a passing punk:

> 22
> Wow, did *he* look weird!

> 23
> *Jim* saw *himself* in the mirror (reflexive used anaphorically).

> 24
> *He* is still following us (anaphoric & exophoric).

The diversity of discourse reference is not limited to the cases enumerated above. There are circumstances in which the coreference may be a mismatch of number agreement, this type of coreference is known as metonymy, indirect anaphora, bridging inferences; pronouns used in this sense are called conceptual anaphors (Gernsbacher 1991, Clark 1978). Allan (1986:126) points out that one of the instances where a definite NP is justified is when denotatum is determined by inference from the preceding text. Webber (1983) and Stenning (1978) tackle this by developing a procedure for extracting the sets an utterance makes available for later reference. Stenning (1978) suggests that an anaphor is best construed as a linguistic device that points to a structure in the discourse model. Clark (1986) stated that demonstratives do not necessarily refer by pointing at the referent itself. Often, the demonstratum is best thought of as an index to the referent, as when one points to a book and makes a remark about the book's author. Examples 25-28 each represent a type of indirect anaphoric coreference. 25 represents a concept that prepares a set in its next mention. One member of a set is pragmatically linked to the entire set. In 26, an indirect reference is the result of the pragmatic inferencing based on semantic shared knowledge of the writer and the comprehender. The speaker assuming that the addressee is aware of the referent, uses a pronoun to initiate reference

to a referent in a particular context. And, in examples 27 and 28, when the agent of an action is not as salient as the action, the speaker may feel free to use a pronoun to refer to an unknown agent signifying the irrelevance of the entity linked to the action.

25
Sarah bought a doberman. They are vicious animals (Webber 1983).

26
That's Macbeth, my favourite. Shakespeare was a noble writer.

27
When addressee comes back from the dentist: What did they do to you!

28
They don't ring the bell in this school.

Having discussed some different aspects of discourse reference and the ways recurrence is realised, we now present a brief outline of the syntactic constraints on coreference before proceeding toward a review of previous discourse theoretical contributions. The purpose of the next section is to briefly show the syntactic constraints that determine the intra-sentential coreference possibilities. It will also be argued that syntax is by no means a complete territory for the study of the rich diversity in the use of the referring expressions within isolated sentences, episodes, across episode boundaries, in different genres of discourse and across typologically different languages.

1.0.2 Syntactic Constraints On Coreference
The issue of inquiry in syntactic analysis has been to answer the question when a pronoun and a full NP in the same sentence can refer to the same entity, and when it is impossible for them to corefer. The grammatical constraints on the sentential coreference have been the thrust of the syntactic generative approach posed in a series of theories proposed by Chomsky and others since the late fifties: Standard Theory (Chomsky 1965), Extended Standard Theory (Chomsky 1971), Precede and Command (Langacker 1969), c-command (Reinhart 1976), and Government Binding Theory (Chomsky 1981). Government Binding is a theory of universal constraints on the use of full NP's, pronouns and anaphors within the syntax of isolated sentences known as binding principles. Binding has been applied by May (1985) to show that, through the paths of NP's in the tree-structures, syntactic rules can account for not only the D-structure and S-structure forms but also the logical form representation of sentences with quantified NP's.

Chomsky's grammar explicitly restricts itself to the investigation of isolated sentences: "syntax is the study of the principles and processes by which sentences are constructed in particular languages. Syntactic investigation of a given language has as its goal the construction of a grammar that can be viewed as a device of some sort for producing the sentences of the language under analysis" (Chomsky, 1957:11). Chomsky's work from the 50's to the present directed linguistics to the study of self-contained, isolated sentence units, yet his concerns were still predominantly with the formal features of language: the aim of linguistic analysis being to separate the grammatical sentences from the ungrammatical ones. The domain of the syntactic analysis did not incorporate relations between the constituents of different sentences in a text.

Yet, another sentential approach to anaphora is a sentence level development called Lexical Functional Grammar which is a theory of lexical function in the sentence (Bresnan and Kaplan 1982). Another approach investigates the semantic constraints on anaphora across sentences, dealing primarily with issues such as referential scope and quantification with an attempt to link intra-sentential to inter-sentence anaphora (Kamp 1981, also Heim 1982, 1983). We will not deal with the semantic inter-sentential and lexical functional constraints in this study. Neither seems to address the full range of anaphoric phenomena, since there is no clear delineation of which anaphoric constraints are dependent on sentence internal configurations and which are best explained in terms of the structure of discourse.

The syntactic relationship between the full NP and the pronoun has been found to be of great importance for the coreference options of the two elements, and in the present state of the generative theory this relationship is most commonly defined in terms of the notion Constituent (C)-Command which is due to Reinhart (1976, 1981). Binding theory seeks to explain anaphora in terms of configurational notions such as 'c-command' and 'governing category'. Prior to Reinhart's c-command, Langacker (1969) introduced some constraints on pronominalisation which he called "precede-and-command", also known as 'primacy relations'. The constraint is formulated as: "NP_a may be used to pronominalise NP_p unless NP_p bears all relevant primacy relations to NP_a i.e. NP_p may not both precede and command NP_a, where NP_a is the antecedent and NP_p is the pronoun" (p. 173). Any node A precedes another node B if it comes before B in the sentence, while any "Node A 'commands' another node B if neither A nor B dominates the other and the S-node that most immediately dominates A also dominates B" (p. 169).

Langacker's theory, through its primacy relations, can correctly block the generation of sentences which are ungrammatical (see 29-32). In 29, *her* neither precedes nor commands the full NP *Mitra*. In

11

30, the pronoun commands its antecedent, i.e. the S-node most immediately dominating *her* also dominates *Mitra*, but since it does not also precede, this sentence is also grammatical. In 31, the pronoun precedes but does not command its antecedent, since *her* only commands elements within the relative clause. In 32, however, both primacy relations are fulfilled in that the pronoun both precedes and commands its antecedent and restriction for coreference blocks the generation of this sentence.

29.
Mitra likes the man who kissed her.

30.
The man who kissed Mitra likes her.

31.
The man who kissed her likes Mitra .

32.
She likes the man who kissed Mitra.

Reinhart (1976) challenged Langacker's precede and command constraint by pointing out several problems with the old constraints on coreference and introduced a new and more explanatory condition on anaphora, which she called c-command. She observes that the assumption that backwards pronominalisation was restricted, whereas forward pronominalisation was free is not correct (33&34). The sentences are grammatical, although in both a pronoun both precedes and commands its antecedent. If the full NP and the pronoun are interchanged, the sentences become ungrammatical.[8] As the pronoun no longer precedes and commands the full NP, this notion can not account for the ungrammaticality of these sentences.

33
Near him, Peter saw a snake.

34
In her office, Mitra works night and day.

The restriction for pronominalisation is that "a given noun phrase cannot be interpreted as coreferential with a distinct non-pronoun in its c-command domain" (1981:617), with domain defined as those branching nodes c-commanded by node A regardless of their linear order. In other words, a pronoun cannot c-command its antecedent. The c-command constraint is able to account for the coreference relations in 35-38 without using precedence because the structure of sentences with fronted adverbial clauses is taken by Reinhart to be different from the structure that was assumed by Langacker.

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[8] According to Allan (p.c.) such interchange does not result in ungrammatical results, but the result is "a very marked case"; the controversial nature of the judgements observed in the issue of grammaticality vs acceptability is strongly to the disadvantage of the syntactic attempts.

35
After he arrived, Fred shook hands.

36
After Fred arrived, he shook hands.

37
Fred shook hands, after he arrived.

38
*He shook hands, after Fred arrived.

The c-command relation:

X

A

Y

B   C

→ c-command domain of A

→ c-command domain of B (including C)
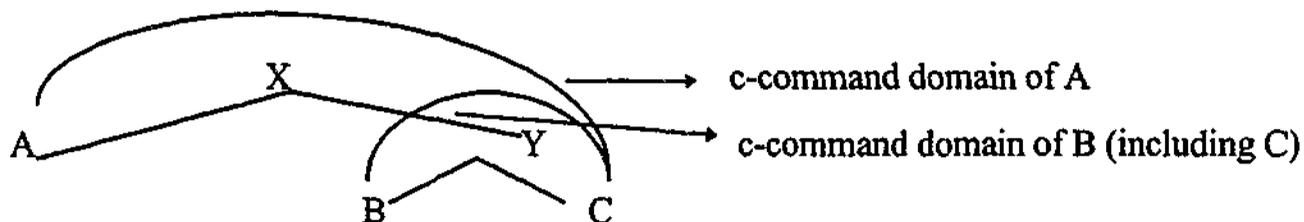
A c-commands B, C and Y; Y c-commands A

Neither B nor C c-commands A

The difference between 'primacy relations' and c-command lies basically in the fact that the latter chooses branching node whereas the former uses S-node as well as linear order as limits of control. There are only two cases where the two restrictions will differ: In sentences where the pronoun precedes and commands its antecedent, but does not c-command it as in: *Near him, Peter saw a snake*. And in sentences where the pronoun c-commands, but does not precede its antecedent as in: *Near Peter, he saw a snake*. These examples involve preposed PP's, which consequently play a crucial role in Reinhart's argumentation.

Binding Theory, as is outlined in Chomsky (1981), pertains to relationships between NP's in A-position. There are two basic notions in this theory. The first is that of government, which reads as follows: β is a governing category for α iff β is the minimal category containing α, a governor of α, and a subject accessible to α (Chomsky 1981:211). The other basic notion is binding, defined as follows for NP's in A-positions (Chomsky 1981:184): A node β c-commands a node α iff the first branching node which dominates β dominates α. If an NP is not bound, then it is free. Anaphors in this theory include

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reflexives and the traces of NP-movement. All other pronouns are pronominals. Other NP's and traces of wh-movement are R-expressions. The binding principles are then as follows:

Binding Principles:

A) An anaphor is bound in its governing category.
B) A pronominal is free in its governing category.
C) An R-expression (NP) is free.

Government Binding is a modular theory, i.e. it consists of various principles and subsystems of principles that are assumed to be universal in character, e.g., THETA-theory, Binding theory, Case Theory, as well as certain parameters that are supposed to account for variations among languages. As mentioned above, the notion of c-command has a central role within this framework; it is the major part of definition of government. And it has been found to be the relevant structural relationship between elements undergoing various syntactic processes, e.g. the NP and its trace in the only remaining transformation, Move α.

The theory distinguishes between anaphors, on the one hand, which include reciprocals and reflexives (as well as NP traces), and pronominals on the other, and zero anaphora (excluding what are referred to as empty categories) is left for pragmatic theories to account for. All NP's bear an index already at deep structure, which is merely randomly assigned. In the component of Logical Form, NP's which are accidentally coindexed are interpreted according to the following restrictions: An anaphor is bound, i.e. coindexed and c-commanded in its governing category, a pronominal is free in its governing category, and an R-expression [full NP] is free within the entire S (Chomsky 1981:188, Lust 1986). The results required by the three binding principles which basically produce the same outputs as Reinhart's c-command condition, are in this framework achieved not by coindexing procedures but by general output conditions on appropriate coindexing (binding).

Following binding theory, and attempting to create a more explanatory principle than the c-command for the quantified data, May (1985, chapter 2) modifies the definition along lines suggested in Aoun and Sportiche (1983). Dealing with how a logical level of the grammar can solve the problem of quantifier scope, he discusses the paths and the path structures whose roots are empty categories and also those associated with A-bound elements. The work shows that it is possible to trace the logical form of sentences from their S-structure forms through syntactic rules. He explores the role of the grammar in characterising semantically relevant structural properties of natural languages. And he explicates this in terms of formal levels of grammatical representation.

Although the basic thrust of the Binding Theory is a substantially strong one, there are unsolved problems. One major problem is that the generative frameworks disregard the differences in grammaticality judgements for the acceptability of the sentences. For the majority of these sentences, there is a disagreement among speakers regarding grammaticality and acceptability. People accept and reject sentences on the basis of whether they can construct a context in which the sentence in question would be pragmatically plausible. In examples 39-41, coreference in each case poses a problem for the interpretation generally assumed of the randomly assigned indices -- the coindexed NP's are coreferential, while non-coindexed NP's are not.

39
Peter and Mitra ate their dinner.

40
Mitra thought she had the mumps and Peter did too (*Mitra may think that she herself has the mumps* (the sloppy reading) or that *Mitra does* (the non-sloppy reading)).

41
a Only Peter voted for himself.
b Only Peter voted for Peter .

In 39, the relation between the indices of each of the proper nouns and that of the conjoined NP *they* form (or of *their*) is a problem. Neither NP is co-referential with the whole or with *their*, so they must receive different indices. Yet, neither are they disjoint in reference. In 40, we see an example from Reinhart (1983) of Ross' (1967) sloppy identity. Given that *she* in the first sentence may take *Mitra* as antecedent on either reading, we must have a way of indexing the pronoun that permits each reading of the second sentence after the verb phrase has been copied. In the cases such as in 41, discussed in Evans (1980), the (b) sentence seems acceptable with the two instances of *Peter* coreferential, despite violation of principle C of the Binding Theory. It is evident that (a) has different truth conditions than (b), e.g. in a situation in which many people voted for *Peter*, (a) may be true while (b) may not.

Syntax cannot be the whole story with regard to pronoun interpretation and use.[9] The relation between pronoun and antecedent crosses sentence boundaries, and extends into the extra-linguistic domain. A purely syntactic approach to anaphora is highly restricted. The most extensively developed GB theory

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[9] Some studies extend claims beyond syntax; e.g. Bickerton (1975), discards the generative syntactic framework entirely; he argues that syntactic relationships play no role in determining the anaphoric pronouns, and claims that by taking four phenomena into consideration (presupposition, assertion, sentence stress, and inter-sentential anaphora) it is possible to derive a single principle that will account for all cases of pronominalisation. Bickerton hypothesises that pronominalisation flows bi-directionally and across sentence boundaries, from presupposed to asserted NP's, and between presupposed NP's, except where one NP has been presupposed throughout its derivational history and the other NP has not; in the latter case pronominalisation shall be from the more consistently to the less-consistently presupposed (see also Westergaard 1986).

being the first and foremost a theory of anaphora accounts for the constraints that govern pronouns in stretches of language not longer than the sentence. The paragraph boundary and across-paragraph anaphora are both unobservable within GB framework. Because GB is a sentence grammar, and the anaphors typically occur across sentence boundaries, anaphora observations cannot be adequately accounted for within GB framework.

The answer to many of the unsolved problems should be sought in a discourse oriented theory of anaphora which takes aspects such as thematic structure, information relations, and discourse functional factors into account when analysing this linguistic phenomena. At most, syntax provides constraints that limit the interpretive possibilities of a large range of pronoun uses in isolated sentences. Except in the case of reflexives, syntax is not of much help in determining the referent of a pronoun. In a few cases, it rules out one possible referent. In other cases, it is of no help at all. The syntactic constraints might determine where a pronoun is possible, but it does not tell us where a pronoun is likely to occur in natural language texts. Grammars limited to the sentence and not to discourse must miss many of the dependencies that exist among its separate sentences. Pronominal reference must inevitably be studied not only in the context of isolated sentences but also in the context of discourse, and particularly in the context of the topic of discourse. While the present thesis will not be dealing with syntactic factors, syntactic constraints have provided a great deal of territory for syntacticians to explore.

1.1 Some Discourse Studies Of Anaphora

In this and many other studies (cf. Phillips 1985), discourse is seen as a textual object.[10] It is contended here that a text is a set of instructions from the speaker to a hearer on how to construct a particular discourse-model (the world spoken of). The model contains 'attributes, entities, and links between entities' (Prince 1979:270). The literal or logical meaning is not what texts are about. Verbs and nouns in a discourse do not just flow by, get interpreted, and vanish without a trace. Indeed, the process of interpretation often consists of "merely adding some element, corresponding to part of the utterance, to the existing model" (Johnson-Laird 1982:60). Sentences in discourse must be understood as they fit into what the speaker and addressee mutually know (Clark and Marshall 1981). Part of what is mutually shared consists of the meaning of previous texts, specially the verbal predicates.

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[10] There have been other territories within which to explore differing aspects of anaphoric phenomena, i.e., some theorists see discourse primarily as a social product, and concern themselves with what a discourse expression contributes to the relationship of the speaker and addressee (cf. Labov and Fanshel 1977).

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Anaphoric expressions do not create a relation between the parts they link, but serve to mark a pre-existing relation. In order to figure out what is going on, the addressees must be able to use their knowledge of the situation in which something is uttered. The approach to discourse analysis taken by any study deals explicitly with at least two context types: with how addressees might represent knowledge about the communication situation, and use that knowledge to arrive at an interpretation of the speaker's intended meaning; second it deals with a restricted part of addressee's knowledge of the communication situation: information from previous discourse, the organisation of that information, and how this organisation influences interpretation of new discourse contributions.

As the pioneers of discourse analysis, Hjelmslev (1943) and Fries (1952) believed the unanalysed text in its undivided and absolute integrity which form the macro-structural aspects of text should be studied. Harris (1970) defined discourse in terms of its equivalence chains derived by identical co-occurrences; van Dijk (1972) and Kintsch (1974) defined discourse by the sequencing in its semantic propositions; Grimes (1975) asserted connectedness in discourse involves the linear processing and the grouping of information blocks into larger units; Halliday and Hasan (1976) stated discourse is created by its cohesion or unbroken cohesive relations, and its semantic continuity; Harweg (1977) by its dynamic-directional concatenation of substituenda and substituentia; and Beaugrande and Dressler (1981) in terms of its continuity in sense. The significant idea latent among these assumptions is that certain elements are recurring in the linear organisation of the text and their occurrences function as staging points mediating between what is to be asserted and what has been asserted. The issue is how discourse proceeds and the discoursal new information is negotiated and recurrence in reference is achieved.

One of the frequently mentioned articles in discourse analysis is Harris (1952). The basis of Harris' study is the idea of equivalence classes, or words in equivalent environments. Equivalence can be represented by a double array formula, the horizontal axis indicating the material that occurs within a single sentence or sub-sentence, and the vertical axis indicating the successive sentences, as shown in the example below, where P represents *millions of people* or its equivalents, and W represents *can't be wrong* or its equivalents (Harris 1952:8-12):

42a
Millions of people can't be wrong when they say they prefer X. Four out of five in a nationwide survey can't be wrong.

Harris represents the three clauses in these two sentences formulaically as follows:

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42b
P (millions of people or equivalents) W (can't be wrong or equivalents)
P-. -------------------------------- W
P-------------------------------- W
P represents "*millions of people,*" "*they*" or "*Four out of five*", W represents "*can't be wrong,*" "*when they say they prefer X*" or "*can't be wrong.*"

Harris's procedure for analysing text is framed around the concept of equivalence. Using equivalence as the starting point, Harris recommended analysing text by first determining equivalence classes, or looking for words which tie up with other sections, and then segmenting those equivalence classes. To try out equivalence classes "we segment the text into successive intervals in such a way as to get, in each interval, like occurrences of the same equivalence classes" (Harris 1952:366).

Prince (1978) summarises the major points of Harris' methods and reviews the ones that she deemed central to analysing text. Prince notes that Harris and other early discourse theorists examined mostly textuality that occurred within a sentence boundary. Prince notes that this was one of the main weaknesses of Harris' methodology. Harris' criterion of 'substitutability', central to discourse theory according to Prince, is the primary method of distribution of text, "isolating occurrences of words...or sequences thereof that have identical environments, where the environment is the rest of the sentence" (1978:192). Prince notes that equivalence means simply 'occurrence in like environments, or ...substitutability" (1978:192). Equivalence seems to be found in the linguists' traditional framework: that morphemes in a sentence fit into structural slots (example 43). Harris' analysis of recurrences in similar sentence slots rather than in places throughout a text avoids the formal rhetorical view of organisation and instead favours the syntactic view of text that may not account for complete textuality. Harris stops at the sentence boundary.

43
N   V   N
Sue   visited Moscow
Bill toured   France

Halliday and Hassan (1976) analyse cohesion as: "The basic concept that is employed in analysing the cohesion of a text is that of the TIE" (p. 329). A tie is directional and relational, depending on the reference direction of the presupposed items, either before (anaphoric) or after (cataphoric). Ties can be immediate, relating to the sentence immediately preceding it; mediated, where an item between two other items creates a tie; remote, where a tie spans a distance of several sentences; or both mediated and remote. Halliday and Hassan use the terms cohesion and coherence interchangeably, but the consensus is that cohesion is a lexical (formal) relation whereas coherence is consistency within the world constructed by a discourse. Carrell (1982) disputes the synonymy of the two terms. She criticises

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"the concept of cohesion used as a measure of coherence" (p. 479). Cohesion is not necessarily a factor in coherence; a text which is cohesive by structure does not necessarily have semantic coherence. She concludes that discourse topic "appears to affect the notions a writer has for using cohesive items" (p. 485), and that "Cohesion is not the cause of coherence; if anything, it's the effect of coherence" (p. 486).[11]

De Beaugrande (1980) calls the formal arrangement of text 'syntax', all meaning 'semantics', and the use of language 'pragmatics'. He defines the "semantics of syntax" as "how people utilise formal patterns and sequences to apply, convey, and recover knowledge and meaning", and "the syntax of semantics" as a concern with how concepts like agent, action, state, attribute, etc. are connected to yield the total meaning of a text. Semantics of syntax has a more predominant linear or sequential organisation (1980:9). Textuality is characterised by a) connectives, b) a sequential connectivity of grammatical dependencies in the surface text, and c) underlying meaning found in conceptual connectivity, e.g., "relations of causality, time, or location". Textuality can be further defined in terms of cohesion which "subsumes the procedures whereby surface elements appear as sequential connectivity", and in terms of coherence, "whereby elements of knowledge are activated such that ...conceptual connectivity is maintained and recoverable" (pp 17-19). From those foundations, de Beaugrande suggests that the following devices lead to the forming of text: sequencing operations, processing sequential connectivity through linearization and grammatical dependencies, textual efficiency, recurrence, definiteness, co-reference, junction, disjunction, conjunction, subordination, anaphora, cataphora, ellipsis, and exophoric reference.

1.2. The Effect of Topicality On Discourse Anaphora

1.2.1. Introduction
In this section, we will present a general view of the functional pragmatic views on anaphora and anaphor resolution. The functional approach contends that choice of a referring expression is determined by a number of factors and is a reflection of the accessibility of the referent. Salience within the discourse boundaries and referential distance are two major factors which influence referential choice. According to Givón, highly accessible referents are believed to be referred to by attenuated marking devices, while discontinuous referents are fully marked. In this sense, discourse reference has been very much an issue for much pragmatic research. Psycholinguistic research has dealt with the effect of distance, referential salience, and the effect of organisational structure on referential choice. We will deal briefly with the pragmatic functional approach of discourse

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[11] See also Brown and Yule (1983)

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reference and review some studies on cohesion. A brief review of the studies that deal with the semantic aspects of discourse reference will also be presented.

Givón (1979) discusses that discourse pragmatics plays a decisive role in explaining the syntax of human language: "syntax cannot be understood without reference to both its evolution ex discourse and the communicative parameters and principles that govern both its rise out of the pragmatic mode and its selective use along the register of human communications". The syntactic mode was developed over time from the pragmatic mode (the earliest acquired and perhaps the most universal component of our communicative system), so that the structure of language was a dependent, functionally motivated entity, whose formal properties must reflect the properties of the explanatory parameters that motivate its rise. Our concern at the level of discourse is linguistic meaning and function; thus the analysis of discourse must be directed to the functional use of language. Consequently, the unit of discourse is not the grammatically defined clause or sentence, but one that is dependent on function. An investigation of function lies in searching how form is related to function in context, relating what is said to what is meant, linking sentences with speech acts (Allan 1986, 1993 a, b, &c, Tsohatzidis 1994, Cohen, Morgan, and Pollack 1990, Searle, Kiefer, and Bierwisch 1980).

1.2.2. The Importance of Topicality

Discourse generally deals with characters who perform actions, have internal states, and are acted upon by forces in their environment. At any point in a discourse, one character is usually more important than the others. Pronouns tend to be used when their discourse antecedents are highly available in memory and are important. The preferred referent for a pronoun might be the entity whose representation in the discourse model is most salient at the time the pronoun is encountered.

Choosing anaphoric expressions in a discourse is believed not to be a random process, but a patterned process that is constrained not at the local sentential level, but at a higher, textual and specifically topical level. Sidner (1980) explained how the central concept of discourse constrained the interpretation of referential terms. A discourse is ideally about some central concept which must serve as the central index point for referencing. Upon designation of a central concept or topic, sentences are assumed to be about that topic, and interpretation of reference terms are constrained to that topic until the topic shifts. The natural antecedent for the pronoun '*his*' in example 44 would be *Mike* if sentence 4 were isolated. However, in the context of discourse, '*his*' is more likely to refer to *Bruce*, the text's main protagonist. Hence, we perceive that in the context of discourse, the interpretation of the pronoun is indeed constrained by the discourse topical structure. This is

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evidence for the claim that the production and interpretation of pronominals must be studied in the context of discourse.

44
I want to have a meeting this week. 2. Bruce will be the guest lecturer. 3. He will speak on slavery in ant colonies. 4. Mike wants to read *his* report before the talk.

The formal surface ordering of pronouns in discourse is a manifestation of an underlying continuity in a particular semantic category, the topic of discourse. Any complete discourse theory on a textual segment should take into account both its formal occurrence in text as well as its underlying function in that capacity. Texts are believed to be stored in episodic memory as files hierarchically structured. Each file has a label, the labels of files are the means by which files are activated. File labels, Givón (1990) states, are topics by which texts are retrieved, stored and accessed. The file, which is the mental representation of a coherent text, is structured hierarchically, with the lowest node-level being the thematic paragraph or clause chain. Brown (1983) noticed that while interacting with other potential referents, salient characters receive greater focus. In the following example, '*Mary*' is not pronominalised because the primary salience and hence focus is given to '*Jim*':

45
Jim insisted on helping *Mary* with the typing. Although it was a simple task, *he* managed to make it seem like a major ordeal. By the time *he* had finished three pages, *Mary* had finished the other ten and was ready to leave.

The semantic case role of topics within a clause is correlated with the degree of continuity of their occurrence. A semantic case role hierarchy predicts that within clauses agents are likely to be the subject of the clause in discourse. On the functional level, it is predicted that a topic, in unmarked circumstances, is most often the syntactic subject, the agent, rarely foregrounded, the human participant, the most persistent entity throughout the text, the most frequently pronominalised, the label of the text files, the leitmotif, and the most frequently mentioned entity in the text (Givón 1990:899). The functional aspect of discourse topicality predicts that, in most discourses and on an average basis, the following hierarchy of case roles is observable in discourse:

Continuous Agent > Dative > Beneficiary > Accusative > Others *Discontinuous*.

Topicality is believed to be of a non-scalar nature: "Cognition much like grammar is apparently a reductive discretizing process. Indeed scalarity in principle of the underlying mental (or physical) dimensions does not automatically mean scalarity in fact at the processing level" (Givón 1990:911). Discreteness in grammar is realised in terms of levels of topicality of topical elements. Subjects, direct

objects and others are main, secondary, and non-topical elements. Such discreteness exists also in cognition. Many of the mental processes apparently involved in referential coherence are again discrete. For example, storage in either the short term memory, permanent semantic lexical memory, or episodic memory is clearly a discrete choice.

In large discourses, there is generally not one topic, but several topics, one main topic and some sub-topics, hierarchically related to the main. Under unmarked conditions, the most pronominalised element in discourse is its main topic, the second most pronominalised element is its first sub-topic, and so on. According to Perrin (1978), participants other than the main one are likely to be re-identified by a full noun phrase every time they are mentioned. Five categories of participants are distinguished: the supernatural, the main, the secondary, the undeveloped secondary and the tertiary participants. The main and secondary participants are initially identified by indefinite NP's; but once introduced, the main participant is rarely referred to by anything other than pronominal forms, while participants other than the main one are re-identified by noun phrases every time they are mentioned. The main participant is the global theme in the chapter. In van Dijk's theory of propositional entailment (1977), the following extract contains two propositional topics that are highlighted in 46:

46
Fairview was defeated. You could see it in the shabby houses, the unkept roads and the quality of goods in the shop windows. You could see it in the dignified shabbiness of the small colony of retired business people who had done well in the golden age and were content to live out their days in this sad, stagnating little town. And you could see it particularly in the numbers of unemployed who gathered at street corners, indifferent and apathetic. But there was still one spark of life to be found in Fairview... when Fairview was at the peak of its prosperity, Harman had founded a newspaper for the town... The staff consisted of the editor, Sam Trench, Al Barnes, three somewhat inefficient clerks and Clare Russell.

Clare was the mainspring of the Clarion. The office, the staff and copy revolved round her. She was responsible for the small spark of life that remained in the newspaper...

The topic is characterised by certain features in discourse. The features characterising an entity as topic are those of: being definite and given, salient, the most often pronominalised entity, the subject of most clauses so statistically posited to the fore, dynamically developed, preferably the human referent, and most frequently mentioned entity of discourse. It is the topic that can determine what constitutes the unit of text for the boundary of discourse is marked by the identification of a topic shift and consequently action shift (Hurtig, 1977, Longacre, 1979, Givón 1983). Hausenblaus (1974) defined the theme/topic as that which has been staged to the fore, into the focus of the field of vision, and at the same time as that which presents a foundation to be developed.

A major application of passivization, thematisation, extraposition, and constructions like cleft and *it*-cleft sentences is to highlight topical elements; Italian left-dislocates topical elements and in addition, makes use of clitic pronouns to reinforce agreement with the left-dislocated topical element (Duranti and Ochs 1979); Japanese utilises the *wa* post-position to denote thematic entities (Hinds 1983); thematic participants in Inga, a Columbian language, are marked with the suffix *ri* (Levinson 1976); Tagalog, a Philippines language, uses topic pronouns or special proclitic to designate the topic of discourse (Schacter 1977).

The relation between the salience of topicality and the clausal linear order has been one of the issues relevant to discourse reference and has been of special interest. Within the functional perspective, the pragmatic objective achieved by the passive transformation is taken into account. The first referential item in a clause, as has been shown in psycholinguistic investigations, requires more time than required for other clause medial or final items for being processed in memory, but it gains a stronger hold in memory; it is retrieved faster compared with non-initial items. The fronted position must therefore be perceptually more salient. In English, Clancy asserted, "the most economical strategy, the default strategy, would clearly be for the listener to assume whenever semantically possible that subject pronouns have the same referent as the prior subject including ellipted prior subjects" (1980:166).

Gernsbacher (1990) had individuals process sentences with subject and non-subject NP's comparing the time spent on processing subject referents in comparison with other non-subject sentence elements. She discovered that individuals spent more time on processing subjects, but subject referents remain more strongly activated and for a longer period than other non-subject NP's within the sentence. In the absence of other constraints, the first concept presented (the grammatical subject) should carry the theme of the utterance. However, when the theme of the sentence is the object rather than the subject of the verb, the passive voice is used to thematize the object, placing it as the first concept presented, over-riding the normal, formal word order position.

Olson and Filby (1972) presented subjects with sentence-picture combinations for verification. A sentence such as "The truck was hit by the car" was followed by a picture of a car hitting a truck. Without context, actives were generally processed faster than passives. However, when the presentation of the sentence-picture pair was preceded by a passage about either the truck or the car, it was found that passives were verified faster than actives when the preceding passage was about the subject of the passive sentence. But when the passage was about the actor, the reverse was true.

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New knowledge is communicated by identifying some entity as a starting point and adding new information to the addressee's knowledge. Given information is the tying point for the new knowledge and occurs normally in the subject position so that the information directly attached to the subject is the most immediately accessible. Chafe calls this the "adding-knowledge-about" hypothesis as regards the functioning of subjects. But it is not always expected from subjects to carry old information and to be the thematic element. Examples are also posed in which subject conveys new but accessible information. In 47 (a) & (b) although *the dog* and *the lamp* are new and definite, they are situationally accessible to the speaker and addressee as part of the script. The new information is conveyed by the verb, *knocked over*.

47
a. What happened? The dog knocked over the lamp.
b. What happened to the lamp? The dog knocked it over.

Karmiloff-Smith (1980) hypothesised that anaphoric pronominalisation functions not as an instruction to retrieve an antecedent referent, but rather, as an implicit instruction to treat the pronoun as the "thematic subject" or topic of a span of discourse; so that deviations therefrom would always be marked out linguistically by the use of full noun phrases. She found that pronominalisation is indeed very much influenced by whether or not it is in the context of discourse and by the topic of discourse. The pronominalisation in connected discourse is a selective and patterned process that is monitored not at the local sentential level, but at a higher, discourse level, and is specifically related to the topic in discourse.

Halliday and Hasan (1976), ignoring the importance of topicality and focussing on the sentential thematic structure, argue for the special status of thematic subject. They recognise that the interpretation of referential items is related to theme for "it is the thematic structure which is the text forming structure in the clause" (p. 311). The "preferred interpretation" of 'they' in example 48 is '*these ponies*' and this is in spite of the preference of English for human subjects. They conclude that other things being equal, the most probable target of any cohesive reference item must be the theme.

48
These ponies [theme] the children [subject] were given by their grandparents [actor]. They [actor, subject, and theme] are staying here now.

The topicality in the development of text is the highlighting or foregrounding position. Foregrounding refers to the degree of activation, so that the most foregrounded element in text is

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also that which is most activated or alive in memory (Gernsbacher 1990). However, only certain elements are foregrounded; Sgall (1975) noted that perhaps the required effort would be smaller if these foregrounded elements were established or given items, and if they were also placed at the beginning of the message (grammatical subject position):

49
John can open Bill's safe. He's an interesting fellow.

The reason why intuitively we would make *John* and not *Bill* the referent of *he* is because *John* occupies grammatical subject position and is most foregrounded in memory. Indeed, Hobbs (1979) claims that commonly (75% in dialogue, and 90% in written text), for cases of ambiguous antecedence, we favour an NP in subject position over an NP in object position (see also Gernsbacher 1990). Under unmarked conditions, the grammatical subject position is also that which is occupied by the theme; Gernsbacher asserts that the notion of foregrounding is closely related to that of theme, for the more an element is foregrounded or activated, the more thematic it is; so that a change in the set of the most activated elements is also connected with a break in continuity in theme. Foregrounding then may be responsible for the projection of certain (thematic/topical) elements in text development.

Givón (1989) points out that on the structural-functional level, the notions of givenness, highlightedness and theme must be considered in the context of discourse and text. So the concept of topic and the concept of theme must be distinguished. In the construction of a text, the possibilities for thematicization will depend on the topic. Barneti (1982) claims that topic is a special property of text, which may under no circumstance be a property of sentence; and that it "differs from topic as employed in the research on functional sentence perspective" (1982:43). Theme is a property of sentence not of discourse. Since topic influences thematicization, it is valid for us to consider or refer to the themes of sentences also as the topics of these sentences. So the topic may be the property of the sentence as well.

Prominent entities are retrievable more easily than other less important referents. Ariel points out "subsequent mentions of referents in discourse are made to mental representations which are relatively more accessible. Once evoked, such memory entities must remain activated at least for a while" (1991:445). Across-paragraph pronominalisation is mainly the result of referential topicality which functions as bridges between paragraph boundaries (Hoffman 1989). Topicality of a character in the first introduction plays a considerable role and is a relevant factor (Anderson et al 1983, Clark, Schreuder and Buttrick 1983, Ariel 1990). Ariel also confirms that in establishing the degree

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of "Accessibility of NP's in first retrievals, rate of popularity among the first mention of given entities" is relevant (1988:73). Broadbent's research (1973) showed that prominence created a preference among subjects to choose the topic as the antecedent of an ambiguous anaphoric expression:

50
The feed pipe$_1$ lubricates the chain$_2$ and it$_1$ should be adjusted to leave a gap half an inch between itself$_1$ and the sprocket.

Clancy asserted that the main character in a story has "a stronger hold on givenness than other referents" (1980:128). Character salience was investigated by Hinds (1977) who believed a writer can organise information in order to convey differing degrees of prominence. The referential prominence of a particular character is marked by the speaker's continued use of inexplicit forms to signal that this character is maintaining an important role. Introduction of a character into the story depends on the prominence given to that character. The main characters tend to be introduced in the first clause of a sentence, while less important characters tend to be introduced in the middle of a long sentence. In English, 44% of all the salient referents are introduced in the first clause of sentences, 29% in the second clause, 18% in the middle of the sentence, and 9% finally (Clancy 1980).

Referential topicality is reminiscent of the concept of "empathy" (Kuno and Kaburaki 1977). Empathy indicates that the speaker, in describing a particular event or state, may make certain lexical and syntactic choices which indicate that s/he is identifying with one of the characters being referred to. In 51, the speaker has an objective point of view in (a), while s/he takes a standpoint of *John* in (b), and in (c), takes *Mary's* standpoint. In long discourses, it is the main character that receives the speakers' empathy, as a result of such empathy, the referring expressions used for the entity in question may be influenced. The character being sided for is pronominalised while characters receiving less empathy are mentioned explicitly. The influence of character salience and empathy is realised in effect as a general tendency.

51
a John hit Mary.
b John hit his wife.
c Mary's husband hit her.

At any particular moment in the narrative, not all characters and actions are equally important. The writer conveys this emphasis to the reader by selecting particular linguistic devices to describe a scene and its parts. The character who is expected to be talked about next is usually the character who

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is taken to be the referent of a pronoun. It is primarily by identifying ourselves with the aims and states of this character that we are drawn into the experience that a discourse conveys. The importance of the referent, the addressee's greater awareness of it than of other possible referents, is marked by using a pronoun. In the following extract, (example 52), speaker C is interested in talking about *Arthur*, and discussing *Wilson* only in relation to *Arthur*. She refers to *Arthur* as *he*, even when *Wilson* has been recently mentioned; and she also refers to *Wilson* as *Wilson*, repeatedly. Speaker F tries to switch the topic to *Wilson* (and makes the mistake of using *he*). This catches C by surprise; she expects *he* to refer to *Arthur*.

    52
    C: I bought one of these for Arthur. It's soap.
    F: Oh that's nice.
    C: He really wanted to get a soap and a dish but he doesn't want to get one when he lives with Wilson,
    because Wilson has one in our bathroom, and anything about Wilson really bothers Arthur. He doesn't
    want to get one because Wilson has one.
    F: Does he still spend a lot of time there?
    C: Wilson? No, no not really, he's not there very often.
    (Reichman, 1978)

Topical importance pertains to either local or global levels. Local importance, which is hard to estimate objectively, entails the importance of topic at a particular juncture in discourse. Assessing local persistence is done by measuring the cataphoric continuity of a topic in subsequent ten clauses in a text (the persistent measurement in Givón 1983). The global importance of a topic is its importance through the overall text. Givón proposes a number of ways of measuring the global importance in discourse: first, through rank ordering of topics in text in terms of their importance judged by native speakers; second, by assessing the topic frequency in narratives recalled by native subjects; third, through psychometric measures which show that important topics are more closely attended to, memorised better and retrieved faster; and last, through measurement of the frequency of occurrences (Givón 1990:908).

According to Givón (1989), topic importance is in conflict with predictability in controlling word order. Predictable topics tend to be postposed, but topical importance forces the topic to the preposed position. The direct objects are more predictable in discourse, hence, they should be preceded by indirect objects but they are not, because direct objects are more important than indirect objects in discourse. Verb first languages are resistant to preposing the nouns. But when indefinite referents are important in subsequent discourse, they are used in existential-presentative constructions. In verb-first languages, indefinite subjects are preposed to the initial position of the clause because both predictability and importance work in the same direction. The discourse functionalist approach claims

that by virtue of discourse functional predictions, one can reach "highly replicable results" regarding topicality of nominal referents marked by various grammatical devices.

1.2.3. Discourse Units: The Constraining Boundaries

"Well-told stories are organised into cohesive, thematic episodes. Comprehenders easily perceive the episode boundaries in most stories and comprehenders' judgment concur....Mental representations are organised by episodes during comprehension" (Gernsbacher 1990:80). Comprehenders receive and understand the signals that speakers and writers use to display the transitions among current and new episodes. The linguistic cues trigger shift in episodes and initiating of new sub-structures so that they can represent each episode in its own substructure. Investigating oral production processes, Chafe (1980) found that oral narrators tend to pause at episode boundaries. He takes this as evidence that episodes are stored as units and retrieved as units during speech production. Black and Bower (1979) concluded the same thing from recall data. Regarding language comprehension, Sharkey and Mitchell's (1985) results suggest that changing a scene makes the components and associates of the previous scene less accessible.

One way to have a partial change of characters is to move from a script-dependent scene to a scene outside the boundaries of the script, where there is a main character who is not tied to the already closed script. This type of scene change made with a time adverbial that goes beyond the boundaries of the script has the effect of making people less likely to expect that script-bound characters will appear again in the new script (Anderson, Sanford, & Garrod 1983). Signalling this type of scene change by talking about a new location of the main character has the effect of making the associates of the previous script more difficult to remember. (Sharkey and Mitchell 1985). Location, time, and participants may change and such changes impact the accessibility of referents associated with them. A concept which belongs to an already closed scene is not as easily accessible as the concepts of a currently open scene.

Polanyi and Scha (1985) elaborated the issue: "The talk produced by speakers is assigned either the status of continuing the train of thought or type of behaviour of immediately previous utterances or the status of talk which initiates a different discourse activity as preceding utterances. This prompts us to argue that the actual flow of talk is properly seen as separable into various discourse units". (Polanyi and Scha 1985:2). "To interpret complex semantic phenomena such as the scope of temporal and locative adverbials, the movement of reference time in narrative and the resolution of discourse anaphora, one needs to be able to determine the discourse constituent boundaries within which discourse structural (syntactic) and interpretive (semantic) relationships obtain" (Polanyi and

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Scha 1985:3). A discourse theory may provide a model that can capture the psychological notion of continuing a train of thought, or embarking on a new one.

1.2.4 Referential Distance

It has been reported (Mackay and Fulkerson 1979, McKoon and Ratcliff 1980, and Ehrlich and Rayner 1983, Givón & associates 1983) that choice, acquisition and comprehension of pronominal and zero anaphora are crucially influenced by the perceived distance between two referential markers and also any topic markers that intervene between pronouns and coreferential antecedents. Clark and Sengul (1979) found that when the antecedent of a pronoun is one clause back, a sentence with the pronoun in it is understood more quickly than when the antecedent is more than one clause back. Their results do fit in well with what is known about memory for discourse: the most recent clause is said to have a privileged status in short term memory (Glanzer, Dorfman and Kaplan 1981). Clark and Sengul's finding is consistent with the spirit of distance approach: pronouns are more difficult to understand when the representation of their referents might be supposed to be distant from them. However, many research findings challenge a purely distance model. Malt (1982) and Morrow (1985) have rejected that the discourse is taken as a homogeneous entity in which all clauses are equivalent. It is claimed that the sheer recency of mention is not a factor influencing referential choice when character status (protagonist vs non-protagonist) and event status (foregrounded vs backgrounded) cues agree.[12]

1.3. Some Psycholinguistic Studies of Anaphora

Several studies have been done on how verb and verb-conjunct bias affects referential choice and comprehension ease (Au 1986, Caramazza, Grober, Garvey, and Yates 1977, Ehrlich 1980, Garvey, Caramazza, and Yates 1975, Springston 1975). One technique used is to have people read sentences of the form 'NP_1 verb-ed NP_2 Conjunct Pronoun...', and make a judgement about who it is that the pronoun refers to. Some verbs and conjuncts make most people interpret the pronoun as coreferring with NP_1, and the use of other verbs and conjuncts shift judgements towards the referent of NP_2..The experiments test the plausibility of the verbs in identifying which of the sentence NP's is judged to be the referent of the clause containing *she*. The subjecthood salience creates a bias while the verb plausibility is in conflict with such bias. The method tests the likelihood of selecting the subject referent for *she* in 53. However, the sentence level effects can disappear when the sentences are used in a context with an opposite bias.

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[12] Theories of distance will be reviewed in chapter 4.

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53
    Jane liked Victoria because she...,

In examples 54 and 55 from Wilkes (1975), the *table* is both most recently mentioned and grammatically appropriate for the pronoun *it* in 54; yet clearly it is the *coke* that is being referred to; it is the most plausible referent. In 55, however, even plausibility added to recency and grammatical agreement is not enough. It seems as though *the coke*, and not *the table*, is brown and round (Hirst 1981:55). Plausibility, in both cases, has made the *coke* more prominent in the addressee's working memory, and so more eligible for pronominalisation. Needless to say, sentence level plausibility may be countered by discourse biases, since at the discourse level, it is the topical entity that is favourably biased toward.

54
John left the window and drank the coke on the table. *It* was good.

55
John left the window and drank the coke on the table. *It* was brown and round.

Information that comes after the pronoun aids disambiguation. Hobbs (1985) has developed a typology of coherence relations between sentences of coherent discourse, and these relations can be of use in determining what is referred to by a pronoun. The plausibility of what is predicated can have an influence: if there are two characters in a narrative, *Sheila* and *Molly*, and you know that Sheila is 18 and Molly is two, then the utterance: '*Oh, no, she wet her diapers again!*' can with a great deal of certainty be interpreted as being about Molly and not about Sheila. Hobbs (1979, 1985) makes the point that mere plausibility often doesn't distinguish between potential referents, as the following example shows. Both John and Bill know the combination, and so the plausibility of a person's knowing the combination is not useful for the purpose of finding out who *He* is (e.g. 56).

56
John can open Bill's safe. He knows the combination. (Hobbs, 1979:78)

Vonck (1985) has some results that are suggestive. She recorded people's eye movements when they read sentences of the type *NP Verbed NP Conj Pro VP* (e.g. (a) *Jason liked Nick because he was handsome* vs (b) *Jim hit Ed because he broke the glass*). When the use of a pronoun was unambiguous (as is in the case of (a)), people fixated longer on the *because-Pro*. When the use of a pronoun was ambiguous (cf. in cases such as (b)), people fixated longer on the sentence-final VP. This suggests that people do resolve the pronominal reference when they can, and when they can't,

they skip ahead in subsequent text that is likely to contain information that will be of help. Ehrlich and Rayner (1983) come to the same conclusion.

Quite different from what the distance approach to discourse anaphora puts forward, psycholinguistic researchers (Springston 1975, Schwarts 1981, Frederickson 1981, and Corbett and Chang 1983) have introduced what might be called a 'multiple access and reinstatement' (MAR) model of pronoun comprehension: when a pronoun is encountered, it triggers a search in memory for all the potential antecedents. When the correct antecedent is found, it is substituted for the pronoun. MAR models generally assume that memory search takes place in a verbatim or propositional representation of the preceding discourse, and not in a semantic organisational interpretation of the preceding discourse; the former involves time consuming search carried out by short term memory. While the latter is achieved through inferences made as for which referent has more salience and is in focus. It is also generally assumed that comprehension is a matter of reinstating the previously mentioned entity for the pronoun. Corbett and Chang base their model on how quickly people recognise the proper names of two potential referents for a pronoun after the pronoun occurs. They presented people with sentences like *Ellen aimed at Harriet but she missed*, and timed how long it took people to recognise *Ellen* or *Harriet* is the antecedent of *she*. Their design, however, lacks a discernible baseline measure. They did not measure how quickly people recognised the names before the pronoun occurred, neither did they make any attempt to record individual variability.

Frederickson used reading time as a baseline measure, and found that the mention of two potential coreferents in preceding text slowed down comprehension relative to the condition where only one potential coreferent was mentioned. There is a problem with Fredrickson's findings: the materials used made the two-coreferent case ambiguous. It is not clear whether readers slow down because they are confused and try to resolve ambiguity, or because they take time for activating the representation of both potential coreferents. Moreover, some process must operate to determine which of the multiply accessed entities is really the referent of the pronoun. The experiment does not go into this problem in any detail.

A distance oriented view, applied to processing, implies that the mental salience of represented entities might be sufficient to disambiguate a pronoun when it is encountered. This idea implies that a pronoun can be interpreted when it occurs. The MAR view, on the other hand, implies that a pronoun is not interpreted when it occurs, and the occurrence of a pronoun makes all entities in an instantiation more salient because they all must be evaluated for how well they fit the predication of the entity referred to with the pronoun. Possibly both ideas are correct on some occasions, and

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neither are correct on all occasions. It makes sense for discourse contributions to be interpreted as they occur whenever possible. Otherwise, processing becomes difficult because many alternatives must be kept in mind simultaneously. On the other hand, when a genuinely ambiguous pronoun comes up, making a bad guess about who or what was meant is costly because back tracking may be necessary.

This section reviewed some pragmatic functional views of anaphora which dealt with discourse reference through examining anaphoric expressions. The different aspects of the lexical referential items were underlined. The relevance of topicality, discourse organisation, and referential distance has been shown by many studies and was briefly discussed. Psycholinguistic studies bearing evidence to the functional effect of the use of pronouns, the studies on verb-conjunct bias determining the plausibility of competing referents, and the processing of the anaphoric expressions (the MAR models) were also mentioned. The next section will be a statement of the research problem tackled in this thesis. An outline of the thesis will also be presented.

1.4. The Present Study

1.4.1 Introduction

Linguists investigating discourse anaphora have examined different genres of discourse within differing theoretical frameworks: oral narrative (Givón 1983, Prince 1981, Chafe 1987, Clancy 1980, Tomlin 1987, Tomlin & Pu 1991), written narrative (Givón and associates 1983), expository written texts (Fox 1987, Ariel 1988, 1990), and conversation (Fox 1987, Grosz 1977, Reichman 1981). Some of the studies dealt with the processes which take place in the writer or speaker's mind dealing with how entities should be marked (Clancy 1980, Chafe 1987, Tomlin 1987, Tomlin and Pu 1991), others dealt with the speaker's estimations of the addressees' needs investigating how referents are identified (Chafe 1976, Sidner 1983, Givón and associates 1983). Evidently, there are two domains for tackling this linguistic issue: the coreference constraints which are related to the speaker's estimations of the addressee's current consciousness of a referent to be marked at a particular point in a given discourse and b) the constraints that are associated with the speaker's mental ability in the dynamic process of discourse production.

Two distinct approaches to anaphora tackle the issue from two different perspectives. The focus of much research has been either the way referring expressions are arranged (Clancy 1980, Givón and associates 1983, Tomlin 1987, Hoffman 1989) or how the accessibility status of referents is maintained (Chafe 1987, Prince 1981, Clark and Marshal 1981); the former tackles reference by

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accounting for how the anaphoric devices are arranged, while the latter tackles givenness of topical referents.

Major studies on the factors constraining the use of referring expressions in discourse have dealt with referential salience, potential ambiguity and referential distance (Clancy 1980, Givón and associates 1983, Givón 1989, 1990, Ariel 1988, 1990, 1991). The measurable accessibility of the referents as reflected in the form of the formal devices used in discourse is assumed to be correlated with the typical arrangements of the referring expressions. Others have studied episodes and discourse structural organisation as the cognitive boundaries within which the activation of discourse entities is maintained (cf. Tomlin 1987, Fox 1987, Tomlin and Pu 1991), and some have centred their accounts on the focus of attention (Grosz 1977, Sidner 1983, Reichman 1983).

Some researchers (Givón 1983, Fox 1987, and Tomlin 1987b) have focussed on the study of referring expressions looking to distance and episode boundaries to account for the use of anaphoric expressions in relation to a) discourse structure or alternatively b) code quantity[13] and linear order. Another, more recent, approach (Ariel 1988, 1990, 1991) has been concerned with a more explicit correlation between the degrees of accessibility of the discourse referents and the accessibility markers. Degrees of accessibility are assessed by such factors as referential distance, referential salience, and competition. Accessibility theory does not appear to be concerned with the functional effect of accessibility on the linear order of linguistic items.

The second major line of research has been those interested in the status of referents within certain stages of discourse: "What contributes to givenness". In this approach, it is assumed that a referent may possess one of the following activation statuses: given, accessible, and new (Chafe 1987). Under unmarked conditions, a given referent is referred to by a reduced form and a new referent is either referred to by an indefinite or a definite NP depending on whether or not the referent in question is known to the audience. The givenness approach comprises both sentence and discourse oriented investigations[14] of the accessibility of the referents as specified and maintained. This

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[13] Code quantity, in Givón's sense (1989) refers to phonological length of the referring expression. However, in Ariel's approach (1990), code quantity is viewed to be both phonological length and informativity of the referring expressions.
[14] A referent possesses one of at least three statuses: it is a) indefinite for which a file is opened in the addressee's mind; b) it is definite which is mutually known to the speaker and addressee but at the time of uttering, the addressee was not thinking of the referent in question; and c) it is given, indicating that it was mentioned in the immediately preceding utterances and it is still maintained in the short term memory. Obviously, the given status makes the use of attenuated forms preferable. The use of the term identifiability is not to be taken as accessibility. We will argue in this thesis that accessibility is related to the short term and temporary memory storage, while identifiability is a stronger status which is supported and maintained by context (see chapters 2, 4, and 6).

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school of research deals with how accessible a referent can be for the addressee. The sentence givenness approach deals with the effect of the givenness of a particular referent on the ordering of sentence elements in isolated sentences; a division is made between old and new information. Under unmarked conditions, the subject slot, which may be the theme of a sentence, is the privileged slot and contains old information; the predicate, rheme, comment, or added information is considered to carry the new information (see chapter 2: the Prague School's functional sentence perspective, cf. Firbas 1966). The givenness approach does not deal, in any detail, with when some given referential concepts are attenuated and when some are marked with definite NP's. The effect of potential ambiguity may also overrule the correlation between the given referent and attenuation of the marking device.

The discourse givenness approach (Prince 1981, Clark & Marshal 1981, Chafe 1987) developed the scope of investigations to discourse boundaries. The question is: how is givenness maintained in discourse? The theory of mutual knowledge (Clark and Marshal 1981) assumed that a referent is known to the interactants through three types of shared context: textual, situational, and semantic context. The theory of presuppositionality (Stalnaker 1979) assumed referring expressions differ in what they presuppose and what they assert; they have inherent in them the capacity to mark referents with differing givenness statuses. Discourse is composed of propositions which function to evoke a world spoken of. Stalnaker points out that there is a common ground between the participants in a communication exchange which increases with the increase in the assertions that themselves add to the amount presupposed. In any communication exchange, the degree of the presupposed information is minimal at the beginning; as the discourse begins to progress, the number of the remaining assertions decreases and the amount of the presupposed increases. Through this process, the context set is limited and the common ground between the communication partners develops. While discourse progresses, the context set is reduced; the set of incompatible worlds are as a result decreased (see chapter 4).

Familiarity theory (Prince 1981) is the most important contribution to the investigation of givenness (Allan 1995). Prince introduces an 'assumed familiarity' hierarchy which replaces the given/new contrast and contains three states: new, inferable, and evoked (see section 1.4.1.1). Only textually and situationally evoked entities can be assumed to be pronominalisable. New entities may possess one of two possible statuses: brand new and unused. A brand-new referent is either anchored to another entity in the context (e.g. the full NP, *A man* in the sentence: "A *man whom I know could do this*" is anchored to *I*) or unanchored (e.g. *a guard* in *a guard always stands at the door front* is not anchored to any other referent); obviously, anchored brand-new entities must have a stronger

familiarity status than unanchored ones. An unused referent is a referent that has been mentioned long ago or is already of proper status before gaining its status from the textual context. Inferable entities are definite and derive the definite status from scripts[15] (e.g. a *bus* stopped, *the driver* was drunk, the definiteness of *the driver* is derived from *bus*); the term metonymy is used to refer to this type of indirect inferential coreference.

At the discourse level, the sentence level classification is modified; the consensus is that concepts can be in one of at least three following statuses: given (because of being immediately mentioned in the immediately previous context or being situationally evoked), accessible (being frame-evoked or mentioned long ago), and new (not mentioned before used as the communicative contribution of the sentence). What distinguishes this school from those of distance and discourse structural approaches is that the former is concerned with context and the status of referents without focussing on anaphoric expressions actually used, while the latter is concerned with reference through investigating how referring expressions are arranged in discourse. Given the multiplicity of the pragmatic functions of discourse expressions, it would seemingly be too difficult for the givenness approach to demonstrate, in a comprehensible way, the functions of anaphoric expressions while trying to focus only on the accessibility of referents. A given referent may be marked by a nominal expression, e.g. the presence of referential ambiguity requires that a given referent be marked by a full NP. Several instances of exceptional referential uses have been reported by Clancy who labelled them 'unusual referential choices' (1980), Fox (1987) who classified them 'determined by non-structural factors', and Ariel (1990) who focussed on the socio-cultural factors.

In this section, we have outlined three different approaches to the study of discourse reference; in chapter 2, we will discuss their advantages and disadvantages. In brief, the status of the referent in isolated sentences and discourse is studied by the givenness approach; the study of the referential choice in correlation with the factors of accessibility is undertaken by the distance approach, in the sense that the correlation between the degrees of accessibility and the types of anaphoric devices used have been the objective (cf. Ariel 1990); and the most advanced approach considers focus within the discourse structural units as the dominant factor determining the referential choice.

As this thesis chooses context as the territory of investigation, we will discuss the concept next. Anaphor resolution is claimed to be an indispensable function of context in correlation with

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[15]Given that every discourse describes a scene, situation, or a world spoken of, the term script is applied to denote a file that is characterised by certain entities, attributes, and things and these are mutually known to participants of the discourse communication. For example, in a script of a *classroom, the teacher, students, blackboard*, etc, are the assumed inferable.

anaphoric expressions. The two constitute complementary sources of information and are inseparable. An integrative view in which context, within the likelihoods of a world spoken of, is central accounts for a correlation which is assumed to exist between the informativity of context and the choice of an anaphoric expression. When context is not informative and there are more than one plausible referents for an expression, the use of full NP tends to be necessary; on the other hand, the use of a full NP may or may not indicate that the intended referent is absolutely unidentifiable through context.

1.4.1.1 Context

Throughout this thesis, and specially in chapters 3, 4, and 5, we make frequent reference to context. It is context that the interpretations of both deictics and anaphors are dependent on. The term context is used to mean any one or more of three different kinds of knowledge: setting or physical context, the familiar world spoken of, and the textual environment (Allan 1986). By definition, an utterance U occurs in a context C. The importance of context in determining the meaning of U is universally recognised. Ariel (1990) who in principle classifies givenness statuses into degrees of accessibility viewed referring expressions as markers of at least three levels of accessibility, accessibility corresponding to context types. But as we will show, our application of context as a source of referential information will enable us to account for the environments in which long distance between two mentions of a referent predicts the use of a full NP, while a pronoun does the task of identifying the referent. We will differentiate between accessibility and identifiability, in the sense that accessibility is constrained by the short-term mental storage, while identifiability is connected to the ability of making inferences based on context and involves the function of the long-term semantic mental storage.

Clark and Marshal's theory of mutual knowledge (1981) suggested the notion of context as the determining source of the degrees of givenness of a referent in discourse. The community membership knowledge, shared between the speaker and the addressee, the knowledge of situation due to co-presence of the speech partners in the same situation, and the linguistic shared context of the previous discourse are the available sources of context that account for the givenness status of referents. According to Givón (1983, 1990) context refers to the shared knowledge of the speaker and hearer, which is a composite of three sources of information: "(a) Generally shared knowledge coded in the culturally shared lexicon and known semantic likelihoods, (b) Specifically shared knowledge of particular discourse, what was said earlier and various inferences thereof including verbal or non-verbal feed back, and (c) Specifically shared knowledge of the particular speaker and hearer" (Givón 1983:18).

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The speaker's assumptions of the hearer's beliefs are grounded on three major sources of knowledge. It is possible that more than one source of knowledge be at work in the identification of a referent in discourse. Definiteness is indeed the assumptions the speaker makes about the knowledge of the hearer's beliefs, ideas, etc.

The speech situation, the Deictic File which is the shared knowledge of the speaker and the hearer of the discourse situation due to their presence in a particular setting forms the context of situation. Antecedents which occur in the situational context are more easily accessible if (a) they are nearer to the speech situation; for instance, *this* is more easily accessible than *that*, and (b) if they are more salient (Givón 1990). The culturally shared knowledge, the Generic File, is a very general knowledge of the world, lexicon, and culture shared by all members of the same culture, often used in combination with other sources of context as the source of referent accessibility. The textually shared knowledge, the Text File, is the knowledge of what was said earlier in the discourse, meaning that the text knowledge might be the source of definiteness and identifiability. The following simple examples represent the involvement of the three types of contextual knowledge:

57
His father was an honest man. = The kinship knowledge and the previous textual context where the antecedent of *his* occurred.

58
This chair is better than that chair. = Deictic reference, context of situation.

59
He saw a man and a woman. The woman was tall. = The text knowledge.

Prince (1981) introduces a familiarity hierarchy which categorises entities in terms of their familiarity (see also section 1.4.1):

EVOKED TEXTUALLY/SITUATIONALLY> UNUSED> INFERABLE> BRAND NEW.

The familiarity scale is not concerned with characterising specific linguistic forms such as definite descriptions, names, pronouns and zeros, etc. The categories on the familiarity scale are properties of referents that are potential discourse entities. However, a natural implication for the familiarity dichotomy is that textually and situationally evoked entities are highly accessible and can be attenuated; while unused, inferable, and brand new entities need to be spelled out with full NP's. It should be mentioned that the categories making the familiarity hierarchy, however comprehensive, do

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not account for the problem of this study: identifiability of entities depends, mainly but not exclusively, on pragmatic inferences which are constrained to both generic and linguistic contexts.

The arguments on context relate to the speaker's intuitions about the addressee's state of knowledge of the communication. The S[peaker]'s consideration of the shared knowledge of the H[earer] requires that both S and H conform to the cooperative principle. Allan (1986b) argues that an observance of the co-operative principle, which is dependent on a mutually shared knowledge of S and H is a requirement; he points out that without the cooperative principle "S would have no ground rules for getting his message across to H, and H would have no grounds for deciding whether or not S's utterance U makes sense, nor what value should be placed upon it". ... "A practical stance with respect to mutual knowledge assumes that person A judges that there are certain things that his interlocutor B possibly knows, very probably knows, almost certainly knows, and absolutely certainly knows, and B judges that A can reasonably make such judgements about what he (B) knows; conversely, B makes comparable judgements about A's knowledge, and A knows he does" (p. 282).

In the absence of evidence to the contrary, the world spoken of is considered to be a reflection of the real world. S is expected to observe the cooperative principle and meet the requirements of H by indicating if S is talking about facts, or is reporting opinions, or whether S is fictionalising, thus characterising the world spoken of. The nature of W, the world spoken of, decides the judgements of coherence in what is said, and therefore "the assessment of anomaly, the identification of referring terms (who or what is being talked about), and the choice between ambiguous senses of expressions" (p. 44). In the following examples, italicised expressions contain information on the relevant world in which to interpret the word *morphology*. Upon facing the expressions, H is most likely to gather what sort of world spoken of is to be drawn. Textual understandings of this kind are normally supported by far-reaching evidence from the whole text and the setting.

60
a. the morphology of *the whale*
b. the morphology of *the Athapaskan languages*

Textual context provides a dynamic background knowledge of what discourse expresses, and presents the knowledge based on which anaphors and deictics are used. Setting, the context of situation, is defined as the time and the location of S and H when uttering and hearing U. The setting forms a three-way division called zone. S zone, H zone, and deictic zone outside of zones S and H, calling them respectively zones 1, 2, and 3. The setting is usually what determines the variety of language used, and often the topic of discourse. Allan argues quite convincingly for a hierarchy of three types of contexts in which W, the

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world spoken of, is central; textual and situational context types serve as determinants of W. In this way, he attributes the greatest importance to the world spoken of. The primary category of context is W; setting is meaningful to an interpretation of utterance meaning when it is part of W; and textual environment is significant when it helps establish the nature and content of W. "The setting often gives a clue to the nature of the world spoken of, so does the textual environment" (p. 43). He points out: (i) only when the world spoken of includes the setting, does setting fall squarely and uncontroversially within the linguist's domain; (ii) the most important function of co-text [textual context] is to determine exactly what world is being spoken of ...almost any utterance U made in language L will evoke a world" (1986b:41). Recognising the world spoken of is vital to the understanding of discourse.

The present section has outlined the studies whose objectives have been to characterise reference in terms of referent accessibility without any explicit interest in extending claims to the correlation between the referents' accessibility status and the type of expression used. The limitations of the sentential attempts were underlined leading to a more developed perspective that is the discourse reinterpretation of givenness. A referent's accessibility status in discourse can be drawn from one or both of local and global context. Discourse givenness was argued to be a more developed framework for classifying information into at least three types: given (highly accessible), new (of low accessibility) and intermediate (intermediately accessible through accessing situation or pragmatic inferences). In cognitive terms, referents' accessibility is discussed in terms of levels of activation.

We pointed out that coherence is a semantic hierarchical organisation while cohesion manifests the lexical linear organisation. A discussion of context clarified the existence of three separate sources of knowledge which should be construed as a hierarchical organisation of three context types in which a world spoken of is central. In the next section, we will discuss the possibility of the use of pronouns for retrieving referents introduced far back in previous context. Then we will point out the hypothesis of this study. And finally, in section 1.4.4, an outline of the thesis will be given.

1.4.2. The Long Distance Links Between Discourse Referential Entities and Referential Stylistic Diversity

The thrust of this study is that long term coreference in discourse is possible only with contextual constraints. The use of coreferring expressions to connect different mentions of a discourse referent when long gaps separate different mentions is not sufficient unless context is taken into account. Therefore, it is inevitable that our account analyses coreference in relation to context, which is actually part of a world spoken of. The salient referents of a discourse are known through their actions and the actions that are

acted upon them by other forces. The role of context is useful in figuring out 'who is doing what' in a discourse presenting a world spoken of.

An attested example illustrates how it is possible for a discourse salient referent to remain accessible for a long interval; the narrow context within which reference is made makes it possible for the mistakenly chosen third person pronoun *he* to be interpreted as referring to a female referent.

A male student talking to male supervisor: (the conversation in normalised form)

> 61
> 1. K. I talked about you with L [a female professor] about your presentation.
> 2. A. Oh, you did? What was his impression about the work?
> 3. K. hh, [?] She believed what you said was not theoretically sound. You overstated your point.
> 4. A. hh, imm, well, I expected it not to be a satisfactorily sound one; but, anyway, I got a lot of feed back and that was good for me. ...

Two days later:

> 5. A. K, may I ask you something?
> 6. K. Sure,
> 7. A. What did he mean by "theoretically not sound"?
> 8. K. Ohh, she meant that ...

After 2 days the pronoun he could successfully retrieve its antecedent. No measure can explain why after such a long interval a person talked about in a conversation can be effectively retrieved with a pronoun he used mistakenly in place of she. Evidently, the roles of supervisor and student narrow the context and limit the number of likely topics; and the expression *viewing something theoretically not sound* entails the accessibility of the referent associated with it. We may expect this type of long-distance reference to happen in natural discourses. As one of the typical observations in every day life, a Persian speaking wife, saying to her husband the sentence quoted in 62, knows exactly that her partner will identify the ellipted referent from the shared context; the only person expected to come and ask for money is the landlord:

> 62
> | oumad-e bud | poule-sh rA | be-gir-ed |
> |---|---|---|
> | come-pp was | money-3.sg. OM | subjunctive-take- 3.sg. |
>
> [He] had come to take his money,

So, it is right to believe that, the job of discourse referring expressions in subsequent retrievals of a referent is simply marking an already existing semantic relation. The association between salient

referents as themic information and actions as new information is what we will refer to continually in this thesis as the role of context, the effect of which is to support discourse coreference specially in long-distance referential links, which naturally exist in different genres of discourse.

A discourse is composed of bits of new and old information, the former being the contribution of a sentence, while the latter is mostly repetitive, can be inferred, and is hence attenuated. Old information, as the name denotes, is a staging point for the new information to be added to the already asserted information; this is indeed the manner in which discourse proceeds. Hence, unless potential ambiguity is created by other referents in a context, old information is attenuated while being a point of linkage. Manipulation of referential choices used within and across discourse boundaries has, in addition to the maintenance of identifiability of the referent at issue, a pragmatic basis and indicates speakers' intent; cf. to show whether the current contribution is the continuation of a currently open unit, a newly started one, or a resumption of a previously interrupted one (Fox 1987).

While the choice of anaphoric expressions is statistically determined by referential recency and discourse structural organisation, it is very much the complementary role of context that enables long-distance referential connections. The thrust of the work presented in this thesis is that unless it accounts for context, a model cannot claim to have presented a complete account of much discourse data. A sequence of identical pronouns without the predications can never display the referential links in the NP slots of a discourse containing more than one character. But a discourse with ellipted subsequent mentions of its topical entities is largely comprehensible, though with difficulty. The function of anaphoric expressions is thus not limited to maintaining the identity of referents. In most cases, anaphoric expressions are used for pragmatic functional intents.

Since the claim of context is made based on the pragmatic inferences drawn from the discourse meaning, some studies tackling the discourse meaning are cited below briefly. Allan (1986) views pragmatic inferencing in anaphor resolution of "overriding significance" (p. 52). He poses several examples in which, in addition to the knowledge of the syntactic rules governing anaphoric relations and the semantic content of the anaphoric expressions used, proper interpretation of anaphors depends on pragmatic inferences:

63
Ed lost the money to Max because he is a skilful player.

64
I took my dog to the vet yesterday, and he bit him on the shoulder.

41

65
I took my dog to the vet yesterday, and he injected him on the shoulder. (p. 53)

On the semantic level, the various referential concepts of a text are organised into a coherent structure in relation to its main topic (Adams, 1980). Anaphoric reference as described by the relationship between an antecedent and a postcedent is one of meaning rather than of form, so that any continuity that is brought about by such relation is semantic continuity. Beaugrande and Dressler (1981) asserted that there is continuity on the semantic level, consistency and unity in sense among the concepts and knowledge that are activated by the expressions of the text. On the structural level, we can hardly perform full investigations into the events of connectives, transition markers, sequence in tense, deixis, anaphora, the marking of definiteness, and the use or interpretation of cleft and even passive sentences, away from the context of discourse and text. Given the emergent interference from competing referents, this type of continuity gives an indication as to why anaphoric reference is so suitable as a candidate for the maintenance of referent identification. And it is consequently relevant to and is a reflection of the organisation of text at the semantic level.

Van Dijk (1972), in his theory of text grammar, argued that sentential descriptions of the textual surface must be based on a description of sufficient and necessary semantic relations between the sentential descriptions, and that these semantic relations can only ultimately be described within the still larger and much more abstract framework of whole texts. Implicit in this argument is the conviction that a text is psychologically real only as a designation of complex semantic macro-structures, as opposed to syntactic structures. In order to obtain the deep structure of texts, van Dijk (1972) and Kintsch (1974) converted the extended discourse into a set of semantic propositions, which possess an ordered, hierarchical relationship to one another, so that the underlying semantic proposition that is most deeply entailed designated the topic of that discourse.

Propp (1968), Thorndyke (1975) and Rumelhart (1975), concentrated on the morphology of simple stories and the development of story grammars. Nonetheless, the structures of relationships among their story elements and the story elements themselves are representations of packages of conceptual knowledge, or schemata. Consequently, we perceive that the text is defined in terms of its semantic propositional content and conceptual perspectives. Grimes (1975) described the discourse phenomena in terms of three separate sets of relationships: its content and semantic organisation, its cohesion relationships, and its staging relationships (expressing the speaker's perspectives on what

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is being said). The cohesive and staging relationships support each other in order to project its semantic content.

Hoffman (1985, 1989) introduces an integrative semantic approach as a semantic solution to discourse anaphora, integrating the context of each sentence with the context of what preceded. A reduced form is used to guide the listener to find the unique referent in what has gone before that has the characteristics specified. According to Hoffman, the correct antecedents can be assigned to sequences of identical pronouns based on verb collocation in the integrative semantic model. In order for the addressees' mind not to become overloaded when they want to keep the previously mentioned details of a long discourse in their head, they try not to keep the details of the story; rather, they suppress less important information to keep an outline of the main idea in their semantic memory. An integrative semantic theory maintains that the meaning of a sentence is integrated into the comprehension resulting from prior sentences to make a new expanded comprehension. It appears to be a theory of the interpretation of paragraphs and "some higher level theory of rhetorics is needed to explain how we understand longer stretches of language" (Hoffman 1989:249). Hinds (1977) raises the issue of "a dynamic discourse registry" implying that the referents at a given place in a discourse receive activation. The "dynamic activation hierarchy" is assigned to referents as a measure of the possibility that they can be antecedents to a later referring element (Sgall 1987).

1.4.3. The Hypotheses of the Study

1.4.3.1. Introduction

The type of model applied for this study is a model of the processes involved in both understanding and producing discourse. Since we do not have direct access to a person's internal states, an account of them must be an abstract model and not a direct description. The mental construct that is set up as a result of interpreting discourse is at least partially a mental representation of the situation that the discourse describes. Such a mental construct is an appropriate framework for a study of discourse reference.

There are several reasons for preferring a contextual treatment of discourse reference: projections posed by a distance approach are simply probablistic (see chapter 2 for the disadvantages); episodes and other discourse boundaries cannot be defined properly and such views of reference are unable to account for global salience of the referents beyond paragraph units; moreover, potential ambiguity can over-ride the effect of the recency of prior mention and episodic unity on a pronominal choice.

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Accounting for a wide range of conflicting factors simultaneously influencing the use of anaphoric expressions is a difficult task to achieve, since each factor may effectively create conflicting results for a strong prediction to be made in individual cases. Abundant redundancy provided by context makes a difference between the urgency of the task of full NP's and pronouns in differential NP slots of particular texts and creates the possibility of using differential stylistic strategies.

Needless to say, the arguments for the significance of context in anaphor resolution have been based on a narrow scope. Detailed claims about how reference resolution is carried out in discourse must take account of the role of several types of information involved in the task. In keeping with the findings of previous research, this study suggests that global statements about when reduced anaphoric expressions and when full NP's are used cannot safely be made. The linguistic devices of differential linguistic systems and the strategies taken by different individuals vary too radically to allow for such broad statements. The differences are expected to exist not only across typologically different languages but also across individual texts, and even in different NP slots within the texts produced under identical circumstances.

The first, and most central issue addressed in this thesis is the exploration of context-coreference coordination. Inasmuch as complete accounts of contextual sources relevant to reference resolution have not been offered (see chapter 2 for a review of the relevant literature), this study provides insights into an almost ignored phenomenon. Familiarity being the best and foremost view on discourse reference ignores the effective role of verbal predicates in determining topical characters associated with them. Distance and discourse structural approaches also do not take sufficient account of the significant role of context in resolving coreference separated by long distances and across episode boundaries.

Three projects are undertaken, each of which deals respectively with a) how readers interpret an intended writer's intent in creating a referential pattern for a piece of text, b) what is the role of context in reference resolution, and c) how context constrains referential ambiguity. The three research hypotheses tested in the three chapters of the study are as follows. A) The pragmatic functional approach to anaphora maintains that the arrangement of the anaphoric expressions in discourse is on a non-arbitrary basis. According to this hypothesis, the referential intent of the writer must be recoverable by the reader. But while, on an average basis, referring expressions are assumed to carry the referential intent of the text producer which is more or less recognisable, a perceived degree of stylistic diversity is hypothesised to exist. The referential freedom of choice indicates the existence of a scale within which the referential expressions are either strongly

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predictable, intermediately predictable, weakly predictable, or unpredictable. B) A text could be largely comprehensible, though with difficulty, even if all the non-initial referential expressions pertaining to topical characters were removed from the NP slots. The discourse reference is the result of the interplay of two sources: the referring expressions in correlation with the context, such that choice of a full NP is necessary only in the absence of the informativity of context. C) Referential ambiguity has to be treated along with context. Unless removed through the informativity of context, ambiguity overrules the effect of givenness and salience in triggering the use of a pronominal choice. As a discourse proceeds, the accumulation of information about the salient characters removes the potential ambiguity resulting from referential interactions.

As is evident from the hypotheses of the study, textual context along other sources related to reference resolution is viewed to be of prime importance in the task of identifying referents. While a reader proceeds through a text, s/he is forming an integrative model which is a mental construct of a world spoken of (see Allan 1994 for a list of contributions). This dynamically growing model represents knowledge of what is done to whom and by whom. Textual context develops a dynamically growing semantic network within which a large number of actions and attributes are associated with a limited number of topical entities, in a sense that a referent gains its givenness status not only from its immediate mentions in previous discourse or its containment within a paragraph boundary, but also from being associated with particular actions that are done by or are acted upon it across paragraph boundaries. The only condition is that the referent is uniquely associated with the action representing it.

Obviously, a context model which has its own limitations challenges the validity of a purely distance oriented or an episode model. As long as anaphoric expressions are used over long referential distances and across paragraphs, and are found to be stylistically variable, we cannot expect these accounts to be fully reliable. A context model differs significantly from the discourse structural accounts that believe episodes as discourse units are the boundaries for the accessibility of referents and the use of pronominal forms. Although shifts in discourse units trigger a nominal choice, it is claimed not all referential choices made within a piece of text can be viewed as being of the same nature. Referential choices may possess a stylistic basis; while in particular environments, the presence of a full nominal choice may play a vital role in maintaining the identity of the referent in question. Major or minor discourse boundaries constitute areas where individuals are most likely to choose an explicit reference form, but this type of choice may not be connected to the need for identifying an intended referent. Being so strong in its determination of topical referents, context is the reason why one finds instances of paragraph-crossing pronominalisation.

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From this standpoint, salience of topicality is not limited to the mere frequency of mentions of a topical referent. Topicality is the association of a given topical referent with an increasing number of actions and attributes which are uniquely connected to it. Given that at every stage of a discourse file there exists a dynamically growing network of actions, a most easily identifiable character in discourse is the one that has the most number of connections with such actions. Within a semantic network, some particular actions are associated with only one character, in which case it is the predication which identifies the character in question; consequently the role of referential distance and discourse episodic unity turns out to be less than being the only decisive factors accounting for the identifiability of the referents.

The presence of the predicate creates an expectation for its arguments whose plausibility is determined within the limits of the discourse world. If a verb predicate characterises the topicality of an agent, patient, etc., the referring form used does not necessarily play the role of identifying it and hence need not be a full NP. If, on the other hand, the predicate in a particular environment, in which more than one referent is competing, does not provide the sufficient information to identify its arguments, the use of a full NP becomes imperative. It is important to note that the recency of prior mention triggers the use of a pronoun; however, figuring out which of the two competing candidates in the previous sentence is the antecedent of the pronoun in question depends on context, in a narrow sense the clausal semantic information. In the light of this approach, a novel question rises: how easy or difficult is it to identify an ellipted referent based on the informativity of context? The hypothesis of context containment of coreference will be fully tested and documented in later chapters.

1.4.4 Outline of the Thesis

The thesis is organised as follows. The present introduction has identified the problem and provided a brief outline of the relevant background information regarding the scope of reference for the term anaphora. An outline of the previous theoretical contributions was also introduced. Chapter 2 of the thesis will be a review of the studies of a) sentence level and discourse givenness; b) the distance approach of discourse anaphora; and c) the focus approach within the discourse cognitive units. We will outline these three major lines of research on discourse anaphora trying to identify issues arising from them and relate them to the objectives of this study. The first section of chapter 2 is a review of the theories which view context as related to the accessibility of referents with both a sentential and discoursal approach. Chapter 2 also surveys the literature of distance oriented studies dealing with: a) the functional iconicity of language structures as reflected in the choice of referential

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items (code quantity) and clausal linear order, and b) cognitive accessibility as reflected in the informativity of the accessibility markers. The last section of chapter 2 presents a review of the focus studies on anaphora as related to discourse organisational structure; works from cognitive psychology, linguistics, and artificial intelligence will be discussed in keeping with the aims of the present study.

Chapters 3-4 test two of the three hypotheses of this study, suggesting that (a) the arrangement of anaphoric expressions in discourse is not strictly rule governed; optional tendencies variably direct referential choice; and (b) reference is strongly supplemented by context. Chapter 5 shows the overruling effect of ambiguity and the role of context in effectively constraining potential ambiguity. Each chapter contains a complete project including an introduction to the method of analysis used for the data and explanatory material and a conclusion. The data used for these studies were employed for presenting both quantitative and qualitative evidence as for how discourse tendencies are observed and how context complements reference resolution. Chapter 3 provides the rationale for the methodology offered in chapter 4; and chapter 4 is built upon the findings of chapter 3; chapter 5 is further elaboration and application of the hypothesis of the study: the overwhelming role of context in disambiguating referents in ambiguous environments.

The objective of the first project is to examine the assumed correlation between the givenness status of topical referents in relation to the type of anaphoric expressions used to mark them. It has been contended that writers convey a purpose to their readers by selecting particular linguistic devices to describe a situation and its parts. The writer's intent must naturally be interpretable for the reader. A tentative hypothesis regarding the function of anaphoric expressions suggests that these expressions are used for the purpose of keeping the referents identifiable. On the surface level, there is some degree of stylistic freedom involved that causes variation in the arrangement of the formal referential items. Stylistic freedom is manifested in the desire and skill of the writer in monitoring the arrangement of anaphoric expressions in texts. In order to collect empirical data, the participants of the study were given pieces of written expository passages in which some of the NP slots pertaining to the topical characters had been deliberately replaced with blanks. The subjects were asked to comprehend the passages and try to choose appropriate referring expressions to fill the empty NP slots. The data elicited through this method were compared and contrasted for possible similarities and differences.

In chapter 4, experimental data are employed to demonstrate the role of context as opposed to the functions of the referring expressions. Anaphoric relations should be studied within the scope of the entire texts. The study compares the performances of native English subjects in a task involving: a) comprehension of a written expository text with all non-initial mentions of the prominent referents

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ellipted; and b) selection of a set of referential expressions in order to create a referential pattern as natural as possible. The study reveals that in the long distance links between antecedents and anaphors, it is not a pronoun per se which indicates the coreference link, the reduced expressions used simply mark an already existing semantic connectedness between a pronoun and a previously mentioned antecedent. The referents of the empty NP slots appear to be identifiable through context. The function of a full NP in each particular NP slot seems to differ; only in environments in which context does not reveal the identity of the referent the use of a full NP is imperative. However, full NP's do not always indicate that their referent would otherwise be unidentifiable through context.

Consistent with this objective, chapter 5 tackles the issue of ambiguity in relation to context and shows that, without taking context into account, the effect of ambiguity would seem perplexing. The potential for ambiguity in a text can be quite formidable unless context functions to neutralise it. The discourse is expected to possess the required devices and techniques to dis-entangle ambiguity and express the meaning distinctions that underlie the ambiguities. Although the potential antecedents of the pronoun may be many, under normal conditions, only one sense is currently expressed at any point. Almost always the informativity of context can determine the plausibility of one or a limited set of referents. There are two types of connections in a discourse. One type of relation is action-referent association (or context-coreference complementation). This indicates that a given referent is identifiable through the action(s) uniquely associated with it. The second type of contextual connection is the scriptic link between the verbal elements of a text constituting the components of a world spoken of. Within this world, certain actions are more predictable than others, the link between the actions forming a script is indirectly related to the identifiability of the referents, in the sense that identifying a particular referent may constrain the predications made of it.

The final chapter summarises the findings of the study and presents our conclusion concerning the significance of the experimental results. It spells out the two hypotheses of the study: referential freedom of choice and action-referent association. Suggestions are made concerning the need for the linguistic research to base claims about discourse coreference on context rather than on referring expressions per se, and the need to limit the extent of the functional claims which are made based on the formal superficial arrangement of anaphoric expressions. It further makes some suggestions for further research.

CHAPTER TWO: THEORETICAL FRAMEWORK

2.0 Introduction

This chapter will review three ongoing research approaches to the study of reference: the context (givenness) approach, the distance approach, and the focus approach. The three approaches are taken chronologically beginning with the context theories, which were initiated earlier than the other two. Distance theories evolved from givenness studies. Focus theories should be considered as the most recent and advanced of all. It goes without saying that there is overlap in any division made between the three approaches; however, we believe that the context approach is associated with accessibility attained from types of context without considering how it is marked; the distance approach attempts to account for how accessibility is marked by referring expressions. And the focus approach operates within episodic boundaries, considering how the choice of referring expressions is accounted by focus of attention. The present study applies a context based focus approach and maintains that the pragmatic inferences based on the textual context are made in the world spoken of; this assumption implies the involvement of long term mental storage. Referring expressions are optionally arranged for conveying the referential intent of the writers; therefore, it is more revealing to deal with how context assists identification of the topical referents complementary to the use of referring expressions. The association between referents and the actions and attributes predicated of them is a rich source for long lasting accessibility. The informativity of action-referent association determines whether or not, in subsequent retrievals, a full NP's function is urgent for clarifying the identity of the intended referent.

2.1 The Context Approach to Anaphor Resolution: Givenness, Definiticity, and Accessibility

2.1.0 Introduction

The context approach begins with theories of givenness that were initiated earlier than other approaches to the study of anaphor resolution. The concept of givenness was originally introduced as a sentence-level criterion, and was later reinterpreted as a discourse property of referents in general. Discourse givenness considers episodes, rather than the sentence, as the domain for givenness. A referential concept is taken to be active after introduction, and is believed to remain active within an episode; it loses the status when the episode is closed down and a new discourse unit begins. Three statuses of activation, deactivation and reactivation account for the status of a given referent in discourse and in its mental representations; given, new and accessible are the correlates of

activation statuses. In addition to discussing the sentence and discourse givenness which is the aim of section 2.1, identifiability, definiticity, as well as grounding or staging of information will also be considered.

It is worth mentioning at this stage that a difference must be established for the three notions of accessibility, definiticity and identifiability. An identifiable entity is definite, but it is dependent more on context while definiticity is a formal (.norphological) property of the NP denoting the referent; therefore, it conveys a definition which is not necessarily related to any specific context. Accessible entities, on the other hand, are identifiable easily and are indicated by attenuated formal expressions, but not every identifiable entity is highly accessible; identifiability involves degrees of difficulty which monitors the degrees of the phonological length and the informativity of the device for its marking; i.e. an ellipted referent which is identifiable with difficulty is of low accessibility, although it is identifiable. The thrust of this thesis is that identifiability is related to context; while recency of prior mention is the main cause of high accessibility.

2.1.1 Sentence Givenness

The Prague School linguists demonstrated, with theoretical consistency, the manifestation of the functional meaning of language in the form or the structure of language. In their theory of Functional Sentence Perspective (FSP), they investigated the ways in which sentences were arranged as messages which conveyed information (Firbas 1966, Chafe 1976, Haviland and Clark 1974). The earliest attempt within the framework of givenness was Mathesius (1932), the founder of the Prague School of Linguistics, who focussed on the way the form of the language is organised into parts which carry different kinds of information. He saw a tendency in Modern English to convert expressions of actual theme to the grammatical subject, visible in the development of the passive construction. The theme/rheme tradition tended to divide sentences into two distinct parts, one of them being the new information, focus, rheme, comment; and the other the theme, the old information, or the topic. Under unmarked conditions, old information was believed to precede the new information. The most salient position in an utterance is initial, and the second most salient position is utterance final.

A given/new distinction is naturally reflected in the information structure of a sentence, but there is controversy concerning the definitions of these terms as well.[1] The given/new distinction should be kept distinct from the concepts theme/rheme, although the two distinctions necessarily very often coincide. Allan (1986) discusses the first clause constituent (FC) of the utterances as the one that carries old information. But he shows that not all first constituent elements carry old information. Theme is supposed to be the initial unit of a clause but not necessarily the given information. The old-new order may be found only in unmarked cases, e.g. the more accessible and less communicatively salient FC in the unmarked neutral sentences is the subject and is topical (Allan 1986:95). Under unmarked conditions, the FC will most often be the topic and is often contrasted with focus and focus is associated with new information.

One of the reasons for thematic fronting, or topicalisation, is to give the fronted element not only thematic prominence, but informational prominence as well. Fronting of focused FC's is mainly a means of giving them increased salience, e.g. "fronted spatial and temporal adverbs function as, respectively, spatial or temporal frames for what is said in the rest of the utterance. As FCs, they have greater salience in locating the topic of discourse" (1986:88). Elements other than the subject, such as complements, direct and indirect objects (example 1) may for various stylistic reasons be preposed and thus given thematic prominence (see also section 2.2.2 on topic continuity).

1

The apple, she gave to Mitra's sister.

In the light of givenness contributions, it is presumed that the need for both the active and the passive sentences is functional and is psychologically justifiable. Praguean tradition demonstrated its impact in the pragmatics of word order in 1970's. Halliday (1970), working within the FSP theory, stated that grammars which either analysed only the structure of language or listed its functions without regard to structure would be inadequate, and so offered the synthesis of structural and functional approaches and the study of language in

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[1] Chafe (1976) defines given information as the knowledge which the speaker assumes to be in the consciousness of the addressee at the time of the utterance. According to Firbas, an element which is considered given is something that has usually been provided by previous context, while new information has not. This definition, however, does not distinguish between the topics that have been mentioned in an immediately preceding context and those mentioned a long distance back in the previous context, both are definite but only the former is given.

terms of its use. He argued that the language is formed or structured in a certain way because it reflects function.

Working within a FSP framework, Chafe (1976) speculated that the idea conveyed by a particular referring expression used in a sentence may have one of various packaging statuses which determine the degrees by which attenuation in marking is moderated, in accordance with the givenness status of an intended referent. The speaker should judge how long a particular item remains given, when new ideas come into consciousness and old ones are out. Such a judgement is approximative and this is an area in which speakers are entitled to use individual judgements (Chafe 1976). A referent is considered to be in one or more of three states: 1) given vs new, 2) focus of contrast selected from a list of other candidates, or 3) definite vs indefinite (Chafe 1976).

Kuno (1972), who argues for a functional model for anaphora retaining the old syntactic notion of primacy relations, claims that there is a pragmatic principle at play, which takes into account the distinction between old, predictable information and new, unpredictable information relying on the theory of Functional Sentence Perspective as formulated by Firbas and other structuralists belonging to the Prague School. Kuno suggested that "A NP that represents what the sentence is about, namely the theme of the sentence, cannot be pronominalised intra-sententially" (Kuno 1972:305).

The clause displays the communicative dynamism, the focus of empathy in the functional sentence perspective. Instead of dividing the sentence in the theme and rheme material, Firbas (1966) assumes a hierarchy of Communicative Dynamism (CD) which is determined by three parameters: 1) linear order, 2) semantic considerations (the type of the verb), and 3) the degree of context dependency (e.g. whether the given expression represents old or new information). Firbas also states that the distribution of degrees of CD over the elements in a sentence is not merely due to pragmatics, but is rather the outcome of an interplay or tension of several factors. This model of language postulates three distinct but interrelated levels of structure: syntax, semantics, and FSP which are all to some extent responsible for word order and other linguistic phenomena. There may therefore be both semantic and language specific syntactic restrictions which bring about a marked word order. Thematicity and rhematicity are realised in terms of degrees. Firbas assumed that sentence elements can carry varying degrees of CD; a higher degree of CD is associated with newness and a low degree with givenness. The most thematic element is an NP which is

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the theme of the sentence and which at the same time carries old information and has no contrastive stress, while the most rhematic element is an NP which is rheme and which carries new information and focus simultaneously. An element in the rheme which also bears the highest degree of CD in the sentence is called "the rheme proper" (Westergaard 1986). The pronoun cannot be lower in its degree of CD than the antecedent, i.e. if a given full NP is higher on the hierarchy of CD than a given pronoun, they are interpreted as non-coreferential (example 2).

> 2
>
> Rosan is kissing him passionately in Ben's picture.[2] (Reinhart 1986)

If the pronoun is more thematic than a full NP in the same sentence, a search will be carried out for a referent in the previous discourse. In sentences with coreferring NP's where one is a pronoun and the other a full NP, the pronoun may not be more thematic than the full NP from which it picks up its referent. The principle suggests that the possibility of setting up a system by which NP's are given points on a scale according to how much newness or, rather, rhematicity they carry.

FSP deals with language as a process of communication, and the organisation of information is thus an important aspect of it. In this framework, it is appropriate to look upon sentences as more or less acceptable rather than grammatical and ungrammatical.[3] Communicative Dynamism is fundamental to this theory and has to do with the extent to which a sentence element contributes to the development of communication, and to the degree it pushes the communication forward. It is incorporated into the system of FSP which is understood as the distribution of degrees of CD over the elements within a sentence, and it basically assumes that sentence elements follow each other according to the amount of CD they convey, starting with the lowest and gradually passing on to the highest. The unmarked word order and the most common distribution of CD in a sentence is thus a consistent theme-transition-rheme sequence illustrated by 3:

> 3
> The man - baked - bread
> *theme-transition-rheme*

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[2] Allan (p.c.) believes that the example is ambiguous between two different coreference interpretatiions (between Ben and another person). Only context can determine which one of the two is possible.

[3] A thorough outline of the history and various definitions can be found in Firbas (1966) and Chafe (1976).

The Prague tradition associated topicality with definiteness and pronouns. This association was widely discussed in terms of topic hierarchies:

Definite > Indefinite,
Pronoun > Noun,
Subject > Object.

The hierarchy of topicality introduced in 1970's took it for granted that semantic or grammatical notions correspond to the degrees of topicality. The hierarchies imply that there are three degrees of topicality. As we will discuss in the next section, this wisdom has been questioned by discourse oriented studies where its shortcomings are underlined.

A) Agent > Dative > Patient > Others
B) Subject > Direct Object > Indirect Object

In his socio-cognitive approach to the function of accessibility in the ordering of NP's within conjuncts and in clauses, Allan (1987) contended that there are several, possibly universal, accessibility hierarchies in play which determine, according to a light-heavy preferential basis in ordering material, sequencing of constituents of NP's in conjunct relations or in a clause. Taking the view from Bock (1982), who claimed that accessible information in mental storage is easily and automatically processed as opposed to new information that requires controlled processing, he rank-ordered accessibility hierarchies according to how powerfully they function in ordering NP sequences. Seven hierarchies are rank-ordered according to their ability in creating salience and as a result accessibility: 1) the familiarity hierarchy, 2) topic < comment ($X < Y$ indicates X takes precedence and is easier to process than Y), 3) the universal sequencing conventions; 4) definiticity and referentiality, 5) the personal, social status, and role hierarchies, 6) the dominant descriptor hierarchy, and 7) the formal hierarchy. The strongest among all is 'the superordinate' familiarity hierarchy, which is reminiscent of Kuno's notion of speakers' empathy and tends to have such correlates as topical, given, referential, and definite statuses; this hierarchy can overrule the influence of other less powerful accessibility hierarchies in determining the order of NP's. Other hierarchies vary in their effect in sequencing NP's in conjuncts and in clauses, e.g. considering NP ordering by social status hierarchies is certainly less motivated than the given < new hierarchy.

There is a cognitive tendency that predicts the antecedents of the referring expressions located on the left hand side of the hierarchies are normally more easily accessible. However,

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accessibility hierarchies may be in conflict; thus not all precedence relations can be evaluated on a light < heavy scale: some sequences, e.g. those determined by the universal sequencing conventions, which are not always likely to be a representation of accessibility, are simply conventional. Hierarchies may co-occur, e.g. the familiarity hierarchy as well as dominant descriptor hierarchy may both be involved in the example below (4). The occurrence of *Paul* prior to *Mary* may have been caused by one or both of the familiarity (sympathy) and the dominant descriptor (significance relations); the default would be the social status hierarchy, which is briefly discussed below, gives the precedence to *Paul*. The sequencing hierarchy is more conventional than representing effective accessibility; however, they influence the ordering of NP's, e.g. the verb *count* denotes an upward counting rather than a downward. As for the dominance of definiticity hierarchy, Allan cites Givón's (1979) finding which indicates 94% of indefinite direct object NP's are preceded by a definite subject NP.

4
I gave the four of them a lift back from the party, *Paul and Mary* fought with each other all the way home in the back of the car; it was awful. (Allan 1987)

The personal, social status, and role hierarchies, which are discussed in more detail, are viewed to be three 'species of dominance hierarchies' i.e. the one entity that takes precedence tends to be the one that is dominant and acts as the potential controller in the sequence of NP's. The dominance hierarchy, or in other terms the controlling feature which is a different but more encompassing alternative to it, is the correlate of personal hierarchy; it predicts, unless politeness decrees otherwise, the following personal ranking:

1st person < 2nd p. < 3rd p. human < higher animals < other organisms < inorganic matter < abstracts

The personal hierarchy is refined by a) the general social status hierarchy which predicts precedence order of "male < female < offspring", and the specific social status hierarchies which indicates "those with most authority < with less authority < with least authority". In some languages the use of pronouns to refer back to entities in conjunctions with different ranks either are avoided, or require that the higher ranked governs the form of pronoun used. The reason we prefer the a) version to the b) version of the following example (5) indicates the role of personal hierarchy.

5
(a) In Sydney today, an elderly man was injured by falling debris [20b in Allan (1987)]
(b) ??In Sydney today, falling debris injured an elderly man.

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The personal hierarchy is related to such hierarchies as case role hierarchy, actor, and controller: a) certain case roles take precedence over others: agent < patient < instrumental < spatial < temporal; b) actors take precedence over undergoers, the actor hierarchy being a more plausible alternative to case hierarchy (actor < undergoer < outer peripherals); and c) eventually controllers take precedence over the controlled in sequences of NP's of adjuncts. The actor or the controller is simply expected to precede the undergoer or the controlled, e.g. in particular constructions in the Apachean language, Navajo, only controllers, as opposed to actors and beneficiaries, are allowed in initial position. The case hierarchy takes effect through the actor hierarchy and the controlling hierarchy is the most supreme, in a sense that when it is neither the personal hierarchy nor the actor hierarchy alone that can account for precedence, a controller hierarchy takes effect. This is specially true where there is a conflict for taking precedence between actor, recipient's personal rank, and controller, e.g. in Navajo cosmology and hence language, "it is only controllers which are at the same time undergoers that can take initial position" (p 66).

The dominant descriptor hierarchies predict the referent of the one term that takes precedence is a) more significant, b) better than the referent of the one NP that follows, and c) is host to it, e.g. positive < negative, bigger < smaller, horse < rider (horse is host to rider), etc. In example *mum* and *dad*, the order violates the social hierarchy but is supported by the familiarity and the dominant descriptor hierarchies. The formal hierarchy indicates that the order of referring expressions in conjuncts is relative to syllable quantity; and relative syllable length is correlated with the accessibility and hence the order of NP sequencing, i.e. structurally simple < structurally more complex, e.g. an entity named initially *an early Victorian red brick labourer's cottage* is subsequently referred to as *it/the cottage*.

In sum, the accessibility factors in the hierarchies ranked to the right hand side of the hierarchy of hierarchies tend to be socio-cultural and as a result less strongly dominant than the ones which are purely cognitive. Precedence because of politeness, power, and social distance brings about salience and leads to higher accessibility of the entity in question. Grammaticality as well as appropriateness related to culturally bound politeness conditions are the criteria for considering the acceptability of the cross-linguistic examples.

Earlier in this chapter, a brief survey of studies dealing with sentence accessibility was presented. Referential concepts can be indefinite, definite, and given; the status is marked by the speaker based on an estimation of the addressee's awareness. Given that definiticity is

closely associated with givenness, we will deal with the concept in the next section. Definiteness and givenness are indeed the result of the change of activation states of discourse entities; the notions are also related to referential complexity and discourse accessibility. It goes without saying that for a referent to be given, it must have already got the status definite.

2.1.2 Definiteness

Definiteness can fulfil "the maxim of antecedence" (Clark and Haviland, 1977) which is related to coherence and meets the demands of a topical referent. The maxim of antecedence also meets a basic condition of coherence in discourse. For our purposes, it is when a NP is meant to be referential, rather than generic and non-referential,[4] that the question of definiticity becomes involved. The condition for definiticity of a referent is set by Allan as: "S[peaker] uses a definite NP where he judges that H[earer] can, at least conceptually, identify the NP's denotatum from background knowledge, or from information evoked by or inferred from context" (Allan 1986b:125).[5] Evidently, the appropriate interpretation of the definiticity of noun phrases is highly dependent on the common ground of the participants of a communication, the linguistic (textual) context and the circumstances of the utterance; without context, such expressions can be ambiguous between referring and non-referring interpretations. Givenness and definiteness both are qualities that are achieved through co-ordination based on mutual expectations between the speaker and the hearer.

Allan's definition of definiteness reads (1986b: 134):[6] "When S utters a definite NP, H will infer that S judges that its denotatum is identifiable to H from information which S

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[4] Allan (1986c:296) defines a referential NP as "one having an implicature where the expression falls within the scope of an affirmative existential."

[5] Non-referentials are of four kinds: those which are within the scope of a semantic predicate denying their existence; those which are expected or predicated to come into existence after the point of orientation for the clause; those whose existence S is uncertain of; and those which designate an unspecified subset of an existing set.

[6] An up to date account of definiteness has been presented in Allan (*Natural Language Semantics* chapter 7, to appear), in which ensemble theory has been applied for describing definiticity. Allan (1986) used set theory to account for definiteness, which was useful to capture the semantics of countable NP's assuming that a set has members. Ensemble theory can account for both countable NP's constituting sets and uncountable NP's having parts rather than members. "The definite NP specifies the ensemble [set] for H without invoking any other ensemble". It is necessary that one safeguards that the addressee has enough contextual information to assign the full NP unique reference within the world spoken of. According to Allan, a definite NP retrieves a conceived or conceivable ensemble of denotata uniquely, while, in contrast, an indefinite NP is an instruction to

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assumes is already available to H because it has been evoked by or is inferable from context or general knowledge". Likewise, when S utters an indefinite NP, H gathers that S reckons that H cannot accurately identify the entity he wishes to denote. According to Allan (1986b), entities form sets and sub-sets, "An indefinite NP partitions an identifiable set of phenomena so as to indicate the countability and either the approximate or the exact quantity of the subset: that is why indefinites typically have initial quantifiers" (p. 134). By using a definite NP, S implies to H that H should perceive that S believes H can identify "conceptually but not necessarily perceptually" which entity in W (the world spoken of) S is marking (1986:122). Definites do not direct H to partition a set, they denote a set holistically.

For being considered definite, the referent of a NP should be "satisfactorily identified for the purposes of the message" (Allan 1986b:129). Different types of full NP's are used for marking differential degrees of identifiability; full NP's such as proper names, definite NP's & descriptions, and indefinite NP's, differ from one another according to their differential properties in retrieving referents. In addition, there are differences in the global importance of entities. *Paris* is readily identifiable world wide, while a small city in my home country, *Lenjan*, is identifiable for a much smaller population. So it is reasonable to think about how definite or how indefinite an entity can be. And the scale of such a type of identifiability is determined by context. Indefinite referents, or preferably unidentifiable referents, may differ in how unidentifiable they are; S by saying *will you go and get a box?* or in saying *will you go and get one of the boxes in the back of the car?* has indicated, through anchoring vs non-anchoring an indefinite referent to a definite one, two different levels of indefiniteness. Likewise identifiability varies in different environments; the definiteness of the *woman* in: *the woman I saw at the station was blond* differs from the same NP in this example: *the woman I saw at the station was your wife* where the *woman* is anchored to the second person referent by the possessive pronoun *your*.

There are two distinct aspects to the argument on definiticity; what definiticity is and how it is marked. While definiteness as a status is a universal feature, marking of the status using definiticity varies across different languages. In addition, some languages may not have a category of definiticity marking (e.g. Polish and Persian). Regarding the

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the addressee to create an ensemble of denotata A by separating "the recognised or recognisable ensemble B denoted by the head noun of the NP", and after that the definite NP represents "the recognised ensemble A of denotata (perhaps a unit set) uniquely".

conventional marking of definiticity, Allan suggests that NP's should be construed to be definite unless they are marked indefinite. It is the mutual knowledge of the S and H that is significant for the sake of the argument on definiticity; however, the knowledge of definiticity can be related to all potential participants that have some type of presence in the discourse in question, i.e. the T[hird] party's knowledge in a conversation exchange may possibly be compared with S and H, e.g. the conversation partners are S, H, and T, Speaker S looks at H and says: *Jim's nephew is coming,* and T who is hearing S's utterance takes the turn by asking: *"Does Jim have a nephew?"* implying that s/he did not know the referent in question. In this example, *nephew* is definite for S and according to S's estimation for H, but not T who is a third person. An entity on any occasion and in any context possesses an accessibility status which may vary in the minds of S, H, and T.[7] The marking device used may correspond to or reflect the needs or the knowledge of S; H; T; S & H; S, H, and T; H & T; or exclusively S & T.

In marking the status of referents, there are two NP constituents involved in the representation of entities: Determiner and Number. Determiners are either definite or indefinite markers: 1) *the, this, that,* etc; a possessive pronoun; a universal quantifier, *all, each, every, no, not any;* 2) indefinite determiners form the set *a(n), some, any, not every, and not all.* Number comprises three kinds of quantifiers: free quantifiers comprise all numerals and fractions, *few* and *little*; restrictive quantifiers comprise *many* and *several*; exclusive quantifiers comprise *much, enough,* and *either* (Allan (1986) (see also Allan (to appear) for a detailed discussion.)

Definiteness in discourse can be preserved over very long distances but givenness is preserved over short distances. It would appear that context is important for definiteness, and that definiteness can be preserved indefinitely if the eventual context in which the referent is reintroduced is narrow enough to make the referent identifiable (Chafe 1976). It is evident that definiteness does not necessarily correlate with givenness, i.e. definite referents may either be new or given, but, for a referent to be given, it has already got the

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[7] T can be involved in a communication situation. Two present members of a conversation are S and H, the knowledge of a/the person/s who is/are not present but is/are involved by being the topical referent of the conversation can be potentially compared with S and H; as far as their knowledge of the definiticity of entities being talked about is concerned, there may be a scenario in which S and H may be talking about S's friend who is not present but shares the knowledge of this conversation. If this third party joins the conversation, his/her knowledge will certainly differ about the referents introduced in the conversation.

status definite. Of the four possible combinations, three are quite common: indefinite and new, definite and new, definite and given.

As mentioned briefly before (see chapter 1) , implication of some nouns by others is a semantically observable way of providing definiteness. One particular noun may imply another noun's identifiability: *a new house* invites the inference of *the kitchen*, *a passing truck* creates *exhaust fumes*, and finally *a mower* can be marked as *the machine* and *the carburettor* is anchored to it. It is part of people's background knowledge that makes inferences possible. "In each of these cases the definite is justified because its denotatum is determined by inference from the preceding text" (Allan 1986a 126-127). The process involves building of a bridging structure as the source of definiteness in which the listener forms an indirect antecedent, the entire process is called metonymical reference. Such implications extend not only from one noun to another, but also from verbs to nouns. Certain salient characters are variably attributed to particular actions and qualities that create greater accessibility for them; this type of implication may be either global, attributed to one's semantic context, or local, inferences made according to previous discourse context, (see chapters three, four, and five of this thesis). In the following example, *A boat* is globally connected to only *one captain*, so the set of relevant captains (a unit set) is referred to using a definite NP. This linguistic property has a great deal of significance in discourse reference.

6
A fishing boat rammed us. *The captain* was drunk.

A given entity may be referred to with a definite NP rather than a pronoun. When a speaker wants to convey contrastive meaning, given information is referred to with explicit reference and with stress. Contrastive sentences are used to assert which candidate, among a limited set of given, definite, and indefinite candidates is the focus of contrast. As the options are narrowed down, contrastive accent is useful in displaying the contrast. Because the expression of a contrast is a "cognitively costly" task (Chafe 1987:38), when a sentence is used in a contrastive way, it need not contain a new concept.

So far, we have discussed sentence givenness, sentence level accessibility and definiticity. We pointed out that these are statuses which are related to discourse reference. We will show that the discourse level definition of givenness considers degrees of accessibility of referents in discourse; there are at least three degrees of accessibility which are called new,

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accessible, and given. An entity may be new upon introduction. After being introduced, it retains the status of given through to the end of paragraph and remains accessible up to some longer distance.

2.1.3 Discourse Givenness

The notion of sentence topic should be turned into a macro-approach in which the degree of presuppositionality of NP's should be dealt with. The topical referent is not an atomic element realised in isolated sentences. It is rather a discourse phenomenon which is coded by various types of grammatical devices; so a more complex, graded and cognitively-based notion of discourse topicality is required. Topicality is realised in a multi-point scale; it has a functional dimension and is not a sentence category (Givón 1990:901). The sentence view of topic (old information) could not solve the opposition between the two atomic notions of topic vs. focus. Only in constructions such as cleft-focus and Y-movement, the focus and the topic do not oppose each other. Thus a given speaker is more likely to utter 7(a) as opposed to 7(b) in the beginning of his/her lecture:

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a. What I am going to talk about is evolution.
b. It is evolution that I'm going to talk about today. (Givón 1989:213)

The identifiability of an entity is related to referential complexity, whose cognitive aspect is competing referent search. An intuitive rule seems to identify the theme only with that part of the sentence that was already present in the previous discourse. However, previous mention may not be sufficient to identify the theme when there are several given or definite contrastive referents. The influence of referential complexity can be accounted for only if a discourse perspective of topic is taken.

Sentence studies of givenness are very limited in their observations of the rich possibilities in which several entities with differential salience can interact; the result of which affects the marking and retrieval of topical referents. A typical text is not ambiguous in terms of what it attempts to convey. Immediate non-determinacy, fuzziness or instability in the concepts invoked can be resolved by pragmatic inferences as concepts appear in a more and more determinate context. It is expected that text organisation is tight and efficient, so the structure of the text itself disambiguates or prevents ambiguities from being communicated in the first place. Such observations are possible only if a discourse approach to topicality is taken.

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Working within the givenness approach, Goodin and Perkins (1982) argue that discourse goes wrong when a) a sentence has little or no information that is really new, but may simply repeat or rephrase what has been already mentioned, and b) a sentence is deficient in given information. "In general, a high proportion of theme to rheme will slow the pace of communication, a low proportion will quicken it" (1982:253). One should remove themic material in the name of economy. If the content is tough and the argument twists and turns in the contexts where information is complex, themic material can be very helpful. In such cases economy runs counter to rhetorical ends.

Viewing givenness from a discoursal cognitive stance, Chafe (1987) asserts that it is rewarding to present a picture of what is happening in the mind of the speaker while producing spoken data. Viewing givenness statuses as basic cognitive processes, he believes text production is a dynamic process in which the units of investigation are distinguishable by inter-clausal pauses in speech calling them 'intonation units'; these basic units are developed into what he calls 'extended clauses'.[8] When a speaker is speaking, s/he utters one piece of momentarily active information after another in intonation units. Only one concept within an intonation unit can be activated from inactive state. So one intonation unit may contain one new concept and one or more given or accessible concepts. This is named the "one new concept at a time" constraint (1987:33). An extended clause then has "at least and only one chunk of new information, and at least or more than one chunk of old information" (Givón 1990:898).

Within this framework, the major assumption is that the human mind contains a large amount of knowledge only a very small amount of which resides in short term memory and can be focussed on at any time. The more traditional terms topic and comment are

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[8] An intonation unit is recognised as a sequence of words combined under a single coherent intonation contour usually preceded by a pause. Most intonation units exhibit subject-predicate structures which are analogous to clauses and some are ancillary to clauses. These units are reformatted by attaching those which are not clauses to the clauses with which they are associated. These extended clauses are fastened together by connectives to form the building blocks of spoken language and to function as units for analysing the accessibility of entities in spoken data (Chafe 1980, 1987). It should be borne in mind that in the conveying of given and new information, there is no one-to-one correspondence between the expressions in a clause and the concepts coded by these expressions, in a sense that one concept may be expressed by several expressions but not vice versa; in expressions such as *gives a lecture* both the verb and the object carry a unitary concept which forms the new information. A point of concern in viewing pauses as criterion for distinguishing intonation units and episodes is that individuals' pauses may possess idiosyncratic characteristics, accidental inter-clausal and intra-clausal pauses can create real problems.

renamed as "starting point" and "added information". A starting point is usually a given, or occasionally an accessible and rarely a new referent. Added information typically contains only one new concept, though it may also contain some given or accessible concepts. This limitation demands that spoken utterances should not contain two or more conjoined items within a single intonation unit if both of them express concepts that are new; this limitation has a bearing on the ways concepts are marked. But in written language in which the writer has the opportunity to monitor and reconsider his/her performance, the segmentation may get modified, i.e. sentences vary widely in terms of their length and are claimed to be rhetorical units rather than representing constraints on storage and the processing of information. Through monitoring, one makes rhetorical changes in the written statements, so that they display a different pattern of organisation. Chafe's account of givenness in discourse takes context as the source of accessibility; however, episodic limits are claimed to be the limits for concepts to be deactivated. The issue at question in this thesis is: the accessibility of entities may last across episodes, i.e. there are clear instances of attenuation in marking referents that are considered to be deactivated based on the episode model. Is semantic memory also involved in processing the resolution of coreference? The answer is, within an episode, coreference resolution is easy, as the concepts are not strongly suppressed yet. But across episodes, it is possible, though with a degree of difficulty in certain contexts, to identify ellipted salient referents based on the informativity of pragmatic inferences regarding 'who will do what'; we will call this 'action-referent association' (see chapters four and five).

Givenness within sentences and discourse is related to staging of information. There are three mutually supportive levels of organisation; these are: the givenness level which contributes to the linear text organisation, the semantic level which is less linear and more hierarchical, and the cohesive level which represents the surface cohesive structure of the text. The informational structure of discourse consists of given and new information in a way that new information is presented in the context of given information. It is the givenness aspect that plays a significant role in the linear grouping and integration of information into a larger discourse unit. Integration is accomplished through the matching of given information in the current discourse to the previous discourse content.

Cognitive psychologists have established that information processing is basically a constructive process of assimilation and accommodation. A new input unit is matched to previously stored knowledge, and by integration into the stored knowledge, modifies, and

is itself modified (Lachman, Lachman and Butterfield 1979). As we turn to the processing of information in text, we perceive that this too is a process of matching and integration. More specifically, we see that it is the given part of the current sentence that is providing the point of linkage, and is matched with previous knowledge or discourse content. Through this matching, the integration of the current sentence into the previous discourse is accomplished (Clark and Haviland 1977). The given aspect thus plays a significant role in the linear process of text creation and development. Grounding of information involves a strategy to identify given information in memory so that new information can be included and the memory revised (Clark and Sengul 1979). Storage of information involves grounding, and grounding of information necessitates the propositions to carry both a portion of old information and a portion of new information.

Givenness, definiteness and accessibility are statuses which pertain to referents either in isolated sentences or in discourse. We will see in the next section that another way of accounting for how reference is resolved in discourse is through the examination of how types of referring expressions are arranged and correlated with the accessibility of discourse referents to which they refer.

2.2 The Distance Approach

2.2.0 Introduction

Sentential givenness allows only for a binary division between given and new, but a diverse set of referring expressions are used to mark various degrees of accessibility; i.e. speakers mark how accessible referents are in a discourse. The importance of a topical referent has the effect of forcing it to occur before the comment; the continuity of the topical entity, however, pushes it to the end of the sentence. This ordering is in conflict with the Praguean presumption of topic < comment. The principle predicts "a more predictable topic follows the comment, a less predictable topic precedes the comment" (Givón 1989:225).

The functional studies dealing with the cognitive effect of distance on the accessibility of referents have dealt with the accessibility on a discourse level (cf. Clancy 1980, Gundel 1980, Grosz 1981, Yule 1981, Marslen-Wilson et al 1982, Givón and associates 1983, and Ariel 1988, 1990). Clark and Sengul (1979) apply the given/new strategy to discourse pronouns as follows: listeners are assumed to treat pronouns as given information and to search their memory for a plausible referent. When the referent is identified, the new

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information is attached to it. They suggest that the more relevant and recent the referent, the less time is necessary to access the memory and link the new information to it. This finding has been the essence of the functional, distance based, approach in linguistics. In this section, we will review the major distance oriented linguistic attempts (Clancy 1980, Givón and associates 1983, Ariel 1988, 1990, 1991).

2.2.1 Referential Choice: On the Use of Strategies

Clancy (1980) conducted a detailed investigation of referential choices made by twenty English and twenty Japanese speakers recalling the story after seeing the pear film (Chafe 1980)[9] to examine linguistic and extra-linguistic sources for referent retrievability. Clancy's analysis of pear stories was one of the first comprehensive attempts to verify the function of referential distance and potential ambiguity as the universal cognitive constraints on determining the arrangement of anaphoric expressions. The constraints are originally proposed by psychological studies as parameters along which the capacity of short-term memory can be measured. The amount of elapsed time between two mentions of a particular and potential ambiguity are assumed to be correlated with accessibility measured by means of clausal and sentential distance representing a "very rough general indication of the amount of cognitive activity" (1980:133). Referential salience is not measured, but the examination of several narrative pieces revealed that referential salience attracts the focus of attention, and optionally motivates unusual referential choices. It is not clarified how the effect of ambiguity is screened out in measuring the referential distance of the nominal distributions in the measurements.

Referential distance is measured by considering eight types of referential gap. If two coreferring expressions occur in the same clause, zero is assigned. When only one simple sentence creates referential gap between two mentions of a referent, the value that is assigned is 1; and accordingly 2, 3, 4, 5-10, 11-20, and finally 21 plus are the next greater ratings for referential distance. In this way, eight ratings were assigned to a range of zero distance to more than twenty clauses distance between two mentions of a referent. The same procedure measured distance in terms of number of sentences creating referential

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[9] The pear film was used by Chafe (1980) to collect spoken narrative data. The main part of the story is as follows: A man is picking pears, putting them in baskets on the ground. A boy steals a basket of pears, putting it on the handle bars of his bike. As he is riding away, he looks at a passing girl, hits a rock and the basket falls off. He is assisted in collecting them by three other boys who have come along. He gives them a pear each and rides off.

gap. Ambiguity was measured through the same tactic. No interfering referent receives zero rating, which indicates minimal ambiguity, and five, which indicates the highest degree of ambiguity. The statistical design used is summarised as follows:

> 1 (Percentage of nominal reference) X 2 (English vs Japanese) X 8 (number of clauses between two mentions of the same referent (0, 1, 2, 3, 4, 5-10, 11-20, 21+)).
>
> 1 (Percentage of nominal reference) X 2 (English vs Japanese) X 7 (number of sentences between two mentions of the same referent (0, 1, 2, 3, 4, 5-10, 11+)).
>
> 1 (Percentage of nominal reference) X 2 (English vs Japanese) X 6 (number of intervening referents between two mentions of the same referent (0, 1, 2, 3, 4, 5+)). (Clancy 1980:142)

The effect of character salience on referential choice is documented in the contexts where two characters of differing salience interact; the insignificant character is rarely ellipted from mention but most of the mentions of the salient characters are predicted to be attenuated or ellipted. Chains of propositions are structured to make thematic unity, called thematic paragraphs employed as the boundaries of the local topical importance. The dominant referential strategy is to pronominalise referents following their introduction and to continue pronominalising until episode boundaries or other characters creating potential ambiguity intervene. Contrastive referential forms are used consistently to keep one referent backgrounded as old information and the center of focus and the other highlighted as new information as is observed in example eight; the *girl* is marked by full NP's despite lack of ambiguity. Among the list of entities in this example, it is *the boy* and *the girl* who can potentially be backgrounded as old information; the entities, *bicycle*, *basket*, and *rock* are mentioned by definite NP's, because they are part of the setting; however, these entities have the least likelihood to be the center of attention. If the speaker chooses to mark *the girl* with a pronoun and keep using a full NP to refer to *the boy*, referential salience is inferably allocated to *girl*.

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...He--um ...a girl...with long pigtails, ...happens by going the other way ...on a bicycle, and there's a long shot, ...you see both of them.. converging and you see him. ...He's more interested in ...the girl going by ...than...taking care of.. making sure the basket doesn't do anything weird. ...And he sees the girl going by, ..he doesn't see the rock

The interference of competing referents, switching subject, and marking discourse sentential and episodic organisation are factors which trigger explicit reference in subsequent retrievals. The presence of ambiguity appears to be the strongest reason for the use of nominal forms in subsequent retrievals. However, effective ambiguity is extremely

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rare; the extra-linguistic context allows speakers to use inexplicit expressions if they assume that the listener is aware of the intended referent. But assuming that it is slightly more difficult to resolve inexplicit references on the basis of context than to resolve references which are unambiguously marked, it appears that environments of ambiguity are points at which one must work harder in order to resolve coreference. This can be language specific: e.g. Japanese allows "high tolerance for potential ambiguity" (1980:166).

The subject switch which tends to occur across the sentence boundaries involves a change of focus from one character to another. In environments of subject switch which involves the costly process of shifting focus from one character to another, speakers choose a nominal expression. Clancy investigated the relationship between different referential choices (nominal versus pronominal), switch reference (same subject versus different subject), and the sentence boundary (switch subject within the same sentence versus, switch subject across sentences). The subjects of main, subordinate and embedded clauses (excluding relative clauses) were counted for the switch subject comparisons to discover the percentage of nominal and pronominal choices used for maintaining reference to the same subject referents, and the proportion used for changing subject referents; the comparison is intended to show how these choices relate to sentence boundaries. The organisation of information into sentences has something to do with the process of selecting referents for subject position. Switch reference across sentences is done mostly with nouns, and same subject across sentences is marked by a pronoun; ellipsis is used only for maintaining the same subject within a sentence boundary.

Clancy concludes that referential choice appears to be the result of an integrated effect of several factors, the interaction of which impacts on the diversity observed among individual performances. Discourse structure, cognitive constraints, optionally marked referential salience, point of view, world shifts, and individual strategies are a variety of factors each sharing a role. Therefore, it is by no means easy to decipher the implications of referential choice. A variety of factors may interfere in introducing and maintaining reference to a character in an oral performance. The speaker may become momentarily distracted forgetting the listener's need. The speaker's presupposition about the interlocutor may result in assuming that from the beginning the characters and the basic elements of the story were old information, where they are not (or vice versa), reference may be made to the character who is being viewed by the addressee, or there may be a

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double world situation within which different worlds are dealt with, the film world and the real world (see Chafe's argument on digression 1979, Fauconnier's mental spaces 1985 and Allan's worlds spoken of 1986); e.g. the first mention of a character is made in the real world, the referential forms used reflect the hearer's familiarity with the characters, then switch is made to the story world and then the character is introduced again, in this way the speaker assumes no familiarity of the listener with the characters. The following example is a sample of a great many examples used by Clancy to illustrate the effect of differential individual strategies:

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...A man was picking pears in ...what seemed to be his orchard, ...and--...came along first, ../someone/ came along first. ...Someone came along before the kid on the bicycle but I don't remember who it was. ...Then a kid came along on a bicycle, (Clancy 1980: 148)

Among major linguistic attempts focussing on referential distance after Clancy, Topic Continuity (TC) (Givón & associates 1983, Givón 1989, 1990) and Accessibility Theory (AT) (Ariel 1985, 1988, 1990, 1991) are two major discourse functional cognitively based studies. The contribution of TC studies is primarily attributed to their attempts to classify grammatical devices (code quantity), syntactic case roles (linear order), and animacy of referents of linguistic elements within clauses in relation to TC, according to the text-based observations of discourse topical referents. The thrust of TC has been to demonstrate that the atomic view of topic and the functional ordering of topic and comment on a sentence level should be replaced with a new and more encompassing discourse oriented wisdom. Accessibility Theory (AT), on the other hand, is an attempt to bring context studies, psycholinguistic findings of the processing of anaphoric expressions, and linguistic presuppositionality contributions into one common model. The model is based on the premise that accessibility markers have contextual correlates and that this correlation is by no means arbitrary.

As will be demonstrated in chapters 3, 4, and 5, the hypothesis maintained in this thesis indicates a relation between accessibility and how it is marked. However, rather than the effect of distance, accessibility is assumed to be attained through inferences based on the association between the topical referents as arguments of the predications made within a world spoken of. Hence, a complementary relation between context and referential coding devices is expected to hold. The function of the linguistic coding devices is not limited to reflecting accessibility determined by distance; linguistic coding devices are used on the basis of optional structural and non-structural factors; an accountable hypothesis is:

referring expressions are used to complement context; in a sense that where inferences from context are not possible as for who or what is predicated of, the use of an explicit NP is essential; but the use of an explicit marker does not necessarily imply that the referent in question is unidentifiable. Full NP's are used if, when ellipted, the intended referent is either difficult or impossible to identify, i.e. full NP's are most often used to remove the difficulty involved in identifying referents. This view of anaphor resolution can easily account for how ambiguity in texts containing several topical and subtopical referents is resolved.

2.2.2 Topic Continuity (TC)

Givón (1983, 1989, 1990) introduces TC, known also as the traditional distance theory, dealing with the discourse factors that determine the choice of referring expressions in a macro-analysis of the topic. The discourse topic is the most recurring participant of the discourse, or in other words, the main protagonist of the narrative, and is marked according to the topic continuity principle leading to referential predictability. The major assumption of TC is that code quantity (phonological length) and linear order (syntactic case roles) are sensitive to the degree of predictability which is itself determined by referential distance, ambiguity and persistence. The two important ingredients of topic continuity, code quantity and linear order, are susceptible to the major features of topicality which are continuity and salience.

Phonological length is used as a criterion for classifying the continuity markers into groups of high, intermediate and low, the presumption is that predictability is inversely correlated with the phonological size. The sensitivity of code-quantity scale to thematic predictability is demonstrable by the use of TC markers and is reflected in grammars, e.g., in 10, the use of zero is not recommended because a shift from action to state in the sequence of actions makes an environment of action discontinuity, displaying how grammar correlates with thematic function. Given that *being dog tired* is not parallel with what took place in the preceding clauses, the use of zero is not preferred even when the stative clause occupies the chain medial or final position (10 b-c).

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a. He came into the room, (0) looked around, (0) went to the window, and (0) looked out. He was dog tired. (Givón 1988:220)
b. He came into the room, (0) looked around, (0) went to the window, (0) looked out, ??(0) was dog tired.
c. Jim came into the room, (0) looked around, ?? (0) was dog tired, (0) went to the window, he looked out, and he/0 could see people passing by.

The use of the term *topic continuity* is motivated by certain presumptions concerning Gestalt Psychology: what is consistent is foreseeable and what is foreseeable is simpler to process. The linear order of topical entities within a clause is controlled according to a psychological principle which dictates: "attend first to the most urgent task". When a topical referent is hard to process, due to long referential distance or potential ambiguity caused by the presence of other referents in the environment, the functional reordering control sends it to the initial position highlighting the least continuous. The underlying principle of the correlation between code-quantity and predictability is: the less accessible a referent is, the phonologically more linguistic material has to be used to code it. The cognitive principle corresponding to this is: "stronger more salient coding will yield a stronger effect in attending to and memorising the coded information" (Givón 1989:218).

According to Givón, there are three types of continuity in discourse namely: thematic continuity, action continuity, and topic continuity. A soccer match being played represents these three processes in progress. One type of continuity involves the referee, the players and the ball, constituting, in Givón's terms, the topics; another is the movements and the actual actions taken by different players continuously without any major break in time and in location. One can imagine two types of action shifts: major and minor; major action shifts may create digressions which can strongly alter attention allocation, e.g. when two participants start a fight, or a penalty is to be shot. Most actions form minor shifts, e.g. those represented by passes from one player to another. Action continuity is pertinent to the temporal sequentiality and is structurally marked. Tense, aspect, and modality in languages express the action continuity. The third and the most general process is the whole game going on which contains participants and actions with minor and major changes, the overall continuity which takes a certain period of time. The observer can distinguish the three separate processes and entities all happening in a coherent portion of time and location, through a set of similar actions, and by a set of more or less salient participants. There are four distinct types of coherence: time, location, action, and reference. Action and topic continuity are variables within the thematic paragraph which is a constant. The three types of continuity make an inclusion set: theme contains topics which contain actions.

Change of actions, time, locations and topics can bring about distinguishable breaks in continuity, but change of theme involves a change in the unity of discourse unit; how strong the break is depends on how different the two discourse files are, so using a pronoun in

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resumption to a temporarily closed file is possible if the break neither has lasted long nor has been created by a very different discourse theme. The thematic organisation is similar to overall semantic coherence which is demonstrable but hardly explainable on the linguistic level. Location and time coherence prepare conditions for the three types of continuity. These three continuities are the criteria for extending a micro organisation of language into a macro organisation. The topic is the "leitmotif" within the thematic paragraph, the participants most frequently recurring, the subject of most sentences within the thematic paragraph. In cognitive terms, continuity in topic, time, location, and action is correlated with mental accessibility and the mental effort required for accessing information and is connected to the cognitive search for the referent in "mental storage space" (Givón 1990:903).

The discourse context is a composite product of several factors; central among them are a) topic (referent) continuity, b) referential complexity, c) redundant clause-level semantic information from the predicate of the clause, and d) redundant thematic information from the preceding discourse. Factors c) and d) are considered as unmeasurable and are as a result ignored.[10] There are additional sources of definiteness, in addition to the above sources of shared knowledge, pertaining to any direct or indirect inference made as justifiable grounds for making assumptions about others' minds. These unconstrained sources of knowledge "form the context in which the speakers consider themselves entitled to use a definite description" (Givón 1989:207).

The methodology used in the measurements of continuity is a simple one. Distance is measured by counting the number of intervening clauses to the left. The minimal distance is 1 and the maximal distance is 20. Ambiguity is measured by counting the number of competing referents in the preceding 5 clauses to the left. Lack of competition in one to five clauses back receives the value 1, presence of one or more semantically compatible competitors within 1 to 5 clauses is assigned the value 2. Persistence is measured by counting the consecutive occurrences of the topic in question in subsequent discourse. The minimal value is zero and there is no limit to the maximal value. The referential distance measure can be

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[10] Allan (1987b) disagrees with any divisions between factors c and d pointing out "G[ivón] subdivides criterion c (the contextual probability that t is the topic) into the availability of semantic vs. thematic information; but the division is invalid because semantic information must be contextually and hence thematically determined, and because thematic information is, a priori, semantically determined" (p. 162). However reasonable in principle, Allan's explanation ignores the fact that predictability of a referent may be connected to what is predicated in the clause containing it (semantic meaning of the clause), when the meaning of the clauses preceding (thematic meaning) is not helpful for revealing the referent in question, i.e. the predicate of a clause per se can be a sufficient source for inferring the identity of the referent associated with it.

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used as a heuristic in classifying the referential devices in four distinct groups. "This grouping", Givón maintains, "is coherent within a cognitively based framework whereby topicality is taken to be a discrete process of attentional activation" (Givón 1990:911):

a) minimal gap devices: zero and unstressed pronoun, b) small gap-devices: stressed pronoun and Y-moved topics, c) gap-irrelevant devices: definite referents and restrictively modified definite referents, and d) long gap devices: left-dislocated definite referents and repeated definite referents.

Only the measurable factors (factors (a) and (b) mentioned above) drawn from inspired guesses, intuitions and insights gained from previous and less rigorous work are chosen for the study of TC. Givón claims the influence of extra-linguistic factors, (c) and (d) is not decisive in the hierarchical ordering of linguistic grammatical devices, but he acknowledges that there is always an imperfect correlation: "The syntactic coding of discourse function, which is the bulk of the functional correlates to syntax is imperfect but geared for a certain efficiency of processing, whereby the loss accruing in the cause of efficient processing is to a large extent offset by the omnipresence of the discourse context" (1983:17). Givón further points out:

Factors (c) and (d) create a certain degree of indeterminacy in the results, so that correlations between grammatical devices and particular measurements appear to be less than categorical. They are nevertheless dramatic, with residues that are important but not devastating. The role of semantic and thematic information in topic identification is going to remain an imponderable for a while together with the more elusive role of personality and memory of speakers and hearers, their specific life experience and the more subtle assumptions they make about each other and their respective abilities to identify referents specifically as well as in general. ...The role of the more easily measurable factors is in some sense decisive. (1983: 11)

Some cross-linguistic studies verifying the viability and feasibility of continuity were conducted, aiming at defining "in a preliminary but cross-linguistically stable fashion, the basic principles of iconicity underlying the syntactic coding of the topic identification domain" (Givón 1983:18). The cross-linguistic comparisons have aimed to uphold the underlying premise of TC: the predictability of a given topic is inversely correlated with the phonological size of the topic marker; and attenuation, word order, case roles, and salience marking are determined by discourse continuity concerns. Given the universal aspect of topic predictability, Allan (1987b), introduces a cross-language hierarchy based on the continuity clines pertaining to the languages analysed:

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Most Continuous/Accessible Topic
   zero anaphora
   unstressed or bound pronouns or grammatical agreement
   stressed, demonstrative, or independent pronouns
   R-dislocated DEF-NP's; VS in Ute; Y-moved NP's in Biblical. Hebrew; passive in Hausa,
      written English, and Chamorro
   neutral ordered DEF-NP's; PRO V in Ute
   L-dislocated DEF-NP's; SV in Chamorro; SV_{exist} in Latin American. Spanish; topic shift in
      Hausa; ?SVS in Ute
   cleft or focus constructions; DEF-NP with repetition in spoken English; -m marked
      resumptive topic in Amharic
   referential indefinite NP's; NP V in Ute; DEF followed by pause in spoken English
Most Discontinuous/Inaccessible Topic

Investigating Ute grammatical devices, Givón (1983:189), who does not deal with potential ambiguity, identifies three separate ranges of categorical grouping of continuity markers: a) the most continuous devices: zero-anaphora and grammatical agreement (clitic pronouns) with the highest percentage of SS (subject continuity), b) the middle range: VS-ordered NP's and independent pronouns with intermediate values of SS; c) the least continuous devices: SV-ordered NP's and independent pronouns and the minor SVS-NP category, with the lowest percentage of SS in the sample. His study reveals that a substantial percentage of high continuity markers (zero and agreement, VS-Pro and VS-NP) appear in paragraph medial or final position (88% to 100%) and are consequently of low persistence. On the other hand, the three most discontinuous categories (SV-NP, SV-PRO, and SVS) evince highest values for presence at major thematic break points (1983:190).

Brown (1983), who conducted a study on 1513 main, subordinate and relative clauses in fifty pages of an Ian Fleming novel, divides Full NP's in five categories: 1) definite article and NP, 2) demonstrative NP, 3) demonstrative alone, 4) name, and 5) noun appearing after possessives or genitives, e.g. John's *smile*. She finds that relative clauses, synonyms, hyponyms, and number create special cases in achieving the continuity measures which constitute a) look back, b) persistence, c) ambiguity, d) humanness of topics, e) frequency of clause types, and f) case role functions for 200 instances of various continuity markers. Indefinite devices are classified into two sub-categories: 1) indefinite referential and 2) existential/presentatives. Generic nouns are also included in the counts.

Unlike Givón's findings regarding the correlation between continuity and persistence in Ute and spoken English, in the studies conducted by Brown and Gasser, the topics with high continuity display high persistence. Apparently the authors differed in their definitions of persistence; and in the case of Amharic, the difference pertains to a language specific

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phenomenon, i.e. Amharic sentences display a sequence of subordinate clauses with the main clause occurring in the chain final position. Givón intends local persistence within thematic paragraph, while Brown treats the overall importance of topic throughout the story; in the sense that continuity as defined by Brown requires that a topic should be persistent throughout the story, but for Givón, continuity and persistence are inversely correlated.[11]

The present study, however, will introduce a global, rather than thematic, definition for salience, similar to the one introduced by Brown. But there is a difference between salience in this thesis with salience applied in TC. Topical referents gain salience through the frequency of their actions throughout an entire piece of story rather than mere frequency of mentions. Distance and salience influence the choice of anaphoric expressions, but such choice is made in compliance with how contextual information complements the retrievability of topical referents. The degree of difficulty for identifying referents is determined not only by distance and frequency of prior mentions, but also by how previous co-text indicates which topical characters are likely to be associated with which actions within a world spoken of. Chapter 5 shows how potential ambiguity is dealt with in actual texts. It will be demonstrated that there are conditions for salience; in certain environments in texts, repeated mentions of a referent may not lead to increased salience and ease in retrievability.

Brown reports that ambiguity is a less remarkable factor for human referents than non-humans and is maximal for indefinite NP's, the difference is explained through pragmatics, i.e. there are more non-human entities in almost any setting than there are humans. But this definition tends to ignore the attainment of salience through predications made of salient characters of discourse. She observes that the three measures of distance, persistence, and ambiguity each indicates a different hierarchy; and she suggests that the way the three factors

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[11] There are considerable differences in how languages mark the continuity of topics; such language specific differences are relegated to marked uses. Ute, for instance, has a much different system of continuity marking than that of English. The grammatical categories in which Ute marking devices are located include: a) subject, b) direct object, c) locative, and d) manner object slots. Subject marking devices were composed of 1) zero, 2) grammatical agreement, 3) independent pronouns used in the SV word order, and 4) independent pronouns used in the VS word order, 5) definite nouns in the VS word order, 6) definite nouns in the SV word order, 7) double occurring definite subject (SVS), and 8) referential-indefinite subjects. Objects are marked by such grammatical devices as 1) zero, 2) grammatical agreement, 3) independent pronouns, 4) full definite NP's in the OV word order, 5) double appearance of definite object NP's (OVO), and 6) indefinite nouns. The locative object markers were classified into four groups: 1) independent pronouns with locative suffix, 2) deictic locative objects, 3) full definite locative object nouns, and 4) indefinite full NP locative objects. Finally the manner objects/adverbs were those in the OV order. Obviously, this variety of topic marking makes Ute grammatical system very different from that of English.

influence referential choice and how they interact should be subject to further study. She also reported that unlike the measures of look back which could separate the three constructions of right-dislocation, left-dislocation and neutral word order, the measures of persistence and ambiguity did not reveal any significant effect on the three constructions. A different encounter with ambiguity makes Hinds' treatment different from Brown's. In his study of TC in Japanese, Hinds excludes indefinite NP's from ambiguity measurement, while Brown allocates the highest score to the effect of ambiguity of indefinite NP's. Givón does not measure ambiguity in his studies of spoken English and Ute. He only introduces a definition and a methodology for how ambiguity should be measured.

The major criticism about TC is that referential distance does not account for unusual referential choices across episode boundaries. The motor-behaviour psychological principle which prescribes: "expend only as much energy on a task as is required for its performance" applies in ideal circumstances. This by no means invalidates the continuity claim which is based on general probabilistic projections; however, the greater the exceptions, the less value can be attributed to the model.[12] Givón states that NP's modified by restrictive modifiers mark less predictable topics than unmodified NP's, since modification increases the phonological size of the NP. Given the criterion of phonological size, indefinite NP's have to be treated differently from all other full NP types, because they are not phonologically the longest expressions. Consequently, attributing the value of 20 to all types of full NP's when introducing a new referent into the discourse leaves the difference between types of full NP's unaccounted for. The claims made by TC pertain mainly to narrative genre; other genres may reveal different structural characteristics (Allan 1987b). Ambiguity is defined as the effect of the presence of other semantically compatible referents within the preceding five clauses. While ambiguity is extremely constrained in actual discourse, effective ambiguity created by the presence of one interfering referent can override the effect of recency and importance. Ambiguity is not measurable by considering the surface mentions of referents; the urgency of

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[12] For instance, English zero is often a stylistic choice and the frequency of its use depends on the writers' stylistic strategy (Clancy 1980). Referential ambiguity does not limit the frequency by which English ellipsis can be employed, while it affects other devices. Definite NP's display no categoricality as regards continuity; within clause coreferential pronouns are accounted for by binding conventions. And linear order in English which is a rigid word order language requires certain constructions; however, marked clausal order such as left and right-dislocation, clefting, etc. are not prevalent phenomena in English. Their correlation with continuity can hardly be completely displayed applying the continuity factors. To examine the continuity status of left and right dislocation in English, Givón investigates a spoken life story of a New Mexican man whose narrative is said to be broadly typical of the oral colloquial genre of American English. But the spoken narrative contained only four instances of R-dislocation and no instances of L-dislocation.

the use of nominal expressions may be variable depending on different contextual circumstances (see chapter 5 for a new account for ambiguity).

2.2.3 Accessibility Theory (AT)

Accessibility Theory (AT) (Ariel: 1985, 1988, 1990, 1991)[13] is a fresh approach to the effect of distance on accessibility of entities in discourse originating from the previous research on reference in terms of presuppositionality, context type theories, and psycholinguistic studies dealing with processing procedures for referring expressions (hereafter RE's).[14] Salient referents gain growing importance and their subsequent mentions must be viewed as anaphoric. The basic assumption is that mental representations are not equally accessible at various stages of the discourse and these representations are coded in language properly. This is why accessibility is a more comprehensive term than givenness and is a better replacement for presuppositionality. AT deals with accessibility signalled by the RE's actually used rather than by dealing with context; not only the discourse optional distributional possibilities regarding the use of RE's but also the formal grammatical options languages are allowed to use in referring to entities are claimed to be accountable by AT.

An analogy is assumed between three types of contextual sources, three types of referring expressions, and three types of memory storage. Three scales in three context types make a neat three-way division between the accessibility markers, connecting previous research findings to the accessibility theory. It is pragmatic being concerned with three types of context, is cognitive being concerned with three types of memory storage, and is linguistic for it introduces a three way division between accessibility markers (Table 1).

Table 1: The three way divisions in accessibility theory

Linguistic Marker	Context type	Type of memory involved
Low Accessibility	general knowledge	long term memory
Mid Accessibility	physical context	short term memory
High Accessibility	linguistic context	active, verbatim working memory

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[13] Ariel (1988) acknowledges that Givón's theory on topic continuity, although the theoretical standing he ascribes to accessibility is not defined, is in the spirit of AT theory. However, there are indeed aspects of AT which make it a more developed and distinct distance theory.

[14] Studies on the processing of anaphoric expressions (Clark and Sengul 1979, Sanford and Garrod 1981, Garrod and Sanford 1985) have mostly drawn conclusions through conducting psycholinguistic experiments in which the processing time is measured in relation with either distance or episodic boundaries. A major finding of these studies is: the time spent for the retrieval of referents of pronominal expressions increases as the distance between referent and the antecedent increases (see chapter 1).

Consonant with Relevance Theory (Sperber and Wilson 1986), Ariel suggests that speakers choose accessibility markers taking into consideration both maximal and optimal relevance (1990:3). As a consequence of relevance considerations, high accessibility markers that take less effort and make the least contextual extension are chosen for marking an accessible antecedent. The speaker presumably chooses adequate referring expressions to instruct the addressee to identify the intended discourse referents, i.e. RE's are keys to retrievals.

There are some factors that decide the degree of accessibility of a concept at a particular stage; and there are some criteria for relating particular accessibility degrees to particular linguistic devices. Consistently, there are two main questions: what are the accessibility factors and what universal criteria are used in marking accessibility? Four factors determine degrees of accessibility: distance, prominence, competition and unity, and three universal criteria are considered in classifying the RE's into groups of high, mid, and low: informativity, rigidity and attenuation (1991:444). Informativity relates to the degrees of semantic richness of RE's, attenuation refers to phonological length, and rigidity refers to how uniquely an expression can pick up its referent; rigidity is also related to properness of a referent, e.g. first and second person referents are maximally rigid, so does *Paris*, but not *city* because there are thousands of them; many more individuals are called by a common first name than are called by a common last name.[15] The lengthening of the expression in most cases adds to informativity, the phonological length, and also to the rigidity; but the manner in which the three interact is not clear.

Referential persistence and ambiguity are not measured as they are in topic continuity, but reference is made to relevant research on these issues. In her treatment of ambiguity, Ariel, like Givón and his associates, introduces a vague definition: "in ambiguous contexts, where more than one referent competes as the proper interpretation, a lower accessibility marker must be employed" (1988:83). Ambiguity is viewed as an unconstrained effect of other competing referents in discourse: "the more competitors there are, the less the specific antecedent intended by the speaker is uniquely accessible to the addressee" (1991:445). Regarding the salience of referents in discourse, the assumption is: memory

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[15] Nevertheless, attenuation and informativity cannot adequately be applied to indefinite NP's that are not the largest in terms of informativity and phonological length, although rigidity can be applicable. Still, one may postulate that indefinite NP's should be excluded from discourse continuity accounts.

scope is crucially related to textual units. Among 60 paragraphs reported on, in 53 the first sentence subject was the discourse topic; out of these 53 topical referents occurring in the paragraph initial position, 75.5% were found to be full NP's. It is not mentioned how the measurements of distance and unity have been done independent of the effect of ambiguity.

The accessibility markers are the components of a complex system, a simplification of which is the three-way divisions between high, mid and low in correlation with the mental statuses of the referential concepts.

Low Accessibility	High Accessibility

Long Term Memory

long full NP ---------------- General Knowledge---- short full NP

long demonstrative NP --- Situation Knowledge--- demonstrative alone

stressed pronoun ---------- Linguistic Context ------ellipsis

Short Term Memory
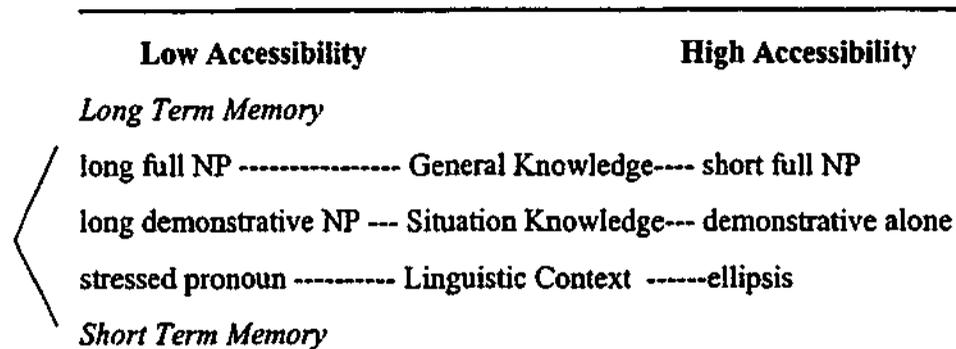
Ariel (1988) substantiated discourse accessibility claims by examining four pieces of fictional discourse each consisting of 2200 words. The data of a more recent study (1991) consisted of fiction, short news items, editorials and popularised academic articles. RE's (pronouns, demonstratives, and definite descriptions) as independent variables by text position of previous mention (same sentence, previous sentence, same paragraph, across paragraphs) as dependent variables were the factors of a comparison. Names and definite descriptions were compared in first versus subsequent retrievals: expression type (definite description and full names) by position in context (first mention versus subsequent mentions) were the factors of a 2 X 2 design. A similar comparison was made for short definite descriptions (one or two words long) versus long definite descriptions (more than two words long): expression type (short vs long definite description) by context position (first mention vs subsequent mentions) made a 2 X 2 design. The frequency of name types (full, last and first names) used in initial retrievals was also measured to reveal the effect of accessibility on the choice of name types.

The significance of the role of referential distance in non-initial retrievals was shown in another comparison (1991) where context position (same sentence, previous sentence, same paragraph, across paragraph) and expression type (pronoun, demonstrative, definite

description) (a 4 X 3 design) were contrasted. The same comparison was made with the non-topic referents to highlight the interfering effect of referential salience on referential distance. Once the factor of topicality is neutralised, the distance results are more revealing. In another but similar comparison, text position (same sentence, previous sentence, same paragraph, and across paragraph) was taken as an independent variable, and expression type (pronoun, demonstrative, and definite description) was taken as a dependent variable. Two articles and the opening section of a short story were used as data for investigating the distribution of different low accessibility markers. In order to show full names are lower accessibility markers than definite descriptions, a comparison was made between definite descriptions and full proper names (first and last names) both being low accessibility markers as independent variables and text position (location of the next mention in the same sentence, next sentence, later in same paragraph, and across paragraphs) as the dependent variables which formed a 2 X 4 design. The comparison of the percentage of full names with last and first names in first retrievals used text position (same sentence, next sentence, later in same paragraph, across paragraphs) by expression type (first names, last names, and full names). The result of the comparisons corroborated the accessibility hierarchy (1988:84):

> Joan Smith, the president > Joan Smith > The president > Smith > Joan > That/this hat we bought last year > That hat > This hat > That > This > SHE [stressed] > she > herself > Ø

Another similar hierarchy was introduced based on distributional findings drawn from other cross-linguistic studies (1991):

> *Lowest Accessibility* = Full name + Modifier > Full Name > Long Definite Description > Short Definite Description > Last Name > First Name > Distal Demonstrative (+ Modifier) > Proximal Demonstrative (+ Modifier) > Stressed Pronoun + Gesture > Stressed Pronoun > Unstressed Pronoun > Ø = *Highest Accessibility*

Suggesting that referring expressions can be used both deictically and anaphorically, Ariel argues that any division made between exophoric and endophoric expressions fails, i.e. it is the accessibility degree of a referent which determines the form of referring expression chosen. The expressions such as: (Ø) *Open* (Ø) *with care*[16] evidence the use of zero for a maximally accessible non-anaphoric referent. The two reference types remain always

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[16] "Strictly speaking, the subject of 'open' is a non-referring expression, i.e. it lacks extension" (Allan p.c.). But given that we read the sentence on a thing, the focus attracted to the entity the expression is used to refer to and the shared world knowledge both warrant that almost 100% the zero marking picks up the intended referent.

distinct, although RE's may be used to refer to both deictic and anaphoric referents according to the degree of accessibility of the referents in question. But anaphoric referents of a discourse which create potential ambiguity do not compete with the deictic referents, i.e. ambiguity is possible only for competing anaphoric referents, e.g. no ambiguity is assumed for first and second person referents that are always accessible in all contexts (Allan 1986, chapter 7, Chafe 1976, 1987).

The main criticism to accessibility theory is that so long as there are contexts in which shorter and longer referring expressions can be used interchangeably, the distinction between mid and low accessibility markers is somehow undermined. The accessibility status is universal, but the accessibility marking is a pragmatic tendency; the use of *that* in the example below can be stylistically variable (example 11):

11
a. That holiday we spent in Cyprus was really something.
b. The holiday in Cyprus was really something.

There are some minor draw backs which are to AT's disadvantage. In initial retrievals, the use of proper names is preferred to the use of a demonstrative expression, and a demonstrative expression is preferred to a pronoun. In the following examples (12 and 13), (b) sentences are preferred to (a) sentences:

"When a) and b) in [12] and [13] refer to the same world object and the speaker is in a position to utter the (b) sentences, these are indeed the preferred forms. [12] shows that first introductions of given discourse entities by proper names are preferred to the use of a demonstrative expression, and [13] shows that a demonstrative expression is better than a pronoun" (1988:68).

 (## first mention)
12
a.##? That woman over there is very intelligent.
b.## Rachel is very intelligent.

13
a.##? There is this woman I know. She is very intelligent.
b.## That woman over there is very intelligent.

The use of the above examples seems to be problematical, or else it is not made clear what is precisely indicated by 'initial retrievals of the same world objects'; they tend to be appropriate in four hardly comparable environments for retrieving entities in first introduction, each signalling a specific presupposition which is determined not only by the referring expression per se, but also by the context within which its referent is mentioned.

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Why Ariel has contrasted (a) and (b) versions without considering context is not clear; the two are used to retrieve the same world entity in different contextual circumstances.

If in 12 (a) the speaker is pointing to *the woman standing there*, the cooperative principle (or relevance) demands that the needs of the addressee who doesn't know *that woman* be met; then 12b would be less appropriate. Evidently in order to talk about a person whom the interlocutors know, 12b is preferred to 12a, and in 13, the speaker is pointing to a person in situation for whom 13b is appropriate. Likewise, (13a) is preferred to mark the same world entity if, according to the speaker's estimation, the knowledge of the identity of the referent is not mutually shared and the referent introduced has cataphoric salience. (13b) is used to refer to the same world entity provided the speaker believes the addressee is viewing the character in question and also doesn't know her name. In other words, each of the versions used presupposes a different level of addressee's shared knowledge.

Uttering *that woman over there is coming* is connecting discourse to situational context, the same situation holds using a name, e.g. *Rachel is coming*. The question is how the referent of *Rachel* who is situationally salient can be inaccessible. Given that an accessibility marker can be used for both mid and low accessibility, a more reliable criterion to judge the degree of accessibility is context.

Intuitive criteria via examples are taken as the supporting evidence for sentence accessibility claim which is exemplified in examples where stressed pronouns, as opposed to unstressed pronouns, signal to the addressee that the unmarked coreference interpretation reserved for zero and unstressed pronoun should be rejected (examples 14 and 15).

14
a) Jane kissed *Mary* and then *SHE* kissed Harry.
b) *Jane* kissed Mary and then Harry kissed *HER*.

15
a) *Jane* kissed Mary and then *she* kissed Harry.
b) Jane kissed *Mary* and then Harry kissed *her*.

Example 16, translated from Hebrew, is intended to demonstrate the sentence level accessibility; what definition of accessibility is intended is not clear, if it is the degree of identifiability, the first person referent is always identifiable, i.e. the effect of distance and

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ambiguity does not determine the accessibility of a first person referent. Furthermore, 16, which is a discourse extract, is used to illustrate sentence accessibility.

16
a. I(ani)think...I'(an') will print it on Monday, I'(an') don't know... [change of discourse topic]:
I (ani) think that may be I(ani) will-have to go to London on Monday.

I (ani)= full pronoun
I' (an')= cliticized pronoun

Like Clancy (1980) who argues for stylistic strategies and Fox (1987) who classified non-structural anaphora, Ariel discusses in detail how socio-cultural factors can create unpredictability or exceptions that are labelled as marked cases. Other than socio-linguistic influences resulting in markedness, differences between grammars that are not consistent with accessibility are categorised as marked cases. English and Chinese, which is an elliptical language, allow extra-textual zero under the same circumstances, except that in English zero is grammatically marked, e.g. *Careful! (0) Contains Methanol*. However, a substantial increase in the proportion of the marked cases will inevitably lead to a decrease in the validity of the functional claims. This is why functional theories such as TC and AT must limit claims to prototypical linguistic behaviour.[17]

To test the model's feasibility in describing anaphoric arrangement of differing genres of discourse (academic book review, science fiction novel, informal conversation, and current affair interview) Toole (1992) applied her own methodology to examine the correlation between accessibility and how the status is marked. Excluding deictics from analysis, she classified anaphoric expressions into a set of 12 hierarchically ordered types: 1) zero 2) reflexive, 3) pronominal, 4) demonstrative, 5) demonstrative NP, 6) proform, 7) first name, 8) last name, 9) short definite NP, 10) long definite NP, 11) full name, and 12) indefinite NP. The highest accessibility marking is valued +6 and the lowest value given to the scale is -2. Low accessibility markers in this scale receive the value of -2 to 0, mid accessibility markers receive a value of 1 to 3, and high accessibility markers receive a value of 4 to 6; so there are 12 NP types and 9 levels of accessibility ratings. Thus, NP 8 to NP 12 receive the rating -2 to zero; NP 4 to NP 7 receive the ratings +1 to +3; and NP 1 to NP 3 is given

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[17] The fact that zero in Chinese is the unmarked choice and that languages with no special definiteness marker have more use for demonstrative pronouns, Italian rich agreement, five types of pronominal forms in Hebrew, use of both agreement and obligatory pronominal subjects in French, and English unmarked pronominal subjects, etc, require ad hoc explanations, e.g. Binding is in trouble as logophoric pronouns are used beyond the c-command domain; this should ideally not weaken accessibility theory's presumption about sentence accessibility.

+4 to +6; the three representing three levels of accessibility. The following tables (2, 3, and 4) illustrate the methods of the measurement:

Table 2: Measurement System Of Distance/Unity.

distance between (A)ntecedent & (P)ronoun	No of intervening propositions	No of episode boundaries crossed	Accessibility value allocated
1. Antecedent to Pronoun	0	0	+4
2. A P	1	0	+3
3. A P	2	0	+2
4. A P	2	1	+1
5. A P	3 or more	1 or more	0
6. A P	3 or more	2 or more	0

Table 3: Measurement Of Competition.

ambiguity created between Referent-Antecedent	competitors with the same person, gender, and num.	Acc. value	degree of Acc.
1. (R)eferent---(A)ntecedent	0	0	high
2. R-------------A	1	-1	
3. R-------------A	2 or more	-2	low

Table 4. Topicality: Number Of Repetitions Within 3 Propositions Back

salience/topicality	No. of repetition of NP within 4 props back.	value given	low vs high
1.	0	0	- salient
2.	1 or 2	+1	
3.	3 or more	+2	+ salient

This section presented two major functional studies dealing with the cognitive constraints of referential distance, ambiguity, and salience. The focus framework discards the distance approach and assumes that a topical referent in subsequent retrievals is attenuated while it remains in focus, the boundary for which is an episode. The next section will deal with focus approaches, which constitute a major line of research on discourse coreference. The review of accessibility theory was intended to show that, although the accessibility of an entity is determined by one or more of three context types, the factors accounting for accessibility cannot deal with unusual choices of the referring expressions in texts. This study maintains that context and referring expressions represent a complementary relation in which a stylistically flexible referential pattern is permissible; what is achieved in this coordination is a balance between referential predictability in relation to the informativity of context. The major problem is that without considering linguistic context effectively, an account lacks the desirable precision.

2.3 The Focus Approach to Discourse Anaphora

2.3.0 Introduction

The choice of referring expressions appears to be very much a function of episodic boundaries rather than the effect of distance. Referential distance fails to account for the significant role of episode boundaries, ignoring a large number of unusual referential choices. Proponents of the recency model concede that there are a great many potential counter-examples but suggest no systematic explanation for them (Tomlin 1987). Distance theories can not selectively predict nominal cases in subsequent retrievals as a structure-based theory can. Fox (1987) pointed out that the distance model predicts more pronominalisation than is actually displayed by the expository texts.

TC captures some important generalisations about languages and groups of speakers. But it does not account for the full range of use exhibited by individuals engaged in a discourse production or comprehension task. The model accounts for the range of referential choices of groups of subjects in an overall simplistic way. As long as an object is in focus, distance does not greatly influence the choice of a referring expression. "When the resolution of definite references is considered from the perspective of focus, questions like how far back in a discourse to look for a referent are no longer relevant. Instead, the problem is how long an item stays in focus and what can cause a shift in focus" (Reichman 1978:6). Reichman demonstrated explicitly that the choice of a pronominal reference is not limited to distance; such choice is exclusively limited to the structural organisation of conversation. These have been the grounds that motivated a departure from the distance approach by some theorists who consider the effect of focus, discourse organisational structure, and the role of episode shifts.

2.3.0.1 Paragraph Segmentation

The advantage of an episode approach is its sensitivity to text-specific variation in referential distance. It is correlated with the psychological constraints of the limited capacity of working memory and with allocation of attention in activation changes. The focus studies on anaphora share a common assumption: that a shift in topic, paragraph, episode, context space, mental space, focus space, scene, time, or place triggers deactivation of the already activated concepts and the activation of new concepts: i.e. change of focus from one character to another. This process is a cognitively costly task. An episode model explains reference

patterns of individuals as well as groups; but there is a limitation in this approach: referents that are the focus of attention maintain their status within limited boundaries. There seems to be no way for accounting the global salience of topical entities throughout an entire discourse. Moreover, the episode approach faces the difficulty of giving us an explicit and structure independent means of identifying episode boundaries. It is acknowledged that the characteristics of episode are weakly defined and are resistant to empirical ʿnalysis. The practical identification of such notions as paragraph, episode, and focus space in actual text data rests on 'relativistic thematic notions of relevance and salience' which are vague (Tomlin 1987). A flexible definition of paragraph embodies notions such as attention disruption, scene changes, action, character, and time shifts, and finally any digression from the straight line of the story. We begin this section by first presenting the various views on paragraphs as units of discourse to shed some light on the issue of paragraph and highlight the difficulties of definition.

Levinson (1978) found the structurally defined notion of paragraph essential to describing the usage of pronouns. The logical structure of a discourse can adequately be represented by a tree structure, one or more points dominated by a common node (the topic). Van Dijk (1977) and van Dijk and Kintsch (1978) have used what is called "macro-structures", similar to what have been called topic sentences, to represent the content of a paragraph. The paragraph rules mark sequences which somehow belong together, i.e. which belong to the same topic. A new paragraph thus indicates "(sub)-topic change" (van Dijk, 1977:152). Hinds (1977) defines paragraph as a segment with a single topic. He demonstrated that paragraph structure affects the occurrence of referring expressions in discourse. Within a paragraph, there is a single peak sentence which carries the most important information in that unit, called the topic of the paragraph. Under unmarked conditions, the peak sentence of a paragraph is the first or the last sentence in the sequence of sentences which comprise a paragraph. Other sentences in the same segment are semantically subordinate to the peak sentence. According to Hinds, paragraphs are made up of segments which are closely connected strings of sentences that develop the paragraph topic. Full noun phrases occur in peak sentences while pronouns occur in non-peak sentences. Nevertheless, instances of the use of full NP's in non-peak sentences are found in actual discourses.

Givón (1983) classifies breaks into two types: A major discontinuity break occurs where a change to a new location, a new time, or a new participant happens and where a new sequence is started. The break of action occurs, a new sequence of action starts, and

resumption is not made after the interruption. The second type of break is paragraph medial interjections. The short interjection temporarily breaks the sequential action within thematic paragraph, but after the short break of sequential action, resumption is made to the current action. So, a subject marking device can have either of two positions in the paragraph. It either occurs in a clause starting a break or in a clause occurring elsewhere. The break in action is expected to be marked by a switch to a full NP.

The episodic changes are the occasions on which new items of information are brought into activation and the already activated items are suppressed. Within episodes, propositions act as minimal units used for forming a coherent discourse structure. In general, studies of episodes consider the proposition as a minimal discourse unit, defined as a semantic unit composed of a predicate plus its argument(s) for which a truth value can be determined, thus representing a basic unit of memory in human cognition. The consensus is that embedded complement clauses are arguments of the matrix clause they are embedded in and infinitives and participials in adjunct relations in sentences are propositions; the only exceptions are nominalisation and other complex phrasal constructions. Propositions are the building blocks of episodes which form a hierarchical structure within which patterns of anaphoric reference are determined and measurements are carried out.

Paragraph segmentation[18] is viewed as a cognitively recognised segmentation type. In oral production, paragraphs are marked by longer pauses, and by the hearer's backchanneling. According to Clancy (1980), episode changes are realised in terms of the changes of scene, action, time interval, or participants; therefore, paragraphs are places of major change in speaker's peripheral consciousness. Configurations of active state change from clause to clause, but configuration of semi-active concepts changes at the more widely spaced episode points (Chafe 1987).

In a number of approaches, the episode boundaries do not have basis in the clear plan of the story. Unlike Tomlin (1987) and Hoffman (1989) who believe paragraphs are independent of the logical schematic structure of narratives, Van Dijk (1977), Van Dijk and Kintsch (1978), Levinson (1978), and Hinds (1977) maintain that a paragraph is defined

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[18] According to Chafe, sentences behave under rhetorical control and are more independent of cognitive constraints (Chafe 1987:46). Variability in length of sentences indicates that they are rhetorical units rather than cognitive units (Chafe 1980).

conceptually as a semantic unit in discourse organisation consisting of a set of related propositions governed by a macro-proposition or paragraph level theme.

Chafe (1987) concludes that shifts in paragraph segmentation are dictated by the story schema that guides the speech signal, and in the recognition of major breaks in context. A change in actors, in the relative importance of the actors, change of time or location, changes from one event to another say, from a theft to an accident, or from one plan to another, contribute to change of discourse units (see also Pohl 1982). World shifts or digressions, where the speaker steps out of the story to make a comment, are especially pronounced boundaries. All of these boundaries are important to speakers and recognised by the addressees. Chafe (1979) had readers mark episode boundaries on a typescript version of a spoken story, edited to omit pauses. Individuals' judgements varied in their agreement on boundaries. But the more judges that agreed on a boundary, the longer the original speaker had paused in that point in the story. Chafe argues that the changes in time, space, and participants require speakers to reorient themselves; this reorientation takes planning and gives rise to the pauses (1980). The changes are linguistically marked as well, so that addressees can recognise them and act on them. The effect of the boundary depends on the prominence of the character. A theme or macro-proposition, sustained and elaborated upon as long as attention is focussed on it, controls the episode. The episode boundaries are seen as a speaker-based re-orientation of attention.

Tomlin (1987), in contrast, believes episode boundaries are identified explicitly and independently of linguistic information. Acknowledging that the argument for attention-driven episodic units remains incomplete for the time being, Tomlin suggests that it is easier to opt for an attention-based model rather than a schema-based one. He takes episode boundaries as shifts in attention allocation that are possibly manipulated independently of text structure. "It represents sustained attentional effort devoted to the macro-proposition and endures until attention is diverted" (Tomlin 1987:460). Episode boundaries are identified as major disruptions in the flow of the non-linguistic visual material perceived by subjects. In an experimental task involving the narrating of a story visually presented, attention allocation is manipulated experimentally. Finishing the description of one picture and starting a new one means attention shift, no matter the character is the same character mentioned last in the previous picture. Episodes are defined ultimately by the supporting of attention on a particular paragraph level theme, "a pragmatic instantiation of a rhetorical act."

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Hoffman uses the analogy of a blackboard that gets covered by writing, which is then erased and the process starts over. Since the context of a paragraph is kept in a storage area of a limited size, long paragraphs tend to be confusing, short paragraphs tend to be boring and unnatural, but occasionally communicate more forcefully; and very short paragraphs appear to be better for a younger audience than for adults. Consistent with Fox, who differentiated paragraph structure from rhetorical structure, Hoffman believes the logical organisation of a paragraph is seldom representative of the paragraph size. All support the hypothesis that the content of a paragraph is held in temporary storage. It is the blackboard that we fill up and then erase, or else erase when only some of it has been written on. But the logical structure has to be a clearly specified structure. The reader decides what parts of the paragraph to save into the long term memory, and this will motivate one to figure out what information is central and what is less important to the communication in the text; i.e. only an outline of the text which exclusively contains the pivotal information can last in permanent memory. The paragraph reflects a restriction on quantity of information and paragraphing indicators help make understanding easier by chunking information. But the question is, how constrained is the mental storage, and how are understanding and retention achieved? Is it an outline of the main ideas or is it a homogeneous linear organisation of sequentially presented information? How large can Hoffman's blackboard be; in other words, how big a paragraph can be?

Given the facts as they are, since alternate paragraphings are sometimes possible, an absolute defining choice appears impossible. While everyone seems to know paragraphs on sight and using them in writing, there is a great deal of variability among individuals' paragraphs; hardly ever do two people have exactly the same criteria for paragraph segmentation; so differences are rife. Writers note that there is sometimes more than one location to break between paragraphs. On the other hand, there are particular locations where a division into two paragraphs is wrong.

Fox (1987), who applied two discourse structural models to analyse English expository texts and English conversations, considers information as being either central or peripheral with respect to the interlocutors' intent and understanding. The structured conversational units are either open or closed; if interrupted, such units should not be considered completely closed, resumption is made after digression ends. English expository texts are structured into rhetorical units[19] within which propositions carry core or ancillary meaning. The rhetorical

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[19] Discourse is composed of R-units which are propositions structured according to centrality and peripherality of information carried by them.

units which form discourse structures are analysed based on judgements made regarding how meaning is organised into core and adjuncts based on semantic criteria.

Fox believes it would not be correct to expect that in expository writing all paragraphs begin with full NP's and are consistent with rhetorical units, although rhetorical breaks are often indicated in expository texts by paragraph breaks, the relation doesn't necessarily hold. Paragraphs represent a type of rhetorical unit, but they are not the central units influencing anaphoric choice. R-units join together to make larger discourse units; in this sense, a whole book must have a structure made from R-units which maintain some limited types of relations.

The above discussion of the various views about episodes leaves the topic without any solution; however, the consensus is that there are cognitively based units larger than sentences which display boundaries for the operation of episodic memory. In what follows, we survey the attempts to account for anaphor resolution within episodes.

2.3.1 Episodes As Constraints On Anaphoric Choice

Within linguistics, a structural discourse approach to anaphor resolution has been taken by many researchers, cf. Clancy 1980, Tomlin 1987, Tomlin & Pu 1990, Hoffman 1989, Grimes 1975, Hinds 1977, 1979, Yule 1981, Anderson et al, 1983, and Marslen Wilson et al 1982. The consensus is that individuals employ a full NP to reinstate reference across episode boundaries, and a pronoun to maintain reference within a particular episode.

> 17
> *Jenny* found the film rather boring. *The projectionist* had to keep changing the reels. It was supposed to be a silent classic. Ten minutes/Seven hours later .....

Anderson, Garrod, and Sanford (1983) constructed brief stories like 17, and asked subjects for continuations. Since the time shift in the sequence of actions creates discontinuity, the presence of a boundary was manipulated by changing the time shift from continuation after either short or long intervals. The presence of a boundary is manipulated by changing the time shift: ten minutes means that all the characters should still be in the movie theatre where the same scenario creates continuity; while seven hours ends the movie scenario and so creates a boundary. The story continues up to a point and then the subject is introduced to the phrase: *after ten minutes*, and then continues the story: *Jenny/she* or the *Projectionist*

.... The "scenario-dependent" character, *the projectionist*, tends not to be mentioned or pronominalised after the large time shift. But the main (scenario-independent) character, *Jenny*, is mentioned and pronominalised in the continuation of the story when there is a long time shift; pronominalised even more often than when the time shift is short and the scenario has not been closed off. By closing off the scenario, the large time shift has made it even more probable that the story will continue with *Jenny* (example 17).

The shift from inexplicit to explicit referential forms in episode boundaries displays the speaker's mental processes of activation; it also reflects a listener-oriented strategy employed as a discourse device to indicate the structural boundaries to the addressee. Chafe (1979) considers a digression from the main plot as an extremely strong form of episodic boundary. Clancy (1980) raises the possibility (see also Chafe 1980) that speakers use nouns not only for their addressees' benefit, but also because of the demands of speech production. Retrieving a new episode may divert the speaker's attention from currently active referents.

Given the significance of the rhetorical organisation of meaning into information units of various sizes ranging from the size of a clause to episode, the choice of referential forms within these units is a manifestation of the cognitive significance of such units; referential choice serves as a marker of these units for the hearer. Since marking boundaries are optional tendencies at work, it is impossible to estimate at what point nominal reference becomes obligatory. Example 18, in which a digression from the direct line of story causes the speaker's disruption of attention, illustrates the effect of episode boundaries in triggering a nominal choice.

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um--...g *a kid* comes by on a bicycle, ...*he* stops, ...*he* gets off his bike, ...um--...the movie was in colour. ...And the movie had a sound track. ...It's important. And then the mo the whole movie started with a cock crowing. ...And then you see-. Anyway. I just remembered that. ...Anyway, so um--...*the kid on the bicycle*, ..gets off the bicycle, (Clancy 1980)

Viewing comprehension as a rather different set of strategies from production, Tomlin (1987) hypothesises that the syntax of reference in discourse production is tied directly to psychological processes of attention as reflected in the episode organisation of natural discourse data. The alternative use of nominal/pronominal choice represents attention allocation in a sense that when attention is disrupted, the speaker reinstates reference with a full NP no matter how few clauses intervene between subsequent references.

The data were a set of four groups of narratives that were produced about two stories visually presented to the subjects through a series of slides and a video cartoon. Attention shift was weakly demonstrated in the video data by video cuts and scene changes while strongly manipulated by independent control in the slide exposure, i.e. in the slide data, the episode boundaries were experimentally manipulated, but in the video data episodic boundaries had to be recognised by subjects. The slide sequence contained scenes in which a larger character (a crab) eats a smaller character (a fish).

20 slide pictures are presented in three ways to groups of 10 subjects who are allowed to self-pace through the narrative production task. In this data type, episode boundaries were triggered by attention shifts caused by the perceptual disruption on the slide projector shutter release cycle. The condition, in which single slides were shown one after another, prompted subjects to recognise 20 episodes. The condition, in which pairs of two slides (e.g. either 1&2, 3&4, 5&6, etc, or 1, 2&3, 4&5, 6&7, etc) were presented, prompted subjects to recognise 10 episodes. Through these alternative ways, three groups of data were elicited. In the single condition, subjects produced twice as much discourse as did subjects in double conditions. The second set of data were elicited from ten subjects who described an on line 108 second short animated video-taped cartoon. Eight major episodes were the break points or disruptions in the flow of visual material. The boundaries were operationalized through video cuts at major shifts in scenes. The episode boundaries were not represented as clearly as in the experimental data elicited through using slides. The referential choices were consistent with the hypothesis of episode/paragraph boundary (about 84% of the time). A distance view predicts the same mean referential distance in both the experimental data and the video data while significant difference in the average referential distance was found between the two data types. Exactly the same investigation was conducted by Tomlin and Pu (1991) on Chinese which revealed the same results.

According to Tomlin (1987), an adequate experimental study of the syntax of reference should meet such requirements as: comparability and sufficiency of data, a definable view of episodes, providing data representing the comparable production of individuals within groups, and filtering out the effect of ambiguity. However, ambiguity appears to have been a problem: the sample narrative in 19 below reveals a fairly ambiguous referential pattern. The underlined *he*'s are ambiguous; the referent resolution within the episodes seems to rely heavily on non-textual context shared only between the narrator and the addressee; as though

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the narrator had either assumed some certain familiarity of the interviewer, or the narrator may have tried to direct the addressee's attention to characters that were being sighted. It is not entirely the effect of the stories' episodic structure that has prompted subjects to use pronouns in ambiguous environments.

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On-line description elicited with the cartoon videotape:

Okay, there's a fish in the ocean. It's a cartoon. And up comes a crab and tries to get it with its pinchers and *it* seems to be avoiding *it* and now *it* disappears. Okay, the crab's looking around and he sees a snail or something walking on the ocean floor. *He* spots *it*. *He* blinks his eyes. *He* looks at *it* crawling along kind of in a weird fashion, okay. Okay, *he*'s been spotted now, the fish that's being chased. Okay, *he* keeps walking. Okay, *he* goes out of the shell so *he*'s uh lost *his* uh shell, so then here comes the crab. Crawls down from the rock. Okay, *he* lifts his hat up or his shell up to the fish. Okay, tries to get him with his pinchers. Okay, unsuccessful.

Close examination of this brief story reveals that several of the reduced forms used should have been full NP's without which anaphor resolution is hardly accomplishable unless extra attention is paid to the predicates. 19 begins by first introducing *a fish* and *a crab* who tries to get it. The only minor character of this story is the *snail* who plays a brief part creating a temporary disruption in the line of events through performing some actions, after which resumption is made to the major line of the story: the chase. The story's most salient character is *the crab* in relation to whom *the fish* is mentioned. The fish gains its salience through being associated with the events involving interactions with the crab. We will argue in this thesis that the identifiability of the characters is related to what is predicated of them. Upon mentioning *a crab comes to try to get it (the fish)*, the reader is expected to make a projection of what is about to happen in a series of more or less predictable actions. From this stage on, a set of predicates will be associated with one, two, or all the characters of the story. The result of such association is to create variable degrees of difficulty in identifying the attenuated referents. The degrees of difficulty in identification is assumed to be related to the type of the formal expressions chosen.

Since in this particular story there are certain actions that do not reveal which of the referents they are associated with, resolving coreference is more difficult without using full NP's than in contexts where such association is helpful. Topicality of *the crab*, that is the subject of most clauses as opposed to the *fish* that is the subject of fewer clauses conveying major actions (cf. *avoids, disappears,* and *is spotted*) and the *snail* that is never mentioned as the subject of any clauses, makes it the only occupant of the subject slots of the sequence of clauses.

Our thrust is, as will be demonstrated in later parts of this thesis, that where only one character is associated with a number of predicates, ambiguity is removed; the stronger the association, the easier is anaphor resolution. If there is more than one character identified as either agent or patient of a certain action, resolution depends on other inferencing procedures or alternatively on the use of a full NP. In this view, there are variable degrees of plausibility for the three-member list of referents of this discourse. Equal plausibility, where there is more than one candidate in the list of referents, leads to effective ambiguity that should be neutralised either through using a full NP or the salience of subjecthood.

Predicates such as *avoiding, being spotted, being chased, disappearing, tries to get, unsuccessful* reveal, to varying degrees, the identity of *the fish* along with *the crab*; while some verbs such as *comes, looking around, see, walking, blinks, crawling, spotting* and *being spotted* do not equally strongly distinguish the plausibility of the three characters, for none of these verbs can be uniquely associated with one character. It is because the plot of the story is such that both the chaser and the chased can be associated with these acts. Evidently then, some of the actions are frame dependent and some are universally distinctive within the world spoken of. When one character is described as chasing, it is inferable that some other character is chased; and inferences such as this are not limited to any specific frames. But there may be instances in which some actions are associated with certain referents within a particular discourse file; e.g. only in this story, a fish is being chased, there may be other imaginable worlds where a big fish chases a crab. It is not easy to claim what proportion of inferences are dependent on a semantic network of shared knowledge and what proportion is dependent on the attributes of the particular world spoken of, i.e. how many of the inferences are scenario dependent. Spotting, for instance, does not identify the fish from snail; it is neither frame dependent nor universally distinctive, i.e. both the chaser and the chased can do the spotting in this world and in all possible worlds.

Normally, we should expect the actions to be inferentially linked to one another too; this vertical linkage additionally helps the projections made about who is expected to do what in a beginning-end view of the story (see chapter 5). The one who avoids is the one who is being chased and is fairly likely to be the one who is being spotted and disappears. However, since the action of spotting has been associated with both *snail* and *fish* as stimuli, in this particular frame it is not distinctive. Likewise, the one who *tries to get, chases, looks around, spots, looks at,* and *is unsuccessful.* The semantic link among predicates evoking the world spoken

of helps establishing a frame within which certain inferences are possible. This view will be elaborated in chapter 5.

In showing that paragraphs are connected to anaphora, Hoffman (1989) restricted his investigation to pronominal anaphora, leaving other anaphoric types such as verb phrase ellipsis, *do so* anaphora, noun deletion after a demonstrative, *one* replacement, demonstratives, and deictic pronouns for other studies. He maintains that, under certain conditions, an anaphoric relation is likely to be blocked across paragraphs. Provided that a pronoun is adequate in its context to select a unique referent, its use is preferred if not obligatory. The use of a long nominal expression when a pronoun is sufficient either must be for some specific intent or is likely to be considered intolerably uncooperative; it may lead the reader to look for some antecedent other than the closest matching possibility; or it may be taken as a marker of a new discourse unit. In a long paragraph, maintenance of activation is vital specially in establishing the link between a nominal at the beginning and the coreferring anaphoric item occurring at the end. The receiver's mind gets filled up writing on it; the speaker can point to something using *it*, *that*, or *this*. After erasing, it is not as simple to refer to the already mentioned material through using reduced expressions. The speaker indicates to the hearer that s/he wants to erase the blackboard and start something new so that the hearer saves what s/he wants in longer term memory.

The reduced anaphoric expressions rarely ever reach across paragraph boundaries. Three conditions are mentioned for pronouns that manage to reach into a previous paragraph for an antecedent, crossing over several other pronominalised competing referents. First, they occur in the first or second sentence of a paragraph, second, they do not have any potential competitor in that paragraph, and third, their antecedents have been the topical entity of the previous paragraphs. Such pronouns act like bridges between the paragraphs and couple discourse units into a larger functional unit. It seems likely that these bridging pronouns serve to deemphasize the paragraph break in expository writing, making a sort of incomplete paragraph break. In narratives, pronouns appear to provide a rhetorical effect of immediacy. That's why in narratives, instances can be found where a noun ties some 20 paragraphs together with chain of bridging pronouns. Hoffman concludes that when a paragraph contains several sub-paragraph units in narratives, it is likely that the use of a pronoun is blocked. But it will be demonstrated that the resolution of long-distance ellipted coreference involves a longer memory storage; there are environments in which linguistic context reveals the

arguments of predicates through inferences based on action-referent association which indicates the function of long term memory storage.

In a story analysed by Marslen-Wilson, Levy, and Tyler (1982), the receiver, independent of the speaker's choice of reference, clearly displayed awareness of what is in focus at each moment and when focus shifts. This is made possible by controlling the organisation and sequence of foci; in other words, the speaker's discourse plan. A discourse plan reminds the speaker of where to focus, and so where to lead the addressee's focus. The speaker can certainly plan and signal focus moment by moment; but in trying to convey a complex set of facts, the speaker must make sure not only that the individual facts are well understood, but also that the connections and implications are clear. The speaker can lead the addressee to anticipate the entire plan of discourse, rather than wait for sentence by sentence cues; then part of the speaker's work in directing the addressee's attention is done. Speakers commonly solve this problem by adopting a hierarchical structure for the discourse. Sanford and Garrod (1981) assert that explicitly mentioned items are the ones that are active in working memory, and that some have more memory allocated to them than others. This "local" definition of focus as a narrow allocation of attention is the one adopted by Chafe (1974, 1976, 1980, 1987). It is this moment by moment attention to particular referents that should make it possible for speakers to use such reduced forms as pronouns.

This section discussed the linguistic attempts dealing with the effect of episode on the marking of referents. We reported some experimental studies which provided supportive evidence to the effect of discourse boundaries and the function of a temporary mental storage in anaphor resolution. We will next deal with a focus treatment of anaphor resolution which implements a discourse organisational structure model as a replacement for episodes. We will then discuss some focus studies within the framework of artificial intelligence; these studies are mainly concerned with global focusing and centering shifts.

2.3.2 Focus Theories: Hierarchically Organised Attentional Domains:

2.3.2.0 Introduction

Fox asserted "by its very nature, a study of text structure must touch upon the work of several disciplines" (1984:5). Hierarchical text structure has been studied in several academic domains, with different areas of focus. The issue has been tackled by cognitive

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psychology (Rumelhart 1975, Mandler and Johnson 1977, Thorndyke 1977, Stein and Glenn, 1979, van Dijk 1977, van Dijk and Kintsch 1978), rhetoric (D'Angelo 1975, Winterowd 1975, Young, Becker and Pike 1975, Fox 1987), and artificial intelligence (Grosz 1977, Reichman 1981, Sidner 1983).

Van Dijk (1982), Reichman (1981), Marslen-Wilson, Levy, and Tyler (1982), Tyler and Marslen-Wilson (1982), and Grosz (1977) among others argue that pronouns are used to make reference when a particular referent is focussed upon. The alternation of noun and pronoun is considered to be due to differential focussing or foregrounding of a given referent. It is assumed that an utterance may contain any number of expressions referring to entities. An entity may be anything, e.g. a conceptual entity with no physical correspondence which need not exist in the physical world.

2.3.2.1 Anaphora And Hierarchical Discourse Structure

Fox (1984, 1987) conducted a comprehensive study to examine the resolution of anaphoric expressions in expository written and conversational English, where she convinces the reader successfully that her main assumption is plausible: the linear arrangement of discourse basic units forms a hierarchical structure which is related to the selection of referential linguistic terms. The work has a limited scope, is based on limited data, deals exclusively with human referents, and seems to ignore the text's topic; in this respect it is different from the focus and centering studies of anaphora (see section 2.3.2.2). Discourse structure replaces episode, paragraph, mental space, focus space, topicality, or what is referred to by Prince (1981) as textually evoked. It is assumed that although linearly produced, texts are designed and understood hierarchically, and this fact has great consequences for the linguistic coding employed. For the oral conversations, the model of Sacks et al (1974) is employed; and for the study of written expository texts, Rhetorical Structure Theory (Mann et al 1982) is the tool of analysis. The notions of active and controlling states associated with open and closed structures have been borrowed from Reichman (1981) and reformulated for this purpose.

In both conversation and expository prose, a cyclic relation is assumed to exist between the form of anaphoric expressions and the context within which such forms are used: "context determines use" mode and "the use accomplishes context" mode. The use of an anaphoric form indicates the speaker's assumption of the openness or closure of the sequence in which the antecedent occurred; and the organisational structure of the discourse predicts

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the preferred form of linguistic referring item to be used. So, upon sighting a pronoun, the hierarchical structure of the text is recognised; and the discourse hierarchical structure requires the writer to choose an appropriate type of referential expression. These two modes, in a way, indicate that judgement about the form of anaphora involves the contextual structure of the text containing the form in question, and judging the hierarchical structure is possible by virtue of the referential form used; however, this cyclic definition does not acknowledge the optionality in the referential choice, e.g. a full NP may be used where the discourse organisational structure would suggest a pronoun.

The theory assumes that expository texts are construed to be made from a combination of propositions conveying core and ancillary meaning. In breaking up discourse into propositions, relative and complement clauses are excluded because these do not have discourse structural relations with other text-units. The constituent propositions forming a discourse structural unit are not equal in the sense that the information they convey is not of the same communicative importance. Propositions are grouped based on the writer's goal and the reader's anticipation of the intentions of what information is central and what is peripheral. A claim is followed by a) details about the claim, b), evidence in support of the claim, or c) some information about the background of the claim. This structure forms a R[hetorical] unit named an issue structure, the most powerful organising unit within the model. The R-structure types include issue, conditional, circumstance, list, narrate, reason, concession, opposition, purpose, response and contrast. Within R-structure units, there are relations between the core proposition and the adjunct propositions, any non-adjacent relation is called "a return pop". A return pop requires the reader to know that a given proposition is not connected to the immediately previous proposition. The concept of return pop captures the effect of referential distance.

Non-expository conversations ranging from telephone conversations to face to face conversations of two parties as well as more than two parties in which the gender of the participants varies are the data of the conversational analysis. The serially numbered utterances create pairs in which an utterance is uttered to express a request, question, or announcement, the first pair part (fpp); and another utterance, the second pair part (spp), is uttered to comply with a request, to answer a question, or to elaborate an announcement. The structuring of adjacency pairs into hierarchies is achieved in a limited number of ways: series structure in which a pair is a member of a series of adjacency pairs; post-expansion of a previous adjacency pair where a piece of information is followed by another post-expansion

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piece; and post-elaboration. While the second pair of a chain of two adjacency pairs is currently being produced, the first pair is in an active state. In active patterns, a referent in a sequence is first mentioned by a full NP, after that, a pronoun in adjacent pairs displays an understanding that the preceding sequence has not been closed down. If the two pairs are non-contiguous, as long as they bear a relation, the first pair is regarded as active while the second is being produced; this environment forms a non-adjacent relation called a return pop. The active pattern is therefore either of the contiguous or non-contiguous type. The use of a full NP in subsequent mentions of a referent where there is no question of ambiguity indicates a sequence is closed down and a new sequence has started.

The concept of return pop is central to structural account, for it represents sustained focus in interrupted units and replaces the concept of distance. The antecedent of a given pronoun is not necessarily the one in the immediately mentioned sequence; the hierarchical structure of the discourse determines this relation. In essence, if a focal[20] adjacency pair is tied to the following pairs and all are tied to one another by the adjacency-pair relations, then there can be a return pop to the focal pair (Fox 1987:27). A return pop is possible when a central adjacency pair and subsequent adjacency pairs are tied to one another by the adjacency pair relations, the non-contiguous adjacency pairs can be return pops to the central adjacency pair. In order for a pronoun to be used, the returning sequence must keep on the returned-to sequence. If the utterance contains only a mention of an antecedent from a preceding sequence, the conditions for a return pop may not be sufficiently met. There is a close interaction between return pop and pronominalisation, but it is not a causal relation in either direction. Return pops are possible in expository prose where in an issue structure a tying adjunct is non-adjacent to the focal core. In series structure, two non-adjacent members may maintain a relation in which case a return pop is formed.

A given referents is in active state and pronominalisable either when the propositions containing its mentions are both adjacent and bear a relation, or when non-adjacent propositions which are members of a structure form a return pop. There are two conditions for pronouns to be used in return pops: either the popped over material is simple, or there are repeated mentions of the referent in question within the popped over material. The other state for the referents is the controlling state. A referent is in controlling pattern in environments where the intervening material separating two propositions causes greater

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[20] Obviously in series structures there is no focal adjacency pair. It is only in structures where there is a core and adjuncts that the notion exists.

interruption than in return pops making environments of the active pattern. There is greater restrictions for using pronouns in controlling patterns.

The difference between R-structure model and the computerised focusing model is that, in the latter, only one character, the theme of the discourse unit, receives the primary focus within the linear organisation of focus spaces, i.e. the model identifies what is the discourse about, as opposed to what is in immediate focus. Under unmarked conditions, the character under primary focus is the one whom the discourse unit is about; other characters are in secondary focus. While in Fox's account, R-structures, which are not necessarily connected to the linear organisation of propositions within discourse units, are the framework for analysis.

A disadvantage of the concept of return pop is that return pops can be indefinitely different in terms of complexity and the number and frequency of competing referents. There is diversity in the length and duration of the popped over material, the number and frequency of mentions of the competing referents, the varying frequencies possible for the mentions of the referent in question, and whether or not the popped over material is a completely different sequence from the one in the interrupted sequence. With regards to the interrupted sequence and the interrupting sequence in series structure, theoretically, it is possible for some adjacency pairs (or propositions) to function as both the tying and the focal tied-to sequence. Saying that the popped over sequence is closed off after the return pop is over does not apply to the members of a list structure, i.e. a popped over sequence which is considered as closed off is itself a focal returned to sequence, since it is not part of an interruption as it is the case in other structure types.

R-structures are either simple or complex. If an R-structure is composed of terminal nodes, the structure is said to be simple. If one or more of the core and the adjuncts are made by propositions which themselves make R-structures, the R-structure is complex. In this sense, R-structures build upon one another to make units as large as an entire text. The controlling pattern is realised in the embedding structures where an R-structure member is not a terminal node, and in return pop structures where a physically distant R-structure unit can tie back to a previously interrupted unit where there is complexity in the popped over material and hence the expectation of a return is weak. In 20, a controlling structure is illustrated in which the adjunct of an issue structure is realised by means of an embedded structure.

20

1. He prospered [core]. 2. When Victoria came to the throne [adjunct of the embedded structure tied to 3], 3. he was living in a comfortable house in or near Tavistock Square [core of the embedded structure tied to 2, both 2 and 3 make the embedded adjunct].[21] (Fox 1984:178)

Return pop is possible in list structures made of several adjuncts, in which the third adjunct is a return pop to the first adjunct. A return pop is also seen in a list structure in which one of the members of the list has a side adjunct. In other structure types with more than one adjunct, the first adjunct is adjacent to the nucleus, but the second and the third adjuncts are return pops connected to the focal nucleus. The model's basic pattern held in the cases of return pops predicts that propositions which are structured into a controlling state by virtue of a return pop can be sources of pronominalisation.[22] However, the use of a pronoun is dependent on the intervening popped over material: either popped over material carries multiple mentions of the pronoun's antecedent, or the popped over material is simple.[23] How complex the intervening popped over material should be for forming a controlling pattern rather than an active pattern is not clear. The following example demonstrates the use of pronouns in return pops (1984:183):

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1. Bob "Smithy" Smith will be installed as the 1984 president of the Monrovia Chamber of commerce at the annual January dinner. [core of the issue] 2. He has been a partner in the Monrovia Travel Agency with Bob Bennett since 1974, [Joins with 3, both serve as the first adjunct of the issue] 3. but after the first of the year, when Bennett retires,[24] Smith[25] will become the sole owner. [Joins with proposition 2, both are the joint members serving as the adjunct of the issue]. 4. An 11-year member of the Chamber, Smith serves on the Ambassadors committee, a group which systematically visits the over 600 members of the Chamber in a series of two or three-day "blitzes." [In a list relation with 5 and 6, all make the second adjunct of the issue] 5. He has served on the Chamber's Board of Directors for three years, 6. and he is a member of the public relations committee. 7. His most recent community involvement has

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[21] 2 can be ambiguous between different coreference interpretations; a reader who does not have any knowledge about the gender of the name *Victoria* may take the subject of 3 as co-referential with 2 not with 1, or alternatively all subjects may be taken to refer to the same person. But access to a larger portion of the text should remove the difficulty.

[22] It is not clear how one should distinguish between active pattern of a return pop type as opposed to controlling pattern in return pop state.

[23] How frequent the mentions should be or how complex should the popped over material be is an unanswered question.

[24] Fox does not seem to have a consistent criterion for considering clauses as propositions. Why should the clause '*after the first of the year, when Bennett retires*' be not considered an adjunct here? In some other examples such clauses were considered as single propositions; or in 4: "a group which systematically visits the over 600 members of the Chamber in a series of two or three-day blitzes."

[25] *Smith* is not pronominalised here in spite of being the second member of a joint structure; according to RST, a pronoun is expected here.

been appointment to the Centennial Committee... [The third adjunct of the issue] (Fox 1984:183)

According to the above discussion of return pop, the second and third adjuncts are return pops to the nucleus, because they tie directly to the nucleus. The use of a pronoun in proposition 7 is possible because the popped over material intervening between the nucleus (proposition 1) and the adjunct (proposition 7) contains multiple references to *Smith*. Note that within the popped over material, in propositions 3 and 4, *Smith* has been referred to by a structurally unaccountable full NP. In the case of 4, it is possible to justify the use of a full NP under the principle Fox named "demarcating new rhetorical units", but the use of a full NP in proposition 3 cannot be explained through a structural explanation.

Fox separated three contexts for pronominalisation: no competition, different-gender competition, and same-gender competition. The pattern of reference in ambiguous environments with different-gender referents is restricted to active patterns which represent adjacent (example 22) structural relations and return pops, but the intervening popped over material should be structurally simple (example 23). In the environment of different gender referents, pronouns may be used in the controlling pattern either of embedding or return pop type (example 24). In 24, the interfering referent is in the adjunct of the embedded structure, and the intervening material is structurally simple, so a pronoun is used in the controlling pattern established. But in controlling patterns in which the structure of the popped over material is not simple, a full NP is used instead of a pronoun (example 25).

22
1. This time he married a sturdy Scotswoman with all the hardihood and endurance of the north--and of her face.
2. Year after year she bore him children (1984:212)

23
1. His re-entry into Hollywoods came with the movie "Brainstorm," 2. but its completion and release has been delayed by the death of co-star Natalie Wood. 3. He plays Hugh Hefner of playboy magazine in Bob Fosse's "Star 80". 4. It's about Dorothy Stratton, the Playboy Playmate who was killed by her husband. 5. He also stars in the movie "Class" (Fox 1984:215-16)

24
1. He prospered.
2. When Victoria came to the throne,
3. he was living in a comfortable house (1984:217).

25
1. Leonard got from *her* both the pleasures and fear of public events, "the horrors and iniquities of the great world of society and politics as recorded in the Baptist Times, about the year 1885." 2. And all this in the untroubled atmosphere of the Lexham Gardens third floor nursery, where the boy felt snug and safe. 3. The fire blazed behind the tall guard; 4. the kettle sang musically, 5. and the music mingled with the *nurse's* reading of serious things (1984:218).

Proposition five in example 25 is a return to proposition one which is put into a controlling state.[26] The return is done with a full NP since the popped over material is structurally complex. However, the question is: how difficult would it be if the writer had used a pronoun for referring to the *nurse* in proposition five? In other words, to what extent is the question at issue felicity of style in contrast with clarity of reference? How *the nurse* has been figured in the previous uncited portion of the text is another question relevant to its familiarity status for the reader. For readers who know the world spoken of, *the kettle, fire, guard,* etc are more easily accessible because of being part of the situational surroundings; they certainly have an easier task in resolving coreference links than those for whom the world is unknown. Furthermore, the difficulty in the above example can not be limited only to the rhetorical complexity; it should be conceded that some of the difficulty triggering a nominal choice which is left unaccounted for is associated with the presence of several unimportant referential concepts. Thus, there are more factors contributing to the referential choice than the R-structure alone.

Example 26 is presented as an instance of an issue structure in which both the nucleus and the adjunct have their own embeddings; and since the tying between proposition 1 and proposition 4 is not easy, a full NP is used in proposition 4. But it should be noted that a pronoun would not be impossible to use here, the only difference is that coreference resolution would be slightly more difficult with a pronoun. Fox's analysis does not appear to explain why the subsequent mentions of *John Singer Sergeant* are done with pronouns. The text's most salient topical entity is *Singer Sergeant*, not *Vanessa*.

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[26] The referent in question is not the most salient among the list of the characters introduced, neither is *the nurse* the subject in both slots in propositions 1 and 5. The analysis is apparently neutral to the significance of being the subject of the proposition containing it; it is not also relevant whether or not the referent in question is the topical character of the discourse, neither is it important if the referent has been mentioned frequently in previous discourse. The pronoun *her* in proposition 1 indicates that proposition 1 is part of another R-structure unit. The entire discourse is assumed to be composed of R-structures building on one another through embeddings.

26a
1. Still later she had John Singer Sergeant as her master; 2. like Furse, he had studied in France. 3. He was a sympathetic and encouraging teacher, a large imposing presence. 4. Vanessa liked his voice . (1984:219)

Furthermore, the proposed structure can be subject to variable judgements. 2 and 3 are about *Singer* and should be structurally close, but each is the adjunct of a different embedded structure in the rhetorical tree proposed.[27] One may ask why should proposition 3 be at all coherent. The reader judges the affinity which exists between *Sergeant's voice* and *have a sympathetic character* not strong enough to make them structurally close. An R-structure is sensitive to punctuation, pronominalisation pattern, and linear order, on the condition they all correspond with the semantic criterion concerning which proposition is the core and which are the adjuncts of the R-structure.

In example 26 the choice of a pronominal device is possible because ambiguity can be resolved through examining context. It is the degree of referential complexity or possibly stylistic felicity which is at issue. Change of linear order should not change the R-structure, but linear order is at odds with the pronominalisation pattern, since recency strongly influences pronominalisation. How acceptable the proposed rhetorical tree for 26b is, is subject to different evaluations. The difference between (a) version and (b) version shows that the constraints determining the choice of anaphoric devices are optional; it is not even certain to claim that one version is the unmarked version and the other is a marked one. As for the R-structure of 26 (a) and (b), the only thing to say is that the assumed correlation between anaphora and R-structure organisation is subject to stylistic variety and cannot be claimed to hold all the time.[28]

26b
1. Still later John Singer Sergeant was her master. 2. Like Furse, Sergeant had studied in France. 4. He was a sympathetic and encouraging teacher, a large imposing presence 3. She liked his voice.

In active pattern, when two same gender referents are mentioned in the same proposition, two conditions for the use of a pronoun in active pattern are suggested: "a) If the referent mentioned in the second proposition was the grammatical subject of the first proposition or

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[27] One may suggest a more simple structure in which 1 is the core and 2 & 3 making a list adjunct tie to the nucleus, and the last proposition being another independent adjunct tying to 1. There is a semi-colon separating 1 and 2 which may be a signifier to identify the R-structure connecting 1 and 2; but it is apparent that the meaning of propositions should override inconsistencies in punctuation.
[28] 2 and 4 are two adjuncts making a list, 1 is the nucleus of the structure and 3 is the second adjunct of the structure tying to 1 which is the nucleus of the higher structure.

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b) the referent mentioned in the second proposition was not the grammatical subject of the first proposition, but is mentioned in the next highest nucleus" (1984:221). The stronger mental status of subject justifies why under normal circumstances the writer's tendency is to choose a full NP over a pronoun when the previous mention of the referent is not the subject of the previous clause. However, different coreference interpretations from the same pronoun are possible, if the semantic content of the verb changes or if a larger portion of the text provides cues as for a different coreference interpretation. Example 27 as cited does not give us any semantic clues for whose inner world was meant, *Virginia* or *Vanessa*. Access to a larger portion of the text would reveal that it is Virginia's world not Vanessa; the clue which signals the coreference is the pragmatic tendency for preferring the unmarked coreference according to which *she* would preferably have been a full NP if it co-referred with the non-subject *Vanessa*. This example, however, could have been written as 27 (b) where the same coreference is contrary to one's intuition:

27
In the phantasmagoria of her$_i$ inner world, Virginia$_i$ loved Vanessa$_j$.
a) She$_i$ wanted total possession of her$_j$.
b) She [preferably Vanessa]$_j$ was totally displeased with this.

A contrast between 28a and 28b reveals that in 28b, *he* is ambiguous unless the second referent is fully spelled out. When coreference is constrained to such conditions, RST's structural explanation does not provide any solution. What is important to note is that the semantic concept of coreference resolution is independent of the formal pronominal usage which reflects recency; e.g. the same *he* can have two different referents if clausal semantic information allows. It is a tendency, not the need for clarity, that influences the sorting out of coreference in favour of the referent in the subject position, since when the two are in conflict, it is the semantic context that rules coreference, not the subjecthood saliency. It seems that the identification of a referent, where context provides no clue, depends primarily on the full expression used, but any full expression does not possess the characteristic of being the only source for clarity.

28
1. Clive asked Lytton to join the luncheon party.
a) He had been a little put out to learn that Clive/Lytton had already met Desmond.
b) He?? was a little put out to learn that he?? had already met Desmond.

In list structures (examples 29), return pop with pronoun is possible only if the popped over adjunct is structurally simple. The list structure creates an expectation that the referent is returned to. In 29, a return pop returns proposition 4 to 1. However, in all of the

four propositions, there are mentions of *Leonard*, so why shouldn't we consider recency of coreference in the linear representation of the clauses? A simple observable rule may predict that in two or more adjacent clauses with the same subject referent, the use of a pronoun is a predictable must; it is not the property of the R-structure.

29
1. He [Leonard] saw with child-like wonder and horror a brawling London whose violence and ginmill sordidness were visible at all times. 2. At night he heard a woman's shrieks; 3. or he saw a drunken, tattered man staggering about with a policeman violently hitting him; 4. he also glimpsed inferno-slums filled with strange human shapes .

When there are two same gender referents in an active adjacency pair such devices as role continuity and semantic information are also factors used for determining the co-reference unambiguously. In example 30, the roles attributed to the characters determine which *he* refers to which referent. But a serious problem is that the verb predicate can potentially undermine the structural explanation: If the verb phrase *making him* were *getting permission from him* the reference of *he* would be different although the R-structure would not change. This type of subject shift creates problem also for computerised accounts based on focus and centering.

30
1. H. Dz Peterson have a copy'v the paper. th't you c'd read.
2.   (1.2)
3. S. Evidently Wa:rd's not letting him, (0.6) talk about what he wannid t'talk about.
5.   (0.5)
6. S. M-he's making him talk about sumhing else th(h)et
7.   everybody's hea:rd.

According to Fox, the choice of a full NP is made because none of the structure, the techniques of lexical repetition, the meaning, the grammatical role continuity or inference based on the semantic information are helpful to disambiguate the reference with a pronoun. But how can discourse organisational structure be different from text meaning? Isn't it the meaning that is structured? In addition, a nominal choice can be forced by either the effect of ambiguity or optionally by the speaker's marking of sequence closure; nevertheless, the difference in the nature of the two is significant and must be treated separately. There may be contexts in which ambiguity and sequence openness are in conflict. The following example (31) represents the use of a full NP in return popping to a previously mentioned sequence in a truly ambiguous environment in which lack of semantic cues results in a nominal choice. Although the competing referents do not occur

in the interval between the two mentions of the intended referent, the use of a full NP seems to be obligatory.

31
1. C. Keegan used to race Fisher's car. When I was fooling around.
14. G. I used to go over there with my cousin when he used to have a car. His name was Tucker. They had a McGill from Knotsville. Sam is from Bellview. He had a two, it was a modified, six cylinder?
22. M. Oh yes that is going way back.
23. G. That was a long time ago. I used to go over there then and now Rich Hawkins from Bellview drives one for some guys from Bellview. He is my sister's brother in law. He is a policeman in Bellview but he is not afraid to drive a car. I don't know what they have to drive I have not been over to see him lately.
40. M. It is a pretty good car.
G. Every time I went over there I froze for minutes. You always go over and, nice in the afternoon, and you go over there with just shirt sleeves and just freezing to death. You are not allowed to drink.
51. M. *Hawkins* is the one that hit A1 last year over in Finley. Flipped him and put A1 in that bad accident.

Fox's argument about M's utterance at line 51 seems a little ad hoc: "Since all of the men mentioned in the fragment are race car drivers in Ohio, hitting someone over in Finley is not a feature that distinguishes among them, especially since both *Keegan* and *Hawkins* have been associated with the agent role in events of driving. Given the structure of M's utterance at line 51, then, and the structure of the preceding talk, a pronominal reference would have been ambiguous" (1984:114-115).

The speakers use pronouns in same gender environments whenever they can assume that the referent will be unambiguous: "The claim is that speakers use pronouns whenever they feel they can get away with it. How is it that it is unambiguous? Quite simply, because of the structure of the talk, and the way the speakers display their understanding of this structure to one another" (Fox 1987:50). But this undermines the difference between degrees of the urgency of the use of a full NP, as demonstrated in the above examples. To characterise the differential full NP's used in different environments under different exigencies, contrasting 31 with 32 indicates that the urgency of a full NP is clearly greater in 31. Both are examples for illustrating ambiguity. But it is the syntax which makes the full NP more preferable in 31; as one may argue for the nominal choice to be related to a stylistic preference rather than ambiguity; if the sentence read: *I saw his* little bucket *is a darn nice looking one*, reference would be unambiguous. The choice of a pronominal device is possible because ambiguity can be resolved through context. It is the degree of complexity or possibly felicity which is at issue.

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32
C. He (*Little*) helped *Merkie* build his T bucket up. I saw *Merkie's* is a darn nice looking little bucket.

In addition to structurally predicted circumstances in which full NP's are used, there are instances in which a full NP is used where a pronoun would have been possible based on structural principles (example 33). This structural property is called "demarcating new rhetorical units" (1984:198). To tentatively verify optionality in choices, both pronominal and nominal expressions are used in the NP slots and it is left to the readers to judge for themselves if the choice between a pronoun and a full NP appears to be effectively in the domain of R-structure organisation. One can observe the choice of a full NP and a pronoun is not simply a clear cut, i.e. style undetermines structure.

33[29]

1. Theodore L. Huller has been appointed executive vice chancellor at Riverside, succeeding Carlton R. Bovell. 2. Bovell announced his resignation to return to full-time duties as a biology professor and researcher on campus. 3. Huller /he/Theodore L. Huller is director of the Agricultural Experiment Station and director for research at Cornell university. 4. At Cornell, Huller /he/ established three important programs--the Cornell Biotechnology institute and New York State Centre for Biotechnology, the Institute for Comparative and Environmental Toxicology, and the Ecosystems Research Centre. 5. As executive vice chancellor, Huller /he is responsible for the administration of faculty and academic policy, involving all colleges, professional schools and departments. 6. In addition, Huller/ he will oversee the Graduate Division and Research, the library, registrar and admissions, student recruitment, affirmative action, University Extension and Summer Session. 7. In the chancellor's absence, Huller /he will act as chief executive for the campus. 8. Chancellor Thomas Rivera said "Dr. Huller /he[30]...."

In order for the referential salience of referents to be thoroughly accounted for, a discourse should be considered as an entire piece, because a reader's task in reading a text is to create a model of the world evoked. The R-structure theory is indeed a cognitive model of the discourse and accounts for texts as short as an episode and as long as a chapter of a book. Through embedding structures, RST gives a complete hierarchical structure for a given coherent text composed of any number of episodes; however long that text might be. The paradox is, the application of the theory does not consider discourses in entirety. Prior mentions of a referent in a discourse contribute to referential salience; therefore, its effect should be accounted for. In some examples, lack of information of the initial portion of the

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[29] According to R-structure judgement, the above passage comprises a core and six adjuncts, only one adjunct (propositions 5&6) has an internal structure. Non-new units contain pronouns while new adjuncts are done with full NP's.

[30] In 8, the kind of slot determines that the only form possible is a full NP; direct quotation of a character's talk makes the use of a full NP necessary.

text makes it unclear for the reader to grasp the co-reference relations between the referents and pronouns.

Furthermore, a less-skilled speaker may demonstrate a pattern which is either inadequately redundant or tolerates greater ambiguity than the desired pattern. Fox proposed this problem to be subject to further research: "Non-biased analysts familiar with the text-parsing technique can test the accuracy of the association between structure and anaphor use by first replacing all of the appropriate NP's with blanks before doing the analysis.[31] I feel that the association will stand, but it needs to be demonstrated in more rigorously non-circular ways before it can be counted as fully documented" (1984:200). The structural account is an account of discourse constraints on the use of anaphoric expressions; therefore, it is expected that the optionality in the use of such expressions is more serious than has been assumed.

There are some problems which may decrease the validity of the application of the discourse organisational model for describing anaphora. A structurally limited encounter with referential ambiguity makes it difficult to provide a more comprehensive account for it. It is evident that theoretically, interfering referents may create an unlimited number of environments of ambiguity. While it must be acknowledged that Fox's treatment of potential ambiguity is more developed than previous distance studies, the effect of more than one interfering referent and the alternative ways in which competing referents may appear in discourse are relevant in accounting for potential ambiguity. [32] It is impossible to account for an indefinite number of possibilities of complexity in return pops: the popped over material creates distance and potential ambiguity in indefinitely diverse ways.

The controlling state certainly requires more clarification. It is not explained precisely when mere ambiguity is the source of influence and when R-structure triggers a nominal NP. The contexts examined are far less than the entire range of possibilities within which referents can create competition. The inductive style of argument, showing that surface arrangements of anaphoric expressions in sample texts are correlated with the R-structure organisation of the texts in question, needs further backing. Lack of consistency in viewing

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[31] Chapters 3-4 of this thesis were actually aimed at investigating this proposal, but on a less ideal basis. Although the data and the individuals who produced them are not ideally representative of what is described here, an attempt was made to create identical conditions under which subjects could display their awareness of the markings of the text structure.

[32] See chapter 5 for a different but more detailed encounter with referential ambiguity.

the structure of propositions, the controversial nature of R-structure judgements, and the presumption that R-structure corresponds with referential choice in the cyclic relation between context and form further weaken the discourse organisational account.

2.3.2.2 Centering

Discourses suggest that focus determines the speaker's choice of reference. Focus is the allocation of attention to a small part of memory. Speakers typically focus on people, places, or objects that they want to describe further for their addressees. They lead their addressees to find or create that concept in memory, and to narrow attention to that concept so that incoming information can be easily added to memory. Offcourse, if addressees are uncertain about what kind of information to expect, they may not focus on any one concept. Instead, they will allocate their attention more evenly among several concepts relevant to the conversation (Higgins, Fondacaro, & McCann 1981). Skilled speakers help their addressees by creating foci and by making focus switches clear. Other concepts that the speaker may want to mention differ in how related they are to the focal concept. They may have been mentioned, or may be inferable from something that has been mentioned, or may be brand new to the addressee.

When organising the discourse, the speaker creates focus spaces and focal entities. These focal entities can be more easily referred to. When they are not, it is because the speaker is doing more with that reference than merely identifying the referent, e.g. the speaker may be expressing an attitude towards the referent. In casual conversations and narratives, referents in focus give rise to pronouns. Less important referents are carefully referred to with names or descriptions, even when mentioned repeatedly (Marslen-Wilson, Levy, and Tyler, 1982). When the speaker shifts focus, new entities become important enough to be easily referred to. In general, the less familiar and salient a piece of information is to an addressee, the more carefully the speaker will have to specify it (Fletcher 1984). Following this view, Linde (1979) uses a tree diagram to explain the distribution of *it* and *that* in apartment scheme descriptions: "The focus of attention can be represented as the pairing of the underlying tree structure of the discourse with a pointer that marks a particular node of the tree. The focus of attention is on the discourse node marked by the pointer" (Linde 1979:345).

When choosing a referring expression, the speaker must keep track not just of common ground shared with the addressee, nor just of what has been said in the conversation, but of what the addressee is currently thinking of and expecting to hear. That small piece of information, in current awareness for both speaker and addressee, is in focus (Grosz, 1981). Grosz and Sidner (1985) (see also Grosz 1981 and Sidner 1983) developed a model in which the structure of discourse is partly a matter of the structure of hierarchically organised attentional domains, or focus spaces.

There is a principal line of description with respect to which digressions or a principal goal that has subgoals are marked. This structure permits both speaker and addressee to take time with details, without losing track of the overall plan. Such hierarchical plans appear in several types of discourse within which the study of focus is prompted: narratives, conversations, task instructions, spatial descriptions, and route directions. Spatial layouts (apartments, route directions, abstract networks) are described as one main path, perhaps twisted, with branches off to the sides (Klein 1982; Levelt 1982; Linde and Labov 1975; Ullmer-Ehrich 1982). Task instructions show a superordinate goal, a series of subgoals, and the sequences of actions that fulfil each subgoal (Grosz 1981). Casual conversations have topics, subtopics and digressions (Reichman 1978). Hierarchies constrain the expectations speakers and addressees can have about referents' importance. Although digressions may be briefly important, or peripheral characters temporarily in focus, it is main events and main characters that guide planning and comprehension.

How does discourse structure create expectations, and so constrain the speaker's choice of referential forms? The discourse is made up of what might be called focus spaces. The exact name of the spaces depends upon the type of discourse studied and on how the researcher named it; they may be episodes (Tomlin 1987, Chafe, 1980, Clancy 1980), subtopics (Reichman 1978), subgoals (Grosz 1981), or scenarios (Anderson, Garrod, and Sanford 1983, Sanford and Garrod 1981). But the consensus is that these spaces can be conjoined and embedded hierarchically, and that there are regularities in the ways that speakers make transitions from one space to another. Because of these regularities, addressees expect certain focus spaces to follow others. For example, one simple expectation is that addressees expect interrupted topics to be resumed later on.

Within the framework of Artificial Intelligence, Grosz (1977) collected task-oriented dialogues and found that focus of attention determined the form of referring expression.

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The identification of discourse units is in turn fundamental for identifying referents. Focus spaces are introduced as units in texts the opening and closing of which is demonstrative to the showing of units and sub-units of the dialogue. The speaker could return to the main task using a pronominalised form, even if what otherwise might be considered interfering referents were present in the just-completed subtask. Another indication of the segmentation phenomenon is the use of pronouns whose referents lie far back in the previous discourse. In every case, the pieces of dialogue skipped over are whole segments relating to some distinct task or subtasks (Grosz 1977:22).

Grosz (1981) analyses a conversation between two mechanics, one of whom is giving instructions to the other. When they narrow their interest from a general problem to a specific action, or when they finish one procedure and start another, their focus of attention shifts and the set of objects to be discussed changes. Knowing this, the speaker can "underrefer"; that is, use a seemingly ambiguous expression that is clearly understood. In one case, a mechanic uses *the screw* to refer at first to *a screw* holding a part in place, then later to *a screw* in the part-removing tool. This is persuasive evidence that the speaker's choice of reference depends upon what is in focus for the speaker and addressee. But the problem is a speaker may use a pronoun not because that referent is in focus, but because the addressee can use other cues to figure out who the speaker means.

Within the current focus space, certain represented entities (the forward looking centers) are candidate referents for pronouns. Focal entities should be more easily referred to and the boundaries of focus spaces within the discourse should be important. Within these focus spaces, there are two kinds of potential referents: those that have been explicitly mentioned, and those that are implicitly present because they are typical of that situation. For example, saying that *Mary dressed the baby* makes it easy to refer to *the clothes* in the next utterance (Sanford and Garrod, 1981). Together, explicit and implicit referents form the focus set. They are the first referents considered for any definite NP in that focus space. Sometimes they are called "globally" focal with respect to the discourse as a whole (eg. Grosz 1981). Grosz, Joshi, & Weinstein (1983) distinguish between two levels of focusing, global focusing and centering (or local/immediate focusing). While a set of entities can be focused globally, only one entity is centrally highlighted in processing an individual utterance. This entity is called "the center or the backward-looking center". We will discuss centering in more detail later in this chapter.

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Reichman (1981) who examined naturally occurring conversations postulated context spaces instead of the focus spaces that Grosz used as the determining force underlying textual units. Utterances accomplishing a single communicative goal constitute a level of discourse structure and lie in a single discourse unit. Reichman's context spaces can possess various statuses that can affect their current prominence in the conversation. A context space can be active, currently being produced; controlling, immediately connected to the one which is active; open, an interrupted context space; and closed, the discussion of which is thought to be completed. The referent in subject position gains high focus and such a discourse element is pronominalised and is in the speaker's current consciousness (1981:118); the referent of a name is of medium focus; and a referent described by a definite description is said to be of low focus (pp 121-122). Explicitly mentioned referents within the same focus space differ in importance. This is exactly the point focused in the example from Reichman (1978), where *Arthur* is *he* but *Wilson* is *Wilson*.

34
C: I bought one of these for Arthur. It's soap.
F: Oh that's nice.
C: He really wanted to get a soap and a dish but he doesn't want to get one when he lives with Wilson, because Wilson has one in our bathroom, and anything about Wilson really bothers Arthur. He doesn't want to get one because Wilson has one.
F: Does he still spend a lot of time there?
C: Wilson? No, no not really, he's not there very often. (Reichman 1978)

Reichman's maxim is "pronominalise if focal" (1978). For drastic changes in topic (total shift), even characters that have just been mentioned must be reintroduced with a full NP, although this may be a means of marking the shift. When returning to a previous and unfinished topic, speakers mark the boundary with *But anyway* or *So*, and continue with a pronoun for the important character. Reichman also notes that in "respecifications", where a contrast or connected thought is stated after a discourse boundary, full NP's are up to the speaker's discretion. That is, if the context has been reestablished, the character can be reintroduced with a pronoun. Otherwise, a full NP may be used to help reestablish the context. So not all discourse boundaries make referents difficult to refer to. Some, like the return of an unfinished topic, lead the addressee to expect old referents to be mentioned again. What is important is that speakers lead addressees to recognise where the discourse boundaries are and what relationships hold among the sections of the discourse. Reference is one of the signals speakers can use to do so. Speakers mark discourse boundaries, but within the boundaries, only referents in focus are pronominalised.

Sidner's anaphor resolution rules are closely tied with control of inferences. Focusing provides an ordered list of referent candidates for a definite anaphor, considerably reducing the computational load for inferences needed in the search process. She posits two kinds of immediate focus, discourse focus and actor focus. Discourse focus (DF) is what the speaker is talking about, and actor focus (AF) is the locus of information about actions in the discourse. An utterance may have neither, either, or both of the two foci but an AF becomes DF if there is no other DF for an utterance. This two-foci set-up, in effect, makes the interpreter keep track of both theme and agent lines that thread the discourse. What criteria exactly distinguish them is unclear, however, and the process in which an apparent actor becomes the DF seems to be a little ad hoc. This complication arising from two foci is removed in the centering model which is a modified and refined version of Sidner's immediate focus (Grosz, Joshi, & Weinstein 1983).

Sidner suggests that the items in immediate focus are those that are talked about for a part of the discourse, and the speaker uses definite anaphora to indicate his/her immediate focus. She found that immediate focusing was mainly associated with the use of pronouns in English while definite noun phrases mainly marked global focusing. Her definite anaphor interpretation mechanism is intended to provide an account of the hearer's actual anaphor interpretation process. It tracks the speaker's focus as it changes over time, by interpreting the anaphors in discourse. This focus-tracking process consists of two main steps. Given the local foci of an utterance: 1) use these foci and a set of anaphor interpretation rules to interpret the anaphor in the next utterance; and 2) update the foci incorporating the result in 1.

Sidner (1983) is concerned with pronoun resolution rather than pronoun production. And in her account, both structural and non-structural factors are examined. Focus is used as a determining factor in selecting the possible set of elements that the anaphor in question could refer to. There are three steps which select the appropriate element from the foci and update the set of focus elements. "A process model of focusing and focus tracking consists of three distinct processors. The first chooses foci based on what the speaker initially says...Then an interpreter [the pronoun interpreter] uses these foci and a set of rules of pronoun interpretation...to interpret the anaphoric expressions in the discourse. A third process updates the foci by decisions that depend on anaphoric interpretations chosen by the pronoun interpreter" (1983:221).

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As is clear from the above, Sidner's model includes structural as well as non-structural factors; factors are syntactic, semantic and pragmatic in nature, and can be used to avoid the interpretation offered by the initial focusing mechanism in order to select an element from the potential foci as the correct interpretation. Sidner (1983) distinguishes actor focus (the agent of the current sentence) from discourse focus (the theme, or object case of the verb). The system selects a group of first and second choice interpretations of a pronoun, and by means of pronoun interpretation rules, can reject the first choice in favour of the second choice. The basic rule operates as: Test the actor foci as a co-specifier with a pronoun in agent position followed by potential actor foci. If these fail, check the discourse focus, potential discourse foci, and actor focus stack. Various types of grammatical and lexical/semantic information are critical in describing the resolution of anaphoric patterns. She proposes that verb objects are the best candidates for discourse focus according to the type of discourse she analyses (example 35).

35
I want to schedule a meeting with Harry, ''illie, and Edwina.
We can use my office.
It is kind of small,
but the meeting won't last long anyway.

Sidner's focus resolution algorithm chooses *the meeting* as the initial discourse focus. In the next sentence, focus is changed to *the office*, and that focus resolves the pronoun *it* in the succeeding clause. Finally, *the meeting* becomes focal again, when there is no verb object, the action focus becomes the discourse focus. It seems reasonable for this discourse to be about *the meeting*, rather than about the initial actor *I* scheduling it. Other types of discourse share this property: route directions, spatial descriptions, and task instructions. For these discourses, the acting character is most likely to be the addressee, who is receiving the description or instructions. And the discourse is not about the addressee, but about what the addressee does or sees: in short, the theme. However, with discourses that look more like narratives, where topical characters shift temporarily in digressions and resumptions are made, Sidner's algorithm does not give us such a good sense of what the discourse is about (example 36).

36
1. Alfred and Zohar like to play baseball. 2. They play it everyday after school before dinner. 3. After their game, Alfred and Zohar have ice cream cones. 4. They taste really good. 5. Alfred always has the vanilla super scooper, while Zohar tries the flavour of the day cone. 6. After the cones have been eaten, the boys go home to study.

According to Sidner, the discourse focus is initially *baseball*, then changes to *ice cream cones* in the third sentence. Yet, the passage seems to be about *Alfred and Zohar* and their after-school activities. *Alfred and Zohar* are mentioned throughout the story in subject position. In fact, because of *the boys'* prominence in the story, it's slightly disturbing that the pronoun *they* in the fourth sentence should refer not to *them* but to the *ice cream cones*. It is difficult to create a reference resolution algorithm that depends only on the use of nominal and pronominal devices to determine discourse boundaries and to assign focus within those boundaries. Grosz (1981), for example, was able to rely on a well-defined task structure. At least most of the episodes in narratives are organised around protagonists (even defining a procedure to recognise protagonists is unexpectedly difficult). Sidner's assumptions, however, make her algorithm too genre-specific. It would be useful to find a more general solution to the focus recognition problem.

In sum, the two merits of the focusing approach to anaphor interpretation are: a) controlling the inferences by giving an ordered list of referent candidates and (b) allowing certain non-identity of reference/specification. According to Fox, these merits make Sidner's theory one of the most useful and powerful computerised models for anaphor resolution yet formulated. However, there are some limitations in this approach; it cannot deal with a) deictic, indexical, and indefinite reference; b) intra-sentential coreference; c) structural parallelism; and d) prosodic features like stress and intonation.

The focusing model highlights the part of knowledge most relevant at a given point in discourse and uses that knowledge to resolve ambiguities and (explicit or implicit) coreference. It incorporates a representation of the knowledge of language, world situation, and of discourse, as well as rules of linguistic performance and commonsense inferences. The centering system is a hypothetical cognitive process involved in discourse processing of any human language. Centering belongs to the model of the attentional component of discourse structure in the focusing approach to discourse understanding (Grosz 1977, 1980, Grosz & Sidner 1985).

Centering is a component of a computational theory of discourse that derives from work on focusing by Grosz (1977, 1981) and its extensions to treat anaphor disambiguation in English discourse by Sidner (1979, 1981). Centering (Grosz et al. 1983) contributes to local coherence, the relation that binds individual clauses and sentences to form a larger discourse segment; it depends on syntactic structure, ellipsis, and the use of pronominal

expressions. The center is a conceptual entity centrally being talked about or in the center of attention of the discourse participants at the time an utterance is produced or understood in discourse (Sidner 1983, Grosz et al 1983).

An utterance contains any number of referring expressions each of which identifies an entity. The entity identified by way of a referring expression is called a center. A center will be classified as either a Cb (backward-looking center) or a Cf (forward-looking center). An utterance is associated with zero or one Cb and any number of Cfs. It is a stipulation for the theory to limit the number of Cb per utterance to one. The Cb is the entity centrally talked about. An utterance may or may not be associated with a Cb. Any centers that are not Cb are called Cfs. The Cfs are potential Cbs one of which may or may not be promoted to become the Cb of the next utterance. They are ordered as Cf1, Cf2, ...Cfn reflecting their expected-center-hood, that is, how much a Cf is expected to be the next Cb. Cf1 has the highest expectance, Cf2 the next highest, and so on.

It is hypothesised that an utterance with no Cb takes place at the onset of a discourse unit. It is then followed by any number of utterances about the same (or a closely associated) Cb until a new discourse unit starts marked by the absence of the Cb. This process is called centering. We may call the minimal discourse unit a centering unit for convenience. The centering rule reads: If the Cb (backward-looking center) of the current utterance is the same as the Cb of the previous utterance, a pronoun should be used. The following aspects of centering have certain linguistic correlates:

1) The initial occurrence of the Cb in a centering unit;
2) The retention of the same Cb across adjacent utterances; and
3) The relative order among the Cfs concurring in an utterance as to the extent to which each may be expected to be the next Cb.

Centering is indeed part of an effort to develop a comprehensive theory of discourse that explains both global and local coherence as well as dealing with computational concerns such as constraining inferences (Grosz & Sidner 1985 describe the overall framework). Center corresponds to Sidner's Discourse Focus. It is the single entity that an individual utterance most centrally concerns (cf. Joshi & Weinstein 1981). Sidner's Potential Foci correspond to what is now called "forward-looking centers". Grosz et al. (1983) argue that

using a single Cb not only removes one of the complications from Sidner's account, but also handles some pronoun uses better.[33]

When an utterance has n pronouns (n > 1), processes other than centering must account for n - 1 pronouns. Identifying and updating two foci (Sidner) is considerably more complex than concentrating on one (centering). Centering enables one to make explicit reference to non-linguistic entities, i.e. the notion of the center itself is defined as a non-linguistic entity. Cb is the semantic interpretation of some linguistic expression that may correspond to some concept in the speaker-hearer's mental state. This non-linguistic point of reference frees the analysis from strictly linguistic confinements. More specifically, an ellipted pronominal need not be a deleted overt NP; the centering model allows it to be a device on its own with its own referential property and discourse function. A very simple discourse in English can be used to illustrate centering. The following discourse is about the individual named *Max*:

37a
1. Max is a chemist.
2. He is 30 years old.
3. He lives in San Francisco.

37a.1 introduces *Max* as a Cf. The next two sentences continue to be about him, so we would be tempted to say that *Max* is the Cb in 2 and 3. The centering rule dictates if the Cb of the current utterance is the same as the Cb of the previous utterance, a pronoun should be used. The motivation for the centering rule is a contrast between natural and unnatural discourse not differentiating between grammatical from non-grammatical. A Cf may or may not be mentioned again in the next utterance in a discourse sequence. When one is chosen for a continuous reference in the subsequent utterance, this Cf is made into the Cb. The centering involved in 37a would then look like this:

37b
1. [Cf = Max]
2. [Cb = He]
3. [Cb = He, Cf = San Francisco]

Another slightly more complicated example with two centers follows:

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[33] Although Sidner's two-foci set-up was meant to facilitate the interpretation of two pronouns in an utterance, inferences are still needed to resolve n-2 pronouns. The difference between n-1 (centering) and n-2 (Sidner's account) does not seem too significant if the same inference component is needed anyway.

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38
1. Who is Max waiting for?
2. He is waiting for Rosa.
3. He invited Rosa/her to dinner.

38.1 has one referring expression introducing a Cf, *Max*, and an indefinite WH- word, *who*, which does not introduce a Cf. A Cf may or may not be mentioned again in the next utterance in a discourse sequence. When one is chosen for a continuous reference in the subsequent utterance, this Cf is made into the Cb. 38.2 then has the Cb, the individual named *Max*, as well as a Cf, the individual named *Rosa*. The third sentence mentions both *Max* and *Rosa* again, so *Max* continues to be the Cb and *Rosa*, though rementioned, stays as a Cf due to the "one Cb per utterance" constraint. Here, the name "forward-looking" should not be taken to mean that it has never been mentioned before. Some Cfs may in fact be referred to with definite expressions including pronouns showing a clear connection to the previous discourse content. Such Cfs are seen as "remaining in focus" but are not Cbs. Centering does not treat every rementioned entity equally. It picks only one of them as the Cb and others become Cfs. This is one of the differences between the notion of centering and the notion of topic in the topic/focus articulation of the Prague School (cf. Firbas 1966, Sgall et al 1973) and Givón's topic continuity in discourse (1983). The centers for 37 would be as follows (Cfs are unordered here):

38b
1. [Cf = Max]
2. [Cb = Max; Cf = Rosa]
3. [Cb = Max, Cf = Rosa, dinner]

The centering rule does not preclude using pronouns for other entities as long as one is used for the continued Cb, so the pronominal reference and center marking do not have a one-to-one mapping relationship. It does not say that the second mention of *Rosa* in 37.3 should or should not be with a pronoun though the pronoun may in fact be preferred. This is the consequence of the model's associating only one entity as the center. Because *Rosa* is not the linguistic entity with primary focus, the likelihood for this entity to be pronominalised is low and the model is designed to capture this likelihood.

The centering rule states a typical or unmarked association between a discourse entity in a certain discourse role and a linguistic form of a certain type. The discourse role called the center or the Cb in this framework is typically associated with the linguistic form of the personal pronoun in the case of English. This typical pronoun-Cb association enables us to

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tell which referring expressions in a sentence are likely to encode the center. For instance, even if 38.2 is isolated from the discourse context, we can tell that whoever is the referent of *he*, someone other than *Rosa*, is the current Cb. The centering rule is about how the same center is retained across adjacent utterances in discourse; this is called the "Cb-retention" rule. It does not predict that the reference to *Max* in 38.2 or 38b.2 must be with a pronoun because the previous status of *Max* is a Cf, not Cb. In other words, since the first utterance has no Cb, this rule does not require a pronominal Cb-encoding in the second utterance. A rule for Cb-establishment, in addition to the centering rule, would be: If one of the Cfs in the previous utterance is made into the Cb of the current utterance, a pronoun is used. A violation of the Cb-retention rule results in a clumsy discourse. In example 39, for instance, the third utterance is nearly impossible for the model to interpret:

39
1. Who is Max waiting for?
2. He is waiting for Felix.
3. He invited Max to dinner.

There are two possible reasons for the difficulty of 39 corresponding to two possible underlying centers. First, if it is intended to encode the centers in 39b, the Cb-retention rule is violated because the reference to the continued Cb is done with a full name while a pronoun refers to Cf:

39b
1. [Cf = Max]
2. [Cb = Max; Cf = Felix]
3. [Cb = Max; Cf = Felix, dinner]

Second, if it is intended to encode the centers in 39c, then the sequence from 2 to 3 is an abrupt center-shift from *Max* to *Felix* while *Max* still continues to be mentioned. This kind of a center-shift is awkward and clearly requires more inferences though the center rules so far do not preclude it. But when it is "Felix invited...", 3 in fact has no Cb, which indicates that a Cb-change is likely to take place.

39c
1. [Cf = Max]
2. [Cb = Max; Cf = Felix]
3. [Cb = Felix; Cf = Max, dinner]

In sum, centering rule states the "unmarked" highly constrained discourse reference rule, namely, that there is a basic association between the center and unstressed pronouns in English discourse. The chief inspiration of centering as a discourse model is its reflection

of the cognitive processes involved in anaphor resolution using inferencing and focus of attention. But the major problem which makes it inapplicable for the purposes of this study is that the model is an algorithmic account based on a correlation between focus of attention and the use of pronouns without acknowledging stylistic possibilities; actual discourses don't always maintain such correlation.

We observed, in this section, the manner in which focus theories deal with the problems of discourse anaphor resolution and we pointed out some advantages and draw backs. This review reported the type of challenge focus theories of anaphora propose. Within linguistics and artificial intelligence, the major common assumption is that there is a limit to the capacity of short term storage, and a cognitive model must take account of units not larger than an episode. Choice of a nominal expression to refer to an already introduced referent may be triggered because either the effective ambiguity interferes or the antecedent is in an already closed unit. In the absence of ambiguity, the nominal choice is associated mainly with file closures. We discussed the present problems with a definition of episode which is a major challenge for the focus approach. This review was presented to suit the needs of this study and was hoped to be a fair exposition of the type of research which is being currently undertaken within different focus frameworks. It is by no means claimed to be a full report of the fast growing contributions to this language issue. The effect of discourse stylistic factors cannot, however, be treated amply in this framework, and the structural accounts are very much restricted in their treatment of widely diverse anaphoric distribution.

As has been remarked in previous sections, the thrust of this work is that a potential model must allow for the inherent flexibility in the arrangements of the discourse anaphoric expressions; violations to the centering rule must also be taken into account, i.e. the inferences determining focus and centering have to be directed mainly by context rather than the formal arrangements of the linguistic markers. Leaving aside this limitation, the analyses presented in chapters 3-5 touch upon works cited here. Clearly, by pointing out that context-based inferences resolve coreference in ambiguous environments, we imply the significance of focus of attention; however, given that discourse constraints are optional, the model presented doesn't have to depend on the correlation between the use of pronouns and the focus of attention.

2.4 Summary

This chapter presented a review of the ongoing paradigms related to the topic of this thesis. The givenness approach is concerned with how information is carried within the sentence and deals with the relation between the sentence structure and function. The given/new division and the communicative dynamism have been the major contribution of the Prague School Functional Sentence Perspective. Old information precedes new information in unmarked conditions. However, there is a distinction between theme and old information; theme is the clausal first constituent and is not necessarily the old information. Definiticity, identifiability, and accessibility are notions which are related to anaphor resolution. Definiticity was considered to be a formal (morphological) phenomenon, while identifiability and accessibility are related and are both cognitive statuses which are determined by context. Through the informativity of context, referents are identifiable with differential degrees of difficulty; however, inaccessible referents are not necessarily unidentifiable. A difficult to identify referent should be considered as low in accessibility. The maximally urgent task of a full NP is to clarify coreference where a given referent is not identifiable through the informativity of context.

Distance theories argue for a correlation between the choice of anaphoric expressions and the predictability of the referent intended. The accessibility/continuity of a referent is believed to be determined by referential distance, persistence, potential ambiguity, and unity. Topic continuity is a major attempt to demonstrate the iconicity of language in relation to function. Choice of referring expressions (code quantity) and syntactic case roles (linear order) are considered to be correlated with topic continuity. The original motivation for topic continuity has been to show that the atomic view of topic/comment is violated in a discourse perspective; the discourse based studies show that continuity of a referent forces it to the final position in the clause and discontinuity of a referent places it to the initial position. In contrast with topic continuity, accessibility theory is an attempt to show how accessibility is determined by the factors of distance, ambiguity and unity. It is an attempt to incorporate the psycholinguistic findings regarding the constraining effect of referential distance and episodic shifts, the studies on presuppositionality of referring expressions, and the context studies into a unique model. It was argued that, while the assumed correlation between accessibility and the choice of accessibility markers is a viable claim, there are two serious problems. First, accessibility can not sufficiently be measured by the factors of distance, ambiguity, and unity; second, there is optionality in the use of accessibility markers which makes the correlation sought probabilistic. The

factors of accessibility can be replaced by the informativity of context, and the optionality of the choice of referring expressions should not be allowed to deter the results of an analysis.

The focus approach includes psycholinguistic, linguistic and computational attempts all sharing a common theme: as long as a referent is in focus, referential distance does not deactivate it; and the limit for focus of attention is the episode boundaries. We argued that definitions and criteria for paragraph segmentation vary, but the consensus is: there are cognitive units longer than a sentence, both in written and in spoken data. Psycholinguistic and linguistic attempts rely on experimental and natural data analysis aiming to display the effect of scenario, scene and episodic breaks on the deactivating of the discourse referents and as a result influencing the choice of anaphoric expressions.

In her account of anaphora in English expository prose and conversations, Fox applies discourse organisational models and uses essentially the notions introduced by the centering theory; however, she challenges it by showing that expository texts and conversations vary structurally. Different models of analysis are used for analysing the use of anaphoric expressions in each of the text types. The structural analysis introduces the concept of return pop to replace distance with a context-sensitive interpretation of it; i.e. not in all contexts referential distance triggers the use of a full NP. Her account for anaphora in English expository texts suffers from some limitations. The controversial nature of rhetorical structure judgements of the pieces of expository texts make the analysis of anaphoric patterns doubtful on occasions. The assumed correlation between the rhetorical structures and the choice of anaphoric expressions also suffers from the optionality of such choices observed in some contexts.

Centering in the computational framework suggests that the focus of attention within discourse units (called episodes, mental spaces, focus spaces, scenarios, etc. depending on the type of discourse analysed) is associated with the use of pronouns. There are two problems with these theories: attention allocation is limited to discourse episodes, consequently the use of pronouns in discourse units larger than episodes cannot be accounted for, and second, focus is optionally marked and a full NP may be used for a referent under focus simply because there is effective ambiguity, i.e. not every full NP indicates that the intended referent is not under focus, as not all pronouns imply that their referents are focused.

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The thrust of this study is that the cognitive process involved in anaphor resolution extends beyond the short term mental storage, i.e. the attained textual salience of an entity must be accounted for by taking into account a rough record of the predicates made of the entity in question. A discourse is recorded readily in terms of an outline of the important details, within which an important association between what is predicated about salient entities in a linear representation signals which entity should be inferred as the most central one; and this association is quite illuminating. Accessibility reflects ease in identification; if ellipted from mention, an entity may be identifiable through context while it is of low accessibility. It is important to bear in mind the degrees of difficulty of identifying a referent in discourse, for the degrees of difficulty determine the urgency of the use of a full NP. In the correlation between referential difficulty and the choice of a full NP, linguistic context is a rich source of informativity.

The next three chapters will substantiate the hypotheses of this study. The hypotheses maintained throughout the three consecutive chapters are: a) there is a perceived degree of referential redundancy which creates referential diversity; b) the text meaning is effectively used by individuals in identifying ellipted referents; and c) context systematically constrains the effect of referential ambiguity.

We will deal with the optionality of discourse referential choice in chapter three. It is demonstrated that, however controlled a task, subjects do not always agree on the use of anaphoric expressions. The main finding of this chapter is: differential NP slots vary in motivating subjects to choose a common device; discourse constraints are recognised in varying degrees, some are strong in directing the choice of a full NP as opposed to a pronoun, some are intermediate, and some do not incite any specific tendency.

In chapter four, the function of context is examined through the analysis of elicited experimental data. The finding of this chapter is: while referents are identifiable through the information available from context, the choice of referring expressions may vary from subject to subject. Anaphor resolution is the result of processes which involve using referential information from context along with the formal expressions used. The two sources of referential information are so integrated that an account based on one cannot present a comprehensive model. The significance of context is much greater than hitherto assumed by the functional studies.

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In the last chapter of data analysis, we will analyse a short piece of written narrative to show that ambiguity is constrained by context; the increase in ambiguity is not correlated with the increase in the number of competing characters, i.e. referent-action association can neutralise ambiguity. It is simplistic to believe that ambiguity is measurable by counting the number of competing referents in the previous textual context.

CHAPTER THREE

Idiosyncrasy In The Arrangements Of Anaphoric Expressions

3.0 Introduction:

This chapter investigates the effect of cognitive constraints on the predictability of anaphoric expressions in discourse. Anaphoric expressions are determined not only by recency and discourse structural factors, but also by the writer's stylistic freedom. Two distinct functions of full NP's include: (a) maintaining clarity in the presence of referential ambiguity, and (b) conveying optional pragmatic intents of the text producer. Taking into account the unpredictability caused by stylistic freedom of the individual producers, an analysis based upon the examination of the use of referring expressions in discourse can only lead to probabilistic results. The study of context in relation to co-reference resolution leads to an improved post hoc explanation of how referents are identified.

The question is how easy or difficult it is to identify an ellipted referent; and when does this trigger the use of a full NP? Studies which focus on how anaphoric expressions are employed in discourse presume that the role of any referring expression is to enable the addressee to pick out the corresponding item from a reference set as economically as possible; so a correlation is assumed to exist between the use of a given referring expression and the predictability of the intended antecedent, determined by the cognitive effect of either referential distance or focus within the episode boundaries (see chapter two for a review of the existing paradigms). However, as Wilkes-Gibbs (1983) pointed out, there is a degree of approximation involved; speakers may give up economy of expression to meet other goals. Speakers add extra information to their descriptions in order to express an attitude toward a particular object or idea. Enkvist (1978) stated that "the manner in which the text has been put together out of such [episode] units can contain stylistic characteristics" (p. 177). In addition, speakers sometimes use pronouns which appear to be lexically ambiguous or misassigned, relying on the addressee to match the propositions to the correct referent (Marslen-Wilson, Levy, and Tyler 1982, Marslen-Wilson and Tyler 1980).

The thrust of this study is that claims about discourse reference touch upon the status of referents in relation to context, and choice of referring expressions may or may not correspond to the identifiability of the referent intended. The identity of a given referent is connected to both the informativity of context and the informativity of the referring expression used. When a given referent is not easy to identify through context, a full NP is used to avoid referential ambiguity; and when context reveals the identity of the referent in question, referential distance does not constrain the use of a pronoun. The variable amount of difficulty identifying referents is determined mainly by the moderating effect of context. How difficult the identification of a given referent is through context makes the urgency of a full NP accordingly variable. Because context contains information for inferring *who will be doing what* in different stages of discourse, there is nearly always some redundant information available. Accessibility is meaningful once a discourse view takes into account the possible pragmatic inferences within a world evoked by the discourse. A context-based accessibility approach is far-reaching and assumes a stronger function for context than has hitherto been assumed.

3.0.1 On the Reliability of Written Narratives for Investigating Stylistic Desire

3.0.1.1 Introduction

Examining stylistic freedom by making a comparison across subjects' referential choices in tightly controlled environments requires that a study limits various possible causes of referential variability. The data elicited in a free writing task can be illusory for an investigation of how the patterns of anaphoric marking compare across subjects. The necessity of limiting the individuals' freedom in using their own styles of writing, tailoring the amount of writing, and minimising differences which are created simply by individuals' deciding which part of the story to elaborate more and which part of the story should be left less elaborated demands the choice of a special methodology for this study. It is when we manage to keep all the sources of variability constant that suggestive evidence can be discovered about the effectiveness of the discourse constraints on the choice of anaphoric expressions. Consequently, the research objective can be attained only through analysing experimental data elicited in a restricted type of performance in which referring expressions marking salient referents are replaced with blanks, and empty NP slots are filled out by subjects in the experiment. This type of task requires the subjects to understand an already existing text partly by filling the empty NP slots pertaining to topical characters.

In order to investigate the variability of individual writings in a free writing task, we collected narrative data from ten native English speakers (male and female) by presenting to them a seven minute soundless action movie and asking them to narrate its story.[1] Age, social class, and educational level were assumed to be roughly constant, because subjects were in the same class at Monash University. Since time allocated for writing the stories was limited, the subjects made their utmost effort to write as much as they could. Five narratives started by mentioning the actions of a named protagonist (*Steed*) being opposed by an unnamed antagonist; in the other five, both the protagonist and the antagonist were introduced by indefinite NP's. We shall briefly exemplify the problems that may exist for correlating the choice of anaphoric expressions with the accessibility status of the intended referents. Narratives written by individual writers contain stylistic diversity and are of variable lengths. An accurate comparison requires tighter control on the subjects' performances.

3.0.1.2 Referential Diversity: The Effect of Referential Strategies in Contrast with Referential Freedom

Diversity among discourse referential patterns might be caused by two types of factors: referential strategies of the text producers and freedom of choice. The environments in which referential freedom is observed are limited: a) optionality in marking minor discourse breaks where there is no ambiguity involved; b) whether or not the presence of an expression is purely stylistic rather than being informative gives the opportunity to the text producer to decide upon the referential choice considering his/her desire; c) the interplay of conflicting factors makes the referential choice unpredictable: recency of prior mention, focus, and referential salience within episodes lead to the use of an attenuated form; potential ambiguity, rhemic complexity, long referential distance, and episodic breaks require producers to use a nominal form; and d) inappropriate choice of referring expressions may be made by less skilled speakers who do not help their addressees by making focus switches clear.

However, referential diversity may be caused by subjects' stylistic strategies which include factors such as: a) varying length of narratives produced; b) the number and the frequency of mentions of characters introduced; c) lengthy elaboration of different parts of the story; d) having the skill to use particular strategies which can affect the frequency of referential forms employed, e.g. the use of English ellipsis requires the writers to develop that skill; e) initial

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[1] Thanks to Prof. Allan for the video tape and the elicited written narrative data collected from the participants of his classes.

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introduction of salient characters by a definite NP as opposed to an indefinite NP; and f) the number and frequency of insignificant entities introduced which contribute to greater complexity of the referential material can cause the use of a full NP. In this section we will demonstrate that the influence of individuals' choice of strategies in narrating a story results in diversity of referential patterns; but this type of diversity does not have anything to do with the effectiveness of discourse constraints.

English ellipsis can be used to remove ambiguity. It evidences the interplay of syntax with the functional pragmatic facet of the discourse reference. Under unmarked conditions, the use of ellipsis is limited to subjects of equi-NP clauses in special semantic and syntactic circumstances. Ellipsis can be more informative than a subject pronoun in certain environments, because the antecedent of a zero, in coordinate and subordinate constructions, is normally the subject of the previous sentence. English speakers have considerable freedom in deciding which actions to unite with ellipsis or separate with the use of pronouns or nominal forms. So ellipsis can be used as a strategy to remove ambiguity wherever possible. Relegating its use to the accessibility of the referent it marks leaves many examples unaccounted for. Unlike English ellipsis, which is a marked device, in many languages ellipsis is an unmarked device.[2]

In many types of discourses, inanimate antecedents are less likely the candidates for attenuation (cf. Givón and associates 1983).[3] But this is not exceptionless, e.g. *the ball* in a report of a soccer match is almost completely eliminated from mention. It is not always the focus of attention that can explain the cause of such difference. There may be stylistic non-ad hoc reasons for attenuation and non-attenuation: salience and focus of attention can lead to attenuation, but every unattenuated entity cannot be claimed to be out of the speaker's focus of attention, as every attenuated entity cannot always be claimed to be under primary focus of attention in the interactants' discourse models. Some focused entities are identifiable easily through inferences based upon context, but they are hardly pronominalisable. In brief, as we shall show in this thesis,

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[2] The use of ellipsis is an unmarked rather than a stylistic option in such languages as Japanese, Chinese, and Korean. In Persian with obligatory agreement, suffixes are attached to verbs to mark person and number of the subject and the object of the clause, so the use of a pronoun is a marked stylistic option and is used in written more often than in spoken language.

[3] The focus of attention and the referential salience can be directed by topicality in discourse. However humanness is not necessarily a condition for topicality, it all depends on type of the world spoken of, e.g. in a report of a football match, frequent ellipted references are made to the ball which is the most recurring entity in this type of discourse; but the ball is the most focused entity not the most important entity of the text.

the focus approaches fall short of accounting for all the referential markings used to refer to the discourse entities.

The italicised pronoun *he* in example one is used in an ambiguous environment where switch subject is clear only through the predicate of the clause containing it, rather than through the use of the pronoun. In contrast, the bolded *he* in the last clause of example 1 can only create an ambiguous impression, i.e. two coreference interpretations emerge. Moreover, both *the kid* and *he* in one are ambiguous because there are two kids interacting in the story. Ambiguity is removed through the inferences made according to context, in more general terms, through the inferences possible in a world spoken of. It appears that in such environments the function of referring expressions is secondary to context.

> 1
> ...And the one kid, I think it was the kid who was playing with the uh...with..the whatever it was, ...stops, and picks it up and whistles. ...And the kid turns around, and *he* goes and takes the hat to the kid, and—um...the kid gives him three pears. ...And- so the...the other kid comes back to his friends and /he/ gives them each a pear.   (Clancy 1980)

In example 2, the role of a pronoun is critical in the switch subject; i.e. in the environment of switch subject, English ellipsis would be ambiguous, but it is evident that not all instances of the use of a pronoun in English are in environments of switch reference. Needless to say, the reader who has not been exposed to the *Pear Stories* (Chafe 1980) may not be able to recover the world spoken of here. Not having the complete story available, it is hard to say that the pronoun *he* can clearly pick up the referent intended without ambiguity. The role of context is often complementary to the use of pronouns.

> 2
> ...and another guy$_1$ picks up the rock and throws it out of the road, and ...he$_2$ gets...all situated again,

In example 3, the need for a pronoun is stylistically justified; it is optionally used to mark a shift in action. If the pronoun *they* had not been mentioned, clarity of coreference would have been attributed to context.

> 3
> but instead *they* helped him, ...tsk *they* set his basket up, and got him going, and *they* kept going,

In what follows, we will discuss briefly why the diversity observed in the data elicited through a narrative writing task does not pertain to only stylistic freedom. The thing is, we should differentiate two major causes for referential diversity: the diverse referential strategies used in a

narrative writing task are manifested as differences in referential patterns and the frequency types of anaphoric expressions used. But, in contrast, the diversity in the patterns of anaphora across individuals may represent freedom of choice, which is caused by subjects' desire in allocating more or less marking to discourse referents. Unlike the former which is not related to the validity of the functional claims about how the choice of anaphoric expressions is constrained, the latter does indeed challenge the strength of the functional claims.

3.0.1.3 The Steed Story

The following is one subject's version of the story:

> Steed was driving along a road when he comes across another car parked across the road. Seeing no driver, he looks around and sees a quarry nearby. At the bottom of a deep pit, he saw what appeared to be a body lying at the bottom. He climbed down a ladder placed handily and while he was checking the body, the ladder was removed. He tried several times to scale the side of the quarry but failed. An earth moving vehicle started up on the top of him and someone proceeded to push shovels of earth into the quarry immediately above him. After three loads of earth had been dumped, the driver, wearing red socks and black shoes and a blue suit, comes to the edge. Amongst the dumped earth he sees Steed's bowler hat so he descends into the quarry. Meanwhile, Steed, still neatly dressed in his black suit etc, had been hiding and attacks the bulldozer driver from behind. They fight. Meanwhile the bulldozer begins to move forward on its own and eventually tips over into the quarry. The bulldozer driver was losing the combat. Steed climbs up over the bulldozer to the top of the quarry and picks up his bowler, pushes out the dirts and dusts it down and puts it on his head.

The story begins with an introductory part in which *Steed* is driving along a road. Then a problem arises and the protagonist is faced with a challenge: discovering what has happened. The action part starts by his getting out of the car and entering into the quarry using a ladder. Thus far, the story contains attenuated references to *Steed* who is in focus, being the only character introduced. Then the action part continues and another character enters the scene, occupying the subject slots. *Steed* is marked as the recipient of the actions, and the subject switch is indicated by the use of full NP's. The examination of the ten written stories demonstrate that: a) greater elaboration of the interactive part of the story involves more frequent use of full NP's which is the cause of the subject switches; b) the number of entities introduced and the frequency of the subsequent mentions of the entities introduced are correlated with the frequency of full NP's as opposed to pronouns used; c) characters initially introduced by an indefinite NP require a different referential strategy throughout the story than characters introduced by definite NP's; and d) inanimate characters are not pronominalised, despite being backgrounded information.

In the above narrative, the subject of *driving, coming across, seeing, looking in a nearby quarry, seeing a body,* and *climbing down,* is *Steed* without any other referent competing. Then the action of *removing the ladder* functions to introduce a new character into the action part indirectly. Steed's resumption of actions begins by trying to *scale the side of the quarry* and *failing.* Again, a vehicle represents a mysteriously represented character; "*a tractor starts up on top of him*". Now the second character is introduced by *someone*; and he is represented by further actions of *proceeding to push shovels of earth.* Steed is still under focus and is coded by *him* in the object position. The indefinite pronominal expression, *Someone,* is changed to *the driver wearing red and black shoes and a blue suit,* and is represented by '*coming above the edge*', he is now in focus and Steed appears to receive secondary attention at this stage. The expressions *seeing Steed's bowler hat* and *descending* predicate the sinister man. A full NP, *Steed,* is used to make a switch subject. The referent is represented by actions such as *hiding nearby* and *attacks*; the latter is associated also with *the driver* who is the recipient of the action of *attack.* The different types of full NP expressions may be for expressing an attitude: *the driver of the bulldozer* is marked as *the bad man, the sinister man* and so forth. This diversity tends to be for stylistic felicity. The verb *fight* predicates both of the men, referred to by the plural pronoun *they.* Focus is then shifted to *the bulldozer* which is represented by *begins to move forward* and *tipping over into the quarry.* The action shifts again, so *the bulldozer driver* takes subject position being represented by *losing the combat,* the word *combat* indicates the presence of *Steed,* although he is eliminated from mention in the sentence; this is the property of the type of predicate that makes it possible to refer to *the driver* in the subject position as the recipient of an action the agent of which is not mentioned. In the end, conquest is achieved and the conclusion part begins. A switch again is made to *Steed* in the conclusion part; he becomes the subject of *climbs up, picks up the hat, pushes out the dirt, dusts down,* and *puts the hat on head.*

As was mentioned, the referent who is introduced with an indefinite NP seems not to persist. Focus is allocated with more difficulty for referents who are introduced initially by an indefinite NP, when there is competition and the context contains interactive events. In the above story, the antagonist of the story is first introduced indirectly, then an indefinite pronominal expression is used and is again reintroduced by several different terms: first he is introduced indirectly through a passive construction, *the ladder is removed,* then the clause *an earth moving vehicle starts up* indirectly implies his action so again the presence of the driver is pragmatically inferred; the next explicit mention is made by *someone,* the fourth mention is made by a much longer expression: *the driver wearing red socks and black shoes and a blue suit,* the fifth and the sixth mentions are

made by *tractor driver*. Contrast this character's introduction and reinstatement with the main character, *Steed*, whose introduction and reinstatement is done through the use of a simple name and for whose further mentions either the same full NP type is used or a pronoun.

As an effective stylistic strategy, it is possible to leave the antagonist unmentioned through the use of passive constructions and the use of a bridging inference, e.g. using *tractor* instead of *the man driving it*, the strategy provides significant help in the task of referring to the characters in potentially ambiguous environments. One useful stylistic technique in elliptical marking of a referent is to leave an entity unmentioned (the strategy tends to be used as a device to create suspense for the reader) while his presence is felt. In the following examples, the referent who is the center of focus is not mentioned, but one can observe the implicit presence. So focus may not necessarily be made explicit by a pronominal mention; there may not even be an ellipted NP slot for some mentions. A strong expectation is created for the reader that someone who is not mentioned on the surface is present in the discourse at this stage of the story. Formal treatments ignore some of these cases of elliptical coreference; only pragmatic inferences within the story world handle the resolution in four (b)&(c).

> 4
> a. The ladder is being slowly pulled up.
> b. A bulldozer starts coming to the edge of the quarry.
> c. The ladder has gone.

While there are clear examples of long distance coreference by a pronoun dominated by focus of attention, it can hardly be claimed that all instances of anaphor resolution can be accounted for in terms of the cognitive effect of focus within episode boundaries. The main issue in accounting for focus of attention is that focus is optionally marked by the use of anaphoric expressions. Example five illustrates the use of a long distance pronoun to resume reference to an entity, *a body*, after a long gap:

> 5
> He investigates at a nearby quarry, and notices what looks like *a body* in the quarry.....[6 clauses intervening ...] He finds that *it* is merely a coat and hat in the quarry.

It is interesting to note that whereas *a body* in the example above is pronominalizable after six clauses intervening; in spite of its immediate previous mentions, nowhere in the data collected is *quarry* pronominalised. While both, *the body* and *quarry* are identifiable through the informativity of context in most of the NP slots they occur in, one is pronominalised but the other is not. How can we account for this difference? One answer is that inanimate entities used as locatives may be

identifiable through context; however, there is stylistically very little preference for using pronouns in marking them. The claim is that a referent may be identifiable through predications made of it, but the type of referring expression used for marking its identifiability may appear unpredictable and stylistically variable. The difference should be taken into account in dealing with how referring expressions are arranged in discourse.

In the following example *the man* becomes *the body* in the next clause. This kind of alternation is possible when the entire story is viewed and when a shared knowledge of the world spoken of enables the bridging between the two semantically different terms which are coreferential. Through a pragmatic inference, it is possible to think of *the man* as *a body* in the next stage of the story. The inferences are based on who is likely to be associated with which action within the limits of a world spoken of.

> 6
> A bolting man gets out of the bulldozer {0} believing that *the man* has been crushed, a hat lies on the ground where *the body* apparently is buried.

There is persuasive evidence to claim that it is the context, rather than the pronominal expression, that reveals the identity of some referents. In seven, it is not the pronoun that reveals the identity of the referent in the ambiguous environment. The reference by the pronoun is not resolved until the entire clause is uncovered:

> 7
> He_1 [the blue suited man] believed he_1 had been successful and descended into the pit.

The anaphoric relation between the pronoun *he* in the second clause of the sentence and its previous antecedent marked as He_1 is resolved by the informativity of the context within which the two mentions are located; in a narrow sense the complementary expression *successful* is associated with the referent of He_1, as we might get a different impression if the clause read:

> 8
> He_1 (the blue suited man) believed he_2 had been buried under the soil and he_1 descended into the pit.

The examples below further show the importance of the clausal predicates in the identification of the referents marked by pronominal devices. In 9, *he* is used for marking *Steed*, then the same referent is marked by *Steed*, rather than *he*, and finally in the last clause, context determines the referent of the slot; so the choice of a marking device is more optional. In 10, the use of ellipsis removes the effect of potential ambiguity.

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9

He (Steed) evaded the dirt and when the driver of the dozer stopped to see whether *Steed* was buried , [zero]/he/Steed jumped upon him from behind.

10

As he (the evil man) leaves to pick up what he thinks is the hat visible indication of Steed, *the latter* jumps on top of *him*, [zero] engaging him in yet another titanic confrontation.

As the results of a simple statistical comparison show, a wide diversity is observed which is connected to several factors including the possible effect of stylistic freedom. Even different frequencies of switch subject and varying selection of types of verb phrases may bear different results regarding the frequency of pronouns and full NP's used. Table one represents the consecutive mentions of *the quarry* where most of the actions in the story take place. The reason for the explicit reference to this referent cannot be that the location of *the quarry* is unidentifiable: the plan of the story and the explicit location of all the actions highlight it; but, despite lack of ambiguity, it appears stylistically not desirable for this entity to be pronominalised. The other feature of the narratives which makes them less homogenous is the great difference across subjects in the frequency of mentions of the entities (three to 13 times in the case of *the quarry*). The variability in the number of entities introduced and the frequency of their mentions both impact on the frequency of types of anaphoric expressions used.

Table two displays how narratives vary because of the ability or the desire of the writer to introduce and remention varying numbers of referents. Such differences do not let us make an exact comparison. The varying number of entities introduced, the varying proportion of the narratives allocated to interactive parts, and the frequency of mentions of the characters all contribute to difficulty in a comparison. The narratives have different lengths, between 22 and 88 clauses; consequently, the number of the entities introduced and the frequency of mentions of each entity differ which impacts upon the frequency of the use of pronouns as opposed to full NP's. These types of differences indicate the difficulties faced by a study of how anaphoric patterns across individuals compare.

Table 1. The devices used by 10 subjects to refer to the quarry (numbers before the expressions indicate where in the story the clause containing the entity occurred).

SUBJECT 1	SUBJECT 2	SUBJECT 3
13. A dug up hole	11. A large excavation	13. a large excavated hole
17. in the quarry	14. at the bottom	15. the top of the hole
29. a load of sand	23. the pit	18. the side of the hole
32. another path	32. dirt	21. into the side of the hole
34. a heap of earth	33. the pit	25. above, outside the hole
39. under the sand	36. the dirt	27. out of the hole
Total: 6 mentions	43. what was left of the pit	30. the hole
	Total: 7 mentions	35. into the hole
		39. the hole
		45. bottom of the hole
		49. the tip of the hole
		51. the hole
		Total: 13 mentions
SUBJECT 4	**SUBJECT 5**	**SUBJECT 6**
7. a nearby quarry	3. in a pit	2. out of the pit
15. the side of the quarry	8. into the pit	8. into the pit
20. into the quarry	17. red earth pit	15. the edge of the cliff
22. three loads of earth	20. red clay	**Total: 3 mentions**
24. above the dumped earth	24. out of the pit	
28. the quarry	26. in the clay	
35. into the quarry	**Total: 6 mentions**	
39. top of the quarry		
43. the dirt and dust		
Total: 9 mentions		
SUBJECT 7	**SUBJECT 8**	**SUBJECT 9**
14. a nearby quarry/excavation	6b. in a nearby quarry	20. earth works where there is a big hole in the ground
17. in the quarry	8b. bottom of the quarry	21b. one edge
20. down the side of the quarry	14b. the sides of the quarry	26b. at the bottom
28. in the quarry	17. the side of the quarry	42. in the hole
32. steep sides of the quarry	31b. over the edge (of the quarry)	40. the dirt
37. the edge of the quarry	38. opposite wall of the quarry	45. the earth at the top
39. large amount of soil	43. the quarry	46. it (earth)
41. a land slide	**Total: 7 mentions**	53. dirt
50. into the quarry		55. dirt
59. the edge of the cliff		57. dirt
Total: 10 mentions		75. the edge of the hole
		80b. the edge (of the hole)
		Total: 13 mentions
SUBJECT 10	**SUBJECT 10**	
3b. a pit or quarry	13b. the bottom of the pit	
4a. in this pit	15c. a load of earth and rock	
5c. the pit 6c. in the pit	18b. at the bottom of the pit	
8b. the side of the pit	19b. the pit	
10b. a load of earth down on top of him	26b. the edge of the pit	
	27b. the edge(of the pit)	
	Total: 12 mentions	

Table 2. The referential devices used to refer to the referents other than the two salient characters in the stories written about the motion picture presented to the native English subjects.

SUBJECT 1	SUBJECT 2
2. A bag of drugs 5. his path, 6. at the end of the road. 6. a stationary car on the deserted road, 9. his car 17. a clock and hat, an injured man, 21. it (the body) 19. the ladder, 25. a trap 30. his direction, 32. another path, 35. his direction. 42. dead man's hat 45. a sudden blow on his back. 46. his surprise. 48. both men, 49. each other, 50. zero, 52. them (both men), 53. they (both of the men). 51. machine, 56. the front of the machine.	2. Someone. 8. Man's car, 9. it. 14. A body at the bottom, 20. the body, 21. a pile of cloths. 16. A ladder, 18. it, 26. the ladder. 28. Starting an engine, 31. a bulldozer, 44. it, 46. zero. 30. Someone (the driver of the bulldozer). 47. His bowler hat. 51. who. 52. People. 53. Ceramics industry.
SUBJECT 3	SUBJECT 4
2. A country road, 4. his way, 5. the road. 5. A car parked across the road, 9. the Thumper. 11. Missing driver 17. A coat and a bowler hat on the ground, 22. these clothes. 18. A ladder leaning against the side of the hole, 24. the ladder. 25. An unseen person above out side the hole. 33. The bulldozer(-driver), 48. the bulldozer (-driver), 50. it, 53. it, 54. the blade, 57. the machine. 34. Steed's bowler hat, 41. the hat. 46. They(the two men), 47. they.	3. Another car 4. Across the road. 9. A body. 11. A ladder, 13. the ladder 17. An earthmoving vehicle, 33. the tractor, 18. Someone. 26. Steed's bowler hat, 41. his bowler, 45. it 32. They (the two men). 38. the tractor 46. His head.
SUBJECT 5	SUBJECT 6
2. Something, 4. something, 6. a corpse, 11. the whole things, 15. the cloths and hat of what he thought was a corpse. 9. A ladder, 13. the ladder. 12. A trap 14. A mysterious power. 22. Elsewhere. 24. His British Suit 25. his hat, 31. the hat. 27. That(the hat being half buried). 37. The bulldozer.	10. Black suited man's hat, 20. his hat. 12. Fast fight. 13. They 14. The bulldozer, 18. it(tractor), 17. zero. 22. His way
SUBJECT 7	SUBJECT 8
1.A man dressed in a suit and wearing a hat, 34. his clothes, 46. his hat, 52. the hat. 2.A narrow country road. 3. An antique car, 8. his car. 5. A car parked across the road, 10. the car blocking the road, 12. it. 16. A body, 26. it, 19. A ladder, 22. the ladder, 24. the ladder, 30. the ladder. 43. Onslaught. 48. The bulldozer, 57. the tractor which didn't have the brakes on, 58. zero, 62. the bulldozer.	1. A road. 2. An old fashioned car, 3. A car, 7. Some clothes, 12. the hat and clothes, 8. A ladder leading to the bottom..., 10. it, 13. the ladder, 18. This (trying to scramble), 20. The bulldozer (driver), 30. the tractor (driver), 34. the sloping blade, 36. back of the machine, 37. the front of it. 23. A hat, 26. the hat, 41. his hat. 31. them (two men).
SUBJECT 9	SUBJECT 10
2. Country lane. 3. Old fashioned car with open hood, 10. his car. 7. A light blue car which is blocking..., 12. the blue car, 14. the driver's window. 15. No one. 18. The dirt road leading off the lane, 19. the road. 23. Someone. 26. A body, a coat and hat, 34. the body, 36. the hat and coat, 37. no one. 29. A ladder, 33. the ladder, 38. the ladder. 39. Some unknown person, 40. zero. 40. The man's hat, 65. half covered hat, 68. the hat, 70. it, 94. his hat, 96. the top, 97. it. 76. they (the two men). 77. the big fight, 78. this (the fight). 79. Shots of tractor, 80. the bulldozer, 84. the tractor, 86. the tractor, 88. zero, 91. the front of the tractor, 92. it.	1. A bowler hatted man, 18. a bowler hat, 21. the bowler hat. 1. A car, 3. his car, A blue car parked..., 1. Across the road, 3. at the side of the road. 4. A body, 6. items of clothing. 5. A strategically placed ladder, 7. the ladder. 9. Noise of heavy machinery. 24. They (the two men) 25. The fight. 26. The tractor, 27. the tractor, 30. the tractor.

Some entities such as *a tractor, a ladder, hat, the body* and *quarry* are essential to the structure of the story; consequently all narratives contain varying frequencies of mentions of these entities. However, there are a good number of other entities that do not constitute indispensable parts of the story setting and their appearance varies widely: e.g. *ceramics industry, path, a cloak and hat, a trap, another path, a sudden blow*, etc. were mentioned in some of the stories but not in others. So the number of mentions of less relevant entities was variable across stories which were written under identical conditions. Sentences in narratives which contained a more frequent appearance of entities less relevant to the structure of the story carried more rhemic material; the result is greater amount of referential complexity.

As is clear from the sample story described above (see also Table three), the character that is introduced by an indefinite NP requires a different referential marking from the one introduced by a definite NP. The difference is not limited to only the initial introduction of the unnamed character. Nameless characters require longer coding when there is potential ambiguity; allocation and marking of the focus appears to be more easily done in the case of the named character in comparison with the character introduced with an indefinite NP. Table three displays how the two major characters of the story are referred to. Longer expressions are used to code the referent who is initially introduced with an indefinite NP; when the two characters interact, an initially named character is more easily reintroduced after a switch subject. Table three shows that in narratives numbered 1-5, short expressions are used; while in narratives 6-10, longer expressions appear to be necessary in order to remove ambiguity. There are two pairs of columns in Table three, each pair represent the stylistic expressions chosen by the subjects to refer to the two characters of the story; the first column in each pair represents the ways subjects refer to the protagonist and the next column represents the way the subjects refer to the antagonist.

Table 3: The full NP types used to refer to the protagonist of the story, Steed/a man as contrasted with the antagonist, a man/the driver of the tractor. Pronominal mentioned are excluded from comparison.

Columns 1 & 2 display how the two characters of the story are referred to by the subjects 2,4,6,8, and 10		Columns 3 & 4 display how the two characters of the story are referred to by the subjects 3,5,7,9, and 11.	
SUBJ 1 Roy Roy Roy the dead man Roy	SUBJ 1 The noises of a tractor The tractor the driver of the tractor. The driver	SUBJ 6 The black suited man The black suited man The black suited man's The black suited man The black suited man	SUBJ 6 The blue suited man in a tractor The blue suited man
SUBJ 2 1. J Steed 2. Steed 3. Steed 4. Steed	SUBJ 2 1. Someone 2. The driver of tractor 3. his opponent	SUBJ 7 A man dressed in a suit The man the first man who is not really buried under the soil	SUBJ 7 A bulldozer (+ driver) The man driving the tractor also dressed in a suit and wearing dark glasses and looking sinister One man (the writer is dubious) The tractor driver
SUBJ 3 Steed Steed Steed Steed's bowler Steed Steed	SUBJ 3 A bulldozer is being used A man in a blue suit with red socks The other man	SUBJ 8 A man The man The body The other man	SUBJ 8 A bulldozer(driver) The driver of the tractor The bolting man The bolting man
SUBJ 4 Steed Steed's hat Steed Steed	SUBJ 4 Someone The driver wearing red socks and black shoes and a blue suit The tractor driver	SUBJ 9 A man The man The man The man The man The man's hat The good guy The good guy The good man	SUBJ 9 An engine This engine The front of the tractor (+ drive) The tractor(+ driver) The person driving the tractor with gloved hands and maroon socks The bad guy The bad guy The bad guy
SUBJ 5 Steed Steed Steed Steed Steed	SUBJ 5 The bulldozer(+ the driver) The evil man The evil man	SUBJ 10 A bowler hatted man driving a car The man The first man The first man	SUBJ 10 A bulldozer(+ driver) A bespectacled man The second man The second man

Tables four and five show that full NP's are maximally used 66% of the time, and minimally 14% of the time in narratives which are written in almost identical circumstances. Pronouns are minimally used 15% of the time to a maximum of 75%. Zero anaphors occur with a minimum percentage of 5% to a maximum of 40%; and this measurement pertains to only the two salient characters of the story. These figures show that narrative data collected through the procedure described above provide an extreme image of stylistic freedom. The point is, there is little

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homogeneity across subjects' produced narrative data. An ideal environment for investigating the cognitive constraints on referential choice needs the implementation of a method which does not allow the inconsistency existing in the data collected through a narrative production task to interfere with the results. If there is diversity across subjects' performances, it must be possible for us to show precisely what are the possible causes.

The figures in Tables four and five provide a quite radical view of stylistic freedom. The longer the story and the fewer the referents introduced, the more established the protagonists become, consequently a greater number of attenuated markings is expected. The frequency of reference to the major characters of the story is certainly related to the possibility of using a greater number of pronouns. For example, in the case of subject eight, the frequency of 62% for full NP's indicates that the characters were not mentioned as many times as they could be, so a fewer number of predications were made of them. The differences in the frequency of full NP's and pronouns are caused by several factors, chief among them are: a) the variable length of the narratives; b) the differential number and frequency of entities introduced; c) initial introduction of referents with definite NP's as opposed to indefinite NP's; d) creating the appropriate semantic and syntactic environment for using particular constructions (e.g. the use of ellipsis depends on creating the appropriate semantic and syntactic environment); and e) greater elaboration of interactive parts, involving frequent subject switches and as a result more ambiguity is to be removed. These are · the major variables causing variance in the referential patterns displayed in the subjects' written narratives.

Table 4: The frequency of referential devices used to refer to Steed/a man

Story no.	Total	full NP	Pronoun	Zero
1.	24	5	18	1
2.	25	4	16	5
3.	20	6	6	8
4.	19	4	9	6
5.	14	6	7	1
6.	8	5	2	1
7.	21	3	14	4
8.	15	4	6	5
9.	38	8	15	15
10.	16	4	9	3

A close look at tables four and five makes it clear that the differences among the frequency of the subjects' choice of types of anaphoric expressions can not possibly be related to referential

freedom. As we will show, the iconicity of language cannot be disputed, i.e. a prototypical correlation between the choice of referring expressions and the cognitive constraints on their use is almost always observable.

Table 5: The frequency of referential devices used to refer to *the driver of bulldozer*

Sub. No	Total Mentions	Full NP: No	Pronoun:No	Zero: No
1.	12	4	5	3
2.	5	3	1	1
3.	8	3	3	2
4.	6	4	2	0
5.	6	3	3	0
6.	6	2	3	1
7.	10	4	3	3
8.	9	4	3	2
9.	14	8	2	4
10.	9	4	2	3

To sum up, while a comparison of the individually written narratives can lead us to some prototypical results, it is hardly possible to reach conclusions about how individuals compare in their use of referring expressions in the discourses that they produce. It is observed that the function of definite and indefinite NP's in marking salient characters is significantly different, the impact of such a difference is not limited only to the strategy taken in the first introduction. Salience, animacy, pronominalisability, and focus are issues which do not necessarily always agree. Salient characters are mostly animate and, when in focus, are pronominalisable. But inanimate referents may be less pronominalisable, e.g. *quarry* in the narrative data analysed above is not pronominalisable because it is not animate; however, in certain contextual environments, an inanimate entity may be the center of focus and be frequently pronominalised, e.g, think of the ball in the soccer match. Indeed, pronominalisability doesn't ensure focus and salience and non-pronominalisability also does not always indicate lack of salience and focus.

There are many factors to explain the variability in the percentages of the use of referring expressions in this type of task. Length of narratives, the writer's decision on which part to elaborate, and individual linguistic skills. The frequent use of ellipsis demands that the writers produce the semantic and syntactic environment for its use. Selection of different verb phrases impacts upon the frequency of mentions of referents, and the different possibilities for the number and frequency of mentions of characters all cause the diversity possible among individually

written stories. We demonstrated that referential stylistic freedom and differing referential strategies may both be factors causing referential diversity; however, these do not interfere with the correlation between the choice of anaphoric expressions and the accessibility of referents marked. Next, we proceed to examine discourse pragmatic tendencies that motivate the use of types of referring expressions.

3.1 The Comparison of the Data

3.1.1 Subjects And The Task

Fourteen self-selected undergraduate and postgraduate native English speakers voluntarily took part in this study. Among them, two were bilinguals and the rest knew at least one language other than English. They were given ample time to read carefully and fill the empty NP slots of five articles; two were chosen from *The Age* newspaper (1993), one from *Etcetera*, the Monash University newspaper (1993), and two expository texts were chosen from Fox (1987). Except for the first mention of the topical referents, the NP slots of some (not all) subsequent mentions were left blank for the subjects to identify and fill in. The subjects' selections of referential devices were compared for similarities and differences. It was hoped that the data collected through this method would enjoy a fair degree of homogeneity and would lead us to some useful results.

The method engaged the subjects simultaneously in two types of language activity: comprehension of an already existing text and choice of appropriate linguistic devices to fill the empty NP slots. The entire task was outlined by a written instruction telling the subjects that their performances would be used to investigate the preferred reference patterns. This step was to ensure that readers thought of the expository texts as formal written texts, instead of trying to identify the discourse entities and merely show that their identification was right.

3.1.2 Material

Were the recognition of the discourse constraints on anaphoric choice a conscious act, subjects would recognise where it is expected for them to choose nominal as opposed to pronominal expressions. Failure in displaying an appreciation of discourse constraints on the use of anaphoric expressions can indicate that discourse constraints are optional constraints which are variably followed and recognised. The experimental materials are the selections by fourteen individuals to fill 38 empty NP slots of five passages totaling 532 tokens of referential NP's:

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the Aveling passage	5 empty NP slots,
the Albertson passage	10 empty slots,
the Jackson passage	3 empty NP slots,
the Gillespie passage	9 empty slots
the Marcus passage	11 empty slots.

Since the aim of the study is to test the subjects' ability to recognise pragmatic tendencies constraining the choice of anaphoric expressions, without verifying the influence of context,[4] no specific criteria for selecting the passages used for data collection were taken into account, neither were there any specific reasons for deciding which NP slots should be left for the readers to fill; the NP slots involved mainly such cognitive constraints as referential distance, episode unity, and referential complexity due to presence of competing entities. The NP slots comprised both subject and non-subject positions and they contained the referents mentioned in either distant or immediately prior context, either initiating an episode or located within an episode. Whether subjects are influenced by salience of the character, its degree of recency, or its occurrence in an already finished episode were all factors. Subjects had to access information and keep the information activated while reading the expository passages; and this forced them to concentrate on the task. Since they had access to the contextual information emerging mainly from the verbal predicates of the texts, there were a few errors in identifying the ellipted referents.[5] Indeed, in order to leave our subjects with plenty of contextual information, we eliminated most (rather than all) of the mentions of the topical characters from mention; we further limited the empty NP slots to only one salient character in most cases, so that the readers could access sufficient cues for identifying the referents of the ellipted expressions. The passages contain topical and sub-topical characters and they have variable lengths.

3.1.3 Design

The referring expressions used by the subjects were limited to four categories which could potentially constitute the variables of a comparison: 1) first and last names, 2) last names alone, 3) first names alone, and 4) pronouns. But these divisions did not practically appear to mark differing degrees of accessibility in the corpus of data we analysed for the study; the use of different types of full NP's often displayed stylistic preferences (see Table six for a comparison). In order to attain reliable results regarding a correlation between these

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[4] We will deal with the function of context in anaphor resolution in detail in the next two chapters.

[5] Only in two slots, Albertson slot 2 & Gillespie slot 4, we faced with mistakes in identification.

expressions and the accessibility of their referents, a much greater corpus would be required, the analysis of which would lead to more reliable findings regarding the precise functions of the differential uses of types of full NP's. Using large corpuses of data of various types, we can limit the possibility of exceptional occurrences of such terms and apply inferential statistical measures to examine their effect in prototypical terms. Given this limitation; therefore, we divided the anaphoric expressions into nominal vs pronominal.

Table 6: The percentages of the anaphoric expressions of subjects in contrast with the writers: 14 subjects X 5 passages.

Subject number	full NP Last&First %	Last names %	First names %	pronouns %
1	15	40	38	7
2	21	28.6	8	42.4
3	24.4	34.8	1.6	9.2
4	14.4	27.2	25.6	32
5	28.4	24	8	38.8
6	18.4	45.4	6	30.2
7	14.4	48	5	31.8
8	14.6	46.4	5	33.4
9	34	11.2	42.4	12.2
10	16	11	22	51
11	14.4	11.6	15.4	58
12	48.6	45.2	6.4	--
13	53.6	18	--	28.4
14	16	57	2	27
Original writers	14.4	53.6	5	27

Needless to say, conformity in selections of the referring expressions would support the functional claims about the employment of discourse anaphoric expressions: the cognitive function of distance and episode boundaries in the assumed correlation between the anaphoric expressions and the accessibility of their referents. If, however, we find instances demonstrating the subjects' disagreement among themselves and with the original writers in their selection of anaphoric expressions, we will have to believe that the diversity observed pertains to either the existence of stylistic freedom in marking the referents of the discourse or lack of an appreciation for them because of the optionality in the discourse anaphoric marking. The constraints may not be recognised for two reasons: either 1) a given subject's degree of developmental maturity is not sufficient for recognising some discourse constraints (this, however, should not apply to our subjects as they are university students); or 2) the discourse constraint is not strong enough to trigger a particular choice, for which case diversity may naturally be observed. Two alternative hypotheses of referential freedom are: 1) complete

referential randomness in all NP slots triggering stylistically varying patterns of reference among individuals, which is not favoured here; 2) constrained freedom revealing tendencies triggering appropriate anaphoric selections. But, as the results of data analysis demonstrate, discourse constraints on the choice of anaphoric expressions vary in their directive influence on referential choice; in a sense, the predictability of the form of anaphoric expressions differs slot by slot. There are differing functions for the use of full NP's, two major functions include; first, to serve the introduction and maintaining of the identity of a referent in coordination with context, and, second, to carry the pragmatic intent of the producer.[6] In the former case, a full NP is used to remove ambiguity, while in the latter, it optionally marks the constraining effect of either referential distance or discourse episodic structure. Simple descriptive statistical measurements were employed for showing the varying influence of the referential tendencies in determining the form of the referring expressions as demonstrated by the subjects in comparison with the writers of the texts. The variables of our comparisons are as follows:

Subjects (14) X Referential Choice Nominal vs Pronominal (2) X Passage (5) X Slots (43).

3.2 Results

3.2.1 Introduction

The results of the data analysis indicate that no identical pattern of reference in all cases of NP selections is found. This is not a surprising observation, as numerous functional studies on the discourse referential strategies report only prototypical results. Identical choices were observed in environments where a formal constraint, recency, or a perceivably strong discourse tendency directed the choice. In most slots a varying number of the subjects displayed conformity in their selected pattern of reference, the cause of which was textual episodic constraints. And in a few cases no conformity was observed.

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[6] As has been demonstrated (cf. Chafe 1987), the choice of referring expressions in discourse may be a reflection of the cognitive cost of reorienting attention in episode boundaries. The choice of anaphoric expressions may also be to signal to the reader the structure of discourse. It is maintained that, while the cognitive cost for producing discourse is an acceptable explanation for the use of nominal expressions in subsequent retrievals, in a written task such as the one used for this study, we may consider the motivation for the use of anaphoric expressions directed by the pragmatic intent/understanding of the subjects.

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We first present the passages as filled by the subjects slot by slot in the following order: the Aveling passage, the Albertson passage, the Jackson passage, the Gillespie passage and, finally, the Foster passage. The thrust of the qualitative analysis is that anaphoric expressions signal the degree of difficulty of identification, in the sense that a full NP does not always indicate that the referent in question is otherwise unidentifiable. Full NP's also indicate the existence of the discourse episodic organisation, but minor episodic breaks are normally marked according to the producers' discretion. In most cases, the interplay of various factors determine the choice of a form, while the identifiability of the referent of most empty slots is secured by context. Identifiability is different from accessibility, a referent with a low level of accessibility is identifiable when ellipted; and a highly accessible entity is easily identifiable; consequently it is either attenuated or ellipted.

3.2.2 The Context Based Analysis of the Data

The five passages containing empty NP slots each had a differing number of sentences. The empty NP slots were filled by the subjects considering their judgements of the discourse structure, referential difficulty, and the effect of referential distance. We first present the passages with brief explanations of the contexts within which the NP slots are located. The Aveling passage contains five empty NP slots pertaining to the major character *Aveling*, all of the NP slots contain the full NP, *Dr Aveling*, in the original text. The passage first introduces the character in question and in four of the five subsequent episodes following the introduction, there are mentions of *Aveling*. Briefly, in slot two (see extracts 11-14 below), two intervening episodes made the preference of a nominal NP clear almost to all the subjects. Evidently, the text has assumed a great deal of shared background knowledge; it was written for people associated with Monash University. The expressions used in the sentences are: 1) *the Department of History*, 2) *the Monash Postgraduate Association's (MPA) Supervisor of the Year*, 3) *the award*, 4) *executive officer of the MPA*, 5) *Ms Margaret Sloan*, 6) *one of the most demanding tasks*, 7) *academic staff*, 8) *all postgraduates*, 9) *their supervisors*, 10) *the nine submissions*. The referents introduced as part of the rhemic material are all considered to be definite but accessible. They create complexity of the rhemic material and hence decrease the probability of the use of a pronoun in slot two.

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Associate professor Marian Aveling of the Department of History is the Monash Postgraduate Association's (MPA) 1992 Supervisor of the Year.

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> The award has been introduced to recognise what executive officer of the MPA, Ms Margaret Sloan, describes as "one of the most demanding tasks that academic staff undertake".
>
> All postgraduates were given the opportunity to nominate their supervisors. From the nine submissions received, (2___) was chosen based on the clarity and depth with which her positive attributes had been described.

Slot three was less of a discontinuity as evidenced by the fact that six out of 14 subjects did not choose a nominal expression. The NP slot is located in an object position, so a shift of focus is observed here. Recency, however, counters the suppressing effect of the shift in focus and the unity of the episode; the salience of *Aveling* is another conflicting factor, i.e. the passage is about *Aveling*; the integrative influence of all the factors involved made it a less probable candidate for a full NP.

> 12
> The anonymous students who nominated (3___) wrote: "A good supervisor is heaven-sent, a bad supervisor a disaster. Postgrad life is much easier when you don't have to grapple with chapters returned late or unread, or a supervisor who is unsupportive or unavailable."

Almost the same environment exists for slot four which appeared stronger in triggering a nominal choice. The referent is in object position; there is a five clause distance between the two mentions. Salience, large referential distance, and lower degree of the focus of attention allocated to this referent in the object position are the factors which determine a choice. The reason for a pronoun used in this slot might be: the user of a pronoun is more concerned with the salience of the referent rather than with referential distance and episodic break. Each of the two possible choices here have reasonable explanations.

> 13
> They described (4___) as "approachable, amiable, caring and understanding" but nevertheless demanding and critical where necessary.

And in the case of slot five which was filled by a majority of the subjects choosing a full NP, there is a shift in subjecthood. *Aveling* who was the object of the previous sentence is now the subject; a switch subject is optionally done with a full NP. The full NP does not reflect the unidentifiability of the referent through context; it has a discourse pragmatic function rather than a semantic role.

> 14
> (5___) received the award and certificate from Ms Sloan at a surprise morning tea in the History department staff room.

The episode boundaries create distinguishable breaks, but if the break is not sufficiently strong, referential choice will be up to the text producers' discretion. Moreover, the interplay of several conflicting factors may create unpredictability: a) how relevant the intervening material is to the episode interrupted is related to the referential choice; b) the salience of the referent in question opposes the suppression caused by episodic discontinuity; and c) recency of the previous mention of the referent, because it occurs in the last sentence of the previous episode, triggers a pronominal choice. These are the reasons why referential choice was more or less unpredictable in this passage. Table seven lists the referential selections pertaining to the Aveling passage; it illustrates the writer's referential pattern as opposed to the readers who filled the empty NP slots. Some subjects (e.g those numbered as five, 10, and 11) demonstrated an idiosyncratic pattern of reference which was quite different from both the writer of the passage and from the majority who recognised and followed these constraints. As is gathered from the table, indeterminacy in selection is demonstrated fairly clearly in some cases.

Table 7: Referential patterns of subjects in comparison with the author of the text: Passage 2 (Aveling)

Subject number	The device used for subsequent mentions of the referents in question.			
1.	Aveling	Aveling	Aveling	Aveling
2.	Mrs Aveling	Mrs Aveling	Mrs Aveling	she
3.	Marian Aveling	her	Marian Aveling	Ms Aveling
4.	Marian	Marian	Marian	Marian
5	Ms Aveling	her	her	Ass. prof. M. Aveling
6	Aveling	her	Aveling	Marian Aveling
7	Professor Aveling	her	professor Aveling	The successful Nomine
8	Aveling	her	Aveling	she
9	Marian	Marian	Marian	Marian
10	Marian	Marian	Marian	she
11	she	her	Marian	she
12	Marian Aveling	Marian Aveling	Marian Aveling	Marian Aveling
13	Marian Aveling	Marian Aveling	Marian Aveling	Marian Aveling
14	Marian Aveling	Aveling	their supervisor	Ms Aveling
Original writer: Ass prof Marian Aveling	Dr Aveling	Dr Aveling	Dr Aveling	Dr Aveling

The Albertson passage contains 11 empty NP slots. In slots two, four, five, eight, and 10, a majority of the subjects agreed with the choices made by the original writer, but slots three, six, seven, nine, and 11 did not display agreement of the majority with the writer's choices. In brief, slot two needs a full NP, because not only is there an episode change, but also subject switch requires a full NP to secure the identifiability of the ellipted referent. The function of a full NP in this slot plays a much greater role than in many other slots. In this slot, there are three likely candidates competing for the role of antecedence: *Albertson*, *Swain*, and *Saxon* are all plausible

referents for this slot. The list of referential expressions in the sentences before slot two is quite large: *James S. Albertson, acting academic vice president, the Regents, President Saxon's recommendation, the appointment, a permanent academic vice president, Academic Vice President Donald C. Swain,* and *president of the University of Louisville.* In sentence four in which the empty NP slot two is located, there are referential expressions such as *academic planning and program review, student affairs, financial aid, admissions, student loan collections, student affirmative action, basic skills, the Education Abroad Program, library plans and policies and UC press*; the presence of several rhemic referential expressions creates referential complexity and costs more to process.

The passage has apparently been written for a specific audience, so a lot of shared knowledge is presupposed and is hence left implicit. In the absence of the requisite shared knowledge, understanding of the passage becomes more difficult than normally expected. Pragmatic inferences are not possible to make, because little has been asserted and so the context set is not limited. The more the shared knowledge of the reader fills the gap, the easier it will be to construct a model of the discourse and hence the easier will be the processing of the referential material of the sentence. Given that this is the beginning of the discourse, there hasn't been any chance for *Albertson,* who is the main topical character of the discourse, to be attributed with a sufficient number of predications; so salience is low and focus cannot easily be allocated to this referent. In spite of this difficulty and the undeveloped stage of the discourse, pragmatic inferences were made successfully so that the ellipted referent was identified by a majority of the subjects and was marked with a full NP.

> 15
> 1. James S. Albertson has been appointed acting academic vice president by the Regents following President Saxon's recommendation.
> 2. The appointment is effective from March 1 until a permanent academic vice president is named.
> 3. Academic Vice President Donald C. Swain earlier was named president of the University of Louisville.
> 4. (2___) will be responsible for academic planning and program review, student affairs, financial aid, admissions, student loan collections, student affirmative action, basic skills, the Education Abroad Program, library plans and policies and UC press.

Slot three is filled with a pronoun because of considerable semantic continuity. But the NP slot can plausibly be filled with a full NP. The factors that determine the choice are: recency of prior mention, focus of attention because the referent in the subject position is the subject of the previous sentence too, and the adverbial expression *also* which acts as an indicator of continuity; the great number of the referential concepts introduced adds to the amount of

complexity in the referential rhemic material; as a result, the discourse becomes twisted and some difficulty emerges. The referential difficulty and the factors of recency, continuity and salience contribute to a choice which is to be made by the writer; the writer's task is to reach a compromise. The complexity in the rhemic material motivates the use of an informative expression while the influence of conflicting factors contributes to unpredictability of the possible choices. The subjects' choice is not always the same since when there is more than one factor to consider, different individuals may make different decisions.

16
5. (3___) also is responsible for UC Extension, summer sessions, instructional media, Counting Education of the Bar, and liaison with the Academic Senate, the Student Body Presidents' Council, and the California Post secondary Education Commission.

Slot four initiates a minor break in unity. But how urgent is the function of a full NP in this slot in contrast with slot two? It is clear that full NP in slot four has a more pragmatic function than a semantic function. A full NP in slot four is a means to ease the recognisability of the coreference, although ambiguity is very unlikely given that there are no plausible competing referents intervening; a list of referential concepts was introduced as part of the rhemic information in the previous sentence. It is essential that the writer uses a full NP for referring to an accessible referent, where there is abundance of referential material. It is not complete to allocate the choice of a full NP to only one factor; a claim for relating the referential choice to organisational structure misses the other aspects of the necessity for a full NP. The fact is that processing a great deal of referential information consolidated in a sentence is a costly task.

17
6. (4___) has been special assistant to Swain since 1978.

Slot five is located in an environment of semantic continuity and is filled with a pronoun. A sense of continuity is conveyed by the adverbial expression *for four years prior to that* and makes explicit the need for a pronoun. However, five subjects chose a nominal expression for this slot; their choice indicates that slot five could have been filled by a full NP. The reason is, in sentence six, there is a mention of *Swain* in the object position, and the clausal semantic information: *being assistant academic vice president*, could be somehow related to both *Swain* and *Albertson*. Removing the complexity requires a choice of a nominal expression. The compromise is achieved by some choosing a full NP and by the majority choosing a pronominal expression.

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18
7. For four years prior to that (5__) was assistant academic vice president.

In slot six, subjects disagreed with the original writer by preferring a full NP; one can reasonably claim there is a break in the sequence of actions, so a sense of discontinuity is felt. But the semantic break, salience of the referent, absence of competing referents, and the recency of prior mention are the factors which conflict. The point is, the full NP or the pronoun are both possible options; in the absence of the informativity of the referential expression, the referent is still identifiable. The only difference is there is a degree of difficulty involved.

19
8. (6__) joined UC in 1973 as director of analytical studies.

Slot seven is filled by a pronoun in disconformity with the writer; but the use of a full NP is equally natural. Slots like this illustrate the optionality of choice. The fact is that discourse constraints on the choice of anaphoric expressions do not equally effectively direct the producers in their choices. Where there is an interplay of several factors and ambiguity does not lead to unidentifiability of a given referent, the choice of an expression is made according to the individual producer's stylistic desire; and such choice is consequently unpredictable. These cases of the use of referring expressions cannot be satisfactorily explained under the principle of discourse structural organisation.

20
9. (7__) is a graduate in classics at St. Louis University.

The next four slots contain pronouns in the original passage, among which slots eight and 10 display subjects' conformity with the writer, while slots nine and 11 do not show any conformity. The recency of prior mentions, the salience of *Albertson* at this stage, absence of potential ambiguity and low level complexity of rhemic material all support pronominal choice. The subjects who chose nominal expressions for slots nine and 11 revealed that they considered the mild semantic break in the predications was sufficient for a nominal choice. Either recency of prior mention as well as salience and absence of ambiguity force a pronominal choice or the optional marking of the semantic break is a motivation for a nominal choice; in both options, the choices made are optional and are made under the influence of certain factors.

21
10. (8__) earned his M.A. in philosophy there in 1953,
11. And received the Ph.D in physics in 1958 at Harvard.

12. (9___) Joined the faculty at Loyola University of Los Angeles in 1962,
13. And became chairman of the department before (10___) left in 1968 to join the faculty of the University of Santa Clara as professor of physics.
14. (11___) was also academic vice president at Santa Clara.

Even in the slots which represented subjects' agreement with the original writer, a minority of them made alternative selections; they showed that the discourse principles determining the choice of anaphoric expressions are realised in terms of tendency rather than necessity. In the Albertson passage, in slots two, four, five, eight, and 10, varying numbers of subjects made alternative choices: three subjects in slot two, two subjects in slot four, five subjects in slot five, four subjects in slot eight, and five subjects in slot 10 made selections which were not consistent with other subjects and the original writer. The differences in the number of subjects agreeing with the writer indicate that discourse constraints on anaphoric choice are variably recognised tendencies. Table eight outlines the subjects' choice of referring expressions in the Albertson passage.

Table 8: Referential patterns of subjects in comparison with the author of the text: Albertson Passage
Alber = Albertson,

Sub No.	The device used for subsequent mentions of the referents in question.									
1.	2. J. Alber	3. Alber	4. Alber	5. Alber	6. Alber	7. Alber	8. Alber	9. Alber	10. Alber	11. Alber.
2.	2. Alber	3. he	4. he	5. Alber	6. he	7. he	8. he	9. he	10. he	11. Alber
3.	2. Alber	3. he	4. Alber	5. he	6. Alber	7. he	8. he	9. he	10. he	11. he
4.	2. he	3. Alber	4. Alber	5. he.	6. Alber	7. he	8. he	9. he	10. he	11. Alber
5	2. Alber	3. he	4. Alber	5. he	6. he	7. he	8. he	9. he	10. he	11. he
6	2. Alber	3. he	4. Alber	5 he	6. Alber	7. he	8. he	9. Alber	10. he	11. Alber
7	2. Alber	3. Alber	4. Alber	5 he	6. Alber	7. he	8. he	9. Alber	10. he	11. he
8	2. Alber	3. Alber	4. Alber	5 Alber	6. Alber	7. Alber	8. Alber	9. Alber	10. he	11. Alber
9	2. Alber	3. Alber	4. Alber	5. he	6. he	7. Alber	8. Alber	9. Alber	10. Alber	11. Alber
10	2. he	3 he	4. he	5. he	6. James	7. he	8. Alber	9. he	10. Alber	11. he
11	2. he	3 he.	4. Alber	5. he	6. he	7. he	8. he	9. Alber	10. he	11. he
12	2. Alber	3. Alber	4. Alber	5. Alber	6. Alber	7. Alber	8. Alber	9. Alber	10. Alber	11. Alber
13	2. Alber	3. Alber	4. Alber	5. Alber	6. he	7. he	8. he	9. he	10. he	11. he
14	2. Alber	3. he	4. Alber	5. he	6. Alber	7. he	8. he	9. Alber	10. Alber	11. Alber
Ori	2. Alber	3. he	4. Alber	5. he	6. he	7. Alber	8. he	9. he	10. he	11. he

In the Jackson passage, the subjects identified the ellipted referent successfully, and showed that they recognise the necessity for using a full NP in slots two and three; and in slot four all agreed on a pronominal choice. Recall the hypothesis of the study: a full NP is triggered when identification of a referent through context is to some sensible degree difficult. It is the degree of difficulty in identifying the ellipted referent, not its being unidentifiable, that prompts the use of a full NP in this passage; the subjects' success in identifying the ellipted referent revealed that the referent of slots two and three is identifiable by accessing the contextual

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information, so the use of a full NP is consistent with the approximate degree of difficulty in identifying the referent in question. Subjects also displayed that they strongly respond to particular episodic gaps, the effect of which creates a strong discourse tendency inciting a nominal choice in subsequent retrievals. However, they did not differentiate between the appropriate use of a last name as opposed to a first name; they appear to use *Jackson* and *Michael* in the same contexts. A syntactically constrained anaphoric choice is exemplified by the bolded *he* which refers to an immediately preceding antecedent and represents an obligatory choice; the compelling effect of recency in the reference to *Michael* in slot four is also demonstrated by the underlined *him*. The last mention of the same character is a stylistically different full NP, *the 25-year-old singer*, the length of the full NP here is to indicate an attitude rather than to render greater informativity; resolving the relation between *Michael* and the pragmatically associated description depends on a shared semantic knowledge.

22
Elvis had his gilded belt, Elton his spectacular spectacles and now Michael Jackson has that glittering glove. Rhinestones a twinkling, the glove lends its wearer a magical air--as if he could pluck a rabbit from a hat with the same ridiculous ease that he snatched an unprecedented eight Grammy awards a couple of weeks back.

(Most of two paragraphs omitted)

...Whitten says that (2___) owns six of the gloves, including two that are black and one that is red, white and blue.

Though (3___) is mum about explaining why *he* wears the glove, other than to say it makes (4___) feel never offstage, Witten maintains it is an integral part of *the 25-year-old singer*'s mystique.

It goes without saying that a model explaining the referential arrangement of the written expository text is complete if it accounts for the knowledge that is presupposed in the passage. The fact is there are implicit propositions which are mutually known by the readers for whom the passage has been written. For example, the reader is expected to know about the referents' profession, about what relation exists between wearing gloves and receiving Grammy awards etc.; the writer has assumed that there are implicit propositions the knowledge of which is expected to be shared. The referent of the empty NP slot two is identifiable mainly because the knowledge that Jackson flaunts his gloves, Elvis had a gilded belt, and Elton has outrageous spectacles is to some great extent helpful in removing potential ambiguity. So part of the ease in the identification of the referent of slot two is that the referent in question is associated with gloves; the readers share this knowledge with the writer. The identifiability of the referent of

empty slot three is partly related to the predication made attributing the referent intended to wearing gloves; the readers can easily figure out who is to be associated with wearing gloves. Ambiguity is then removed and other already introduced referents who are semantically plausible do not effectively deter identifiability. Table nine outlines the subjects' choices of anaphoric expressions in the Jackson passage.

Table 9: Referential patterns of subjects in comparison with the author of the text: Jackson Passage

Subject number	The device used for subsequent mentions of the referents in question		
1.	2. Michael	3. Michael	4. him
2.	2. Michael Jackson	3. he	4. him
3.	2. Jackson	3. Jackson	4. him
4.	2. Jackson	3. Jackson	4. him
5	2. Michael Jackson	3. Michael Jackson	4. him
6	2. Jackson	3. Jackson	4. him
7	2. Jackson	3. Michael	4. him
8	2. Michael	3. he	4. him
9	2. Michael Jackson	3. Michael Jackson	4. him
10	2. Jackson	3. he	4. him
11	2. Michael.	3. he	4. him
12	2. Jackson	3. Jackson	4. him
13	2. Michael Jackson	3. he	4. him
14	2. he	3. Jackson	4. him
Ori	2. Jackson	3. Michael	4. him

The Gillespie passage is the subject matter of the analysis of the next chapter, in which not only the choice of anaphoric expressions is investigated, but also the significance of context in the identification of the ellipted referents is examined. In this chapter, we limit the objective to the factors which trigger the use of types of anaphoric expressions. The Gillespie text contains nine empty slots, eight of which pertain to *Mrs Gillespie*, the salient female character of the expository piece, and one pertains to *Raja Bahrin Shah*. Except for slots seven and eight, the majority of the subjects, from a minimum of nine to a maximum of 13, displayed conformity and agreed with the writer's choices of anaphoric expressions.

Slots two and three pertain to mentions of the same referent, *Gillespie*, in two different episodes. Slot four requires a full NP because this specific slot represents the view point of the solicitors and hence a full NP is appropriate in the world represented by solicitors. Identifying the referent in these slots depends on how much the informativity of context assists and how much the informativity of the referring expressions used helps. The identification of the referent of these slots is overall difficult. The reasons are a) there is complexity of the

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referential rhemic material, b) the salience of the referent in question is not yet considerable, since the referent under primary focus in these four episodes seems to be *Mr Duffy* who occupies the subject positions of all but one of the consequent sentences. A good number of referential concepts are also introduced in the beginning of this expository text, the effect of which is the presence of a good deal of referential complexity. The concepts introduced by a single sentence are: *The federal Attorney-General, Mr Duffy, the Australian Government, Malaysia, the possibility of extraditing Raja Bahrin Shah, the father of Iddin and Shahirah Gillespie.* And the concepts introduced in the second sentence are *Iddin, 10, and Shahirah, 7; Australian Family Court order; last July; their father, a Malaysian prince who was divorced from their mother and custodial parent, Mrs Jacqueline Gillespie.* Introducing numerous referential concepts in two sentences makes the understanding of the text difficult. The background knowledge of the reader is required to ease the understanding. It is not sufficient to argue for these cases of full NP as instances representing episodic discontinuity.

23

The federal Attorney-General, Mr Duffy, yesterday announced that the Australian Government was making inquiries in Malaysia about the possibility of extraditing Raja Bahrin Shah, the father of Iddin and Shahirah Gillespie.

Iddin, 10, and Shahirah, 7, were abducted in defiance of Australian Family Court order last July by their father, a Malaysian prince, who was divorced from their mother and custodial parent, Mrs Jacqueline Gillespie, in 1986.

(1___) said yesterday that following a request from the director of public prosecutions that the extradition of Raja Bahrin Shah be considered, his department had written to (2___) solicitors on 12 January, seeking her views on a possible extradition request.

He said this step was taken after concerns were expressed that any such action might adversely affect her attempts to gain access to the children.

He said (3___) solicitors had advised his department on 2 March that, on instruction from (4_) they wanted the extradition question to be pursued.

Slot five contains the next mention of *Gillespie* in the subject position of the first sentence of a new episode representing a change from *Duffy* as the referent under focus to *Gillespie* who becomes the topical referent. In the intervening context between the two previous mentions of *Gillespie* and the current mention, there are mentions of *Duffy, solicitors, his department, they (solicitors),* and *the extradition question*. The greater the list of the competing referents, the more difficulty emerges in identifying *Gillespie*. Not only the referent intervening between the two most recent mentions of the referent in question, but also all the referents introduced prior to this point can potentially contribute to the difficulty in identification.

24
(5___) said yesterday that she wanted nothing less than a solid commitment from the Prime
Minister, Mr Keating, and the Opposition Leader, Dr Hewson, to bring her children home. "I
demand that they prove to the Australian electorate that they have a heart and some humanity
and make a commitment now, before the election. I want them to make a commitment to
bring my children home.

And slot six is a switch between *Mrs Gillespie* as *I* and then *she*; this kind of switch is done
according to post hoc considerations. The reader understands easily that the character who is
being quoted directly is *Gillespie*, so the full NP in this slot does not supply information for
identification. The full NP here signals the formality of the contextual environment rather than
accessibility status for the reader.

25
"I also want them to make a commitment to extradite Prince Raja Bahrin Shah. Apparently
there is nothing holding up the extradition except the spinelessness of the Australian
Government," (6___) said.

Slot seven which contains the mention of *Raja Bahrin* was filled with a pronoun as well as
different full NP types. The character in question is referred to as i) *Raja Bahrin Shah* ii) *my
husband, iii) their father, iv) he, v) my ex-husband, vi) Raja Bahrin, vii) Raja, viii) Prince, and
ix) Prince Raja Bahrin Shah*. This diversity runs counter to an accessibility explanation. The
pronominal and full NP expressions listed above are all considered natural choices; the only
difference is that they create stylistically different impacts: the choices may be ascribed to the
fact that it is Gillespie's attitude that is represented referring to her husband; so any choice is an
estimation of how *Mrs Gillespie* would refer to her husband in this particular context. The
choices may represent one or more of the following points: a) being formal requires subjects to
use a full name, *Prince Raja Bahrin Shah*; b) showing empathy, familiarity, or significance of
one in contrast with another is possible by referring to Bahrin through a term referring to his
relation with children: *the kids' father*; c) supplying the reader with greater referential
information demands also a full NP; d) demonstrating an attitude by using *my ex-husband*; e)
lack of shared knowledge of culturally different principles in addressing may lead to the choice
of terms such as *Raja*; and f) finally showing referential salience by using a pronoun to
acknowledge that the referent is in focus.

26
"I have not been allowed to speak to my kids, or see them, or receive any sort of information
about them since 9 July, the day (7___) kidnapped them.

Slot eight contains the mention of *Mrs Gillespie* after a long direct quotation from her, switching between *I* and *she* both referring to her. The writer chose a full NP, but eight of the 14 subjects chose a pronoun to fill this slot. One may judge both full NP and pronoun to be appropriate choices for a slot such as this. It is not accessibility that is being marked, since the referent is easily identifiable. There is no competition for this slot; none of the characters already introduced has the plausibility required for being considered as a potential competing referent for this slot. Between the last mention of the referent and its present mention in slot eight there are 14 intervening sentences containing mentions of such referents as *kids, Raja, their nana, they* (referring to the Prince's family), *little boy, the first birthday, Australia's future, its kids, they* (Prime Minister and Opposition Leader); within these 14 clauses, there are nine mentions of *Gillespie* as the speaker marked by the first person pronoun *I* and *me*. It is not easy to know which characters are under primary and secondary focus in this extract; however, one can judge *Gillespie, children*, and *their father* convey an equal degree of focus in these sentences.

27
"The children don't even know that their nana died last month. They won't let me speak to them. My little boy turned 10. It's the first birthday I've never spent with him. I couldn't even ring him. "I'm sick and tired of waiting. Australia's future is with its kids. If they are not willing to protect them and to make a stand then I don't see how we can trust any of them," (8___) said.

Slot nine is located in the middle of a new episode, so there is an environment of episodic break between the previous mention of *Gillespie* and her present mention in slot nine. The referent of slot nine is not the subject of the sentence, hence it does not carry the primary salience, and six clauses separate slots eight and nine; these do not contribute to the referent's being unidentifiable, but a nominal choice is triggered. Slot 10 contains the mention of an already accessible referent, but referential formality is displayed by a last name. A full NP in slot 10 is not a reflection of difficulty in identifying the ellipted referent.

28
Speaking to an ethnic news conference yesterday, Dr Hewson said he would not "make a decision on the run" when asked if he would respond to (9___) call for help. But he said he would phone Mrs Gillespie within days. Mr Keating has said that the Federal Government's ability to help (10___) was "regrettably limited."

Table 10 displays the subjects' performances in comparison with the writer of the Gillespie passage. As is outlined by the table, prototypically, the claim is discourse constraints on the use of anaphoric expressions do direct their arrangements. But it is evident that NP slots, depending

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on the circumstances surrounding them, are identifiable with differing degrees of difficulty. A full NP is often to display difficulty in identification; however, it rarely signifies that the referent is unidentifiable if marked by ellipsis. Degrees of difficulty correspond to degrees of accessibility, but a referent of low accessibility can never be claimed to be unidentifiable. Most referents with a low level of accessibility are identifiable with a degree of difficulty; therefore, highly accessible referents are those for whose identification short term memory storage is involved.

Table 10: Referential patterns of subjects in comparison with the author of the text: the Gillespie Passage

Subj No	The device used for subsequent mentions of the referents in question.								
1.	2. J.	3. J's	4. J	5. J.	6. J.	7. Raja Bahrin	8. J.	9. J.	10. J.
2.	2. J.	3. J's	4. J.	5. Mrs G	6. she	7. my husband	8. she	9. her	10. Mrs G
3.	2. Mrs G	3. Mrs G	4. their client	5. J. G	6. she	7. their father	8. she	9. Mrs G	10. Mrs G
4.	2. Mrs G	3. G's	4. her	5. G	6. she	7. he	8. she	9. her	10. G
5	2. Mrs G	3. her	4. G	5. G	6. she	7. he	8. she	9. Mrs G	10. Mrs G
6	2. G	3. G's	4. her	5 Mrs G	6. she	7. he	8. G	9. G	10. G
7	2. G	3. Mrs G	4. her	5 Mrs G	6. she	7. My ex-husband	8 Mrs G	9. the	10. Mrs G
8	2. Mrs G	3. Mrs G	4. Mrs G	5 Mrs G	6. she	7 R. B. S.	8. she	9. Mrs G	10. Mrs G
9	2. J. G	3. J's	4. J.	5. J.	6. J	7. Raja	8. J.	9. J.	10. J. G
10	2. her	3 her	4. her	5. she	6. she	7. he	8. she	9. her	10. J.
11	2. her.	3 her	4. her	5. Mrs G	6. she	7. my husband	8. she	9. Mrs G	10. her
12	2. J. G	3. Mrs G	4. J.	5. Mrs G	6. Mrs G	7. Prince	8. Mrs G	9. Mrs G	10. Mrs G
13	2. Mrs G	3. Mrs J G	4. Mrs G	5. J. G	6Ms J.G	7. Prince R. B. S.	8. J G	9. J. G	10. J. G
14	2. Mrs G	3. Mrs G	4. her	5. Mrs G	6. she	7. he	8. she	9. Mrs G	10. Mrs G
Ori	2. Mrs G	3. Mrs G	4. Mrs G	5. Ms G	6. she	7. he	8. Mrs G	9. Mrs G	10. Mrs G

G = Gillespie, J. = Jacqueline, P.R.B.S. = Prince Raja Bahrin Shah,

In the Foster passage, we observe that all subjects made a nominal choice in slot two:

> 29
> The rolling eyeball effect often greets Marcus Foster when he drops his work at 5 PM and rushes out of the office to collect his children.
>
> (2___), an engineer at the Department of Agriculture, Werribee, says that some of his childless workmates are not very sympathetic when it comes to tight family deadlines.

The full NP in slot two is the subject of the initial sentence of a new episode, so *Foster* who was introduced immediately in the previous sentence seems to need a full NP. The degree of cognitive difficulty involved in initiating a new episode by moving from introduction to action, and the formal environment of the mention of *Foster* all agree on the choice of a nominal expression. It is important to note that *Foster* is identifiable based on the previous textual context, so a full NP marks a slight degree of difficulty in the identification of the referent. The following extract containing NP slot three indicates that break in unity can be caused by changing the indirect perspective to a direct one in which a direct quotation can trigger a

nominal choice; however, this is an optional instance of the use of a full NP and does not make a strong tendency.

> 30
> "You get the eye-rolling response from childless colleagues sometimes," (3___) said. "But I have to leave work at 5 PM or my wife does, in order to pick up the kids."

The use of a full NP, in shifting from directly quoting the referent to an indirect style, is what the majority of the subjects agree in slot four. Identifiability is secured as the context the referent is located in is informative, but marking the beginning of the new episode is to acknowledge the difficulty for activating an already introduced but deactivated entity. Potential ambiguity is almost null, since there is no plausible competing referent for this NP slot. We observe that the full NP is chosen according to a discourse pragmatic tendency. A majority of the subjects agreed upon the nominal choice for this slot.

> 31
> As a working parent, (4___) tries to run his life with military precision. But the order is thrown into chaos by the simplest of events a sick child or a school curriculum day.

The filling of slot five illustrates two points: the choice of a full NP, which is to mark a minor shift in episodic structure, is purely optional as indicated by the subjects; the writer's choice of a title and last name, *Mr Foster*, which is a more natural one for such a context, is not followed by the subjects who used a first name for this slot, *Marcus*. The only explanation for the two differences is: optional discourse constraints on the choice of referring expressions may be a sub-conscious awareness for non-professional writers; there seems to be shortage of referential maturity that causes the use of a first name in a formal environment. It goes without saying that the concern for referential formality which triggers a preference for a last name differs from the correlation assumed between the accessibility of the referent and the accessibility marker used.

> 32
> When one of his two children has fallen ill, (5___) has used some of his paid sick leave or a day's annual leave to care for them.

Slot six contains a pronoun in the original text, but subjects chose a full NP for filling the slot. There is indeed a break here to mark, but it is not a drastic one; the disagreement between the subjects and the writer in this case is proof for the referential stylistic freedom. Slots seven (a) and (b) are more easily marked in conformity, immediate prior mention almost always triggers a pronominal choice, except when there is a break in episodic unity.

33
(6__) says he is luckier than many working parents. (7a__) employer allows (7b__) to work flexible hours and make up the missed time after hours.

Slot eight is also another instance of referential freedom as indicated by subjects' disagreement on the choice of a nominal expression; both pronominal or nominal expressions appear to be acceptable. The direct quotation from the referent is cited by the writer, then the referent is marked in the anaphoric form in a clause predicated by *say*. This kind of shift from the first person marking to a third person marking requires a nominal expression only when referential formality is intended; otherwise, a pronoun appears also to be acceptable.

34
"I am not thrilled but that's the deal if you have to leave early to pick up a sick child," (8__) says. "I can work up the hours by doing report writing at night. But it would be a very different story for a blue-collar worker on a production line; they would be in big trouble if they had to try to pick up a child."

Slot nine is filled with a full NP by the subjects analogous to the writer; a fairly large gap is a cause for difficulty; the referent is the subject of the second sentence of the episode, so a semantic break is recognisable. As for the identity of the ellipted referent, context provides the informativity required for knowing who is intended to be the subject of the slot, the full NP signals difficulty in knowing the identity.

35
School holidays are another hiccup in the family's tightly run routine. (9__) and his wife, Lynne Chapman, a social worker at a private welfare agency, get a combined total of eight weeks annual leave a year.

Slot 10 which contains the mention of *Foster* is highly distant from his previous mention in slot nine. Also, two episodes intervene between the two mentions of *Foster* in slots nine and 10. Moreover, this slot is the subject of the second sentence of the episode. The large referential gap and the deactivating effect of two intervening episodes signalled a strong tendency for a nominal choice. However, there doesn't seem to be any recognition for the difference between the use of a last name in contrast with a first name. The referent is identifiable through the informativity of context, its marking is done by considering the low accessibility due to a large referential gap and episodic break. The informativity of context is connected to how easily a given salient character is identifiable; not only the referents with primary importance, but referents with secondary salience may be identifiable through inferences based on context.

36
But their children Louise, 9, and Stephen, 6, are on school holiday for 10 weeks. The couple try to cover the extra two weeks by enrolling their children in council-run school holiday programs and sometimes grandma is asked to step in.

Unscheduled school curriculum days and strikes have caused the greatest disruption. (10_)
says   (11_) and Ms Chapman have tried to minimise their stress by using the kitchen calendar
as the nerve centre of all family departures and arrivals.

Slot 12 indicates a clear example of indeterminacy of choice; a nominal choice would be a
preferred choice, but most subjects made a pronominal selection. The expository texts usually
contain direct to indirect quotations. In such environments, the referent is marked by switching
from a first person pronoun to a third person pronoun; this type of switch is preferably marked
by a full NP; however, a pronoun is also optionally acceptable. Table 11 illustrates the subjects'
referential choices.

37
"You ought to see our calendar," (12_)says. "It's quite staggering in terms of the elaborate
pick-up and delivery rosters that we have with friends.

Table 11: Referential patterns of subjects in comparison with the author of the text: the Foster Passage.

Subj No	The device used for subsequent mentions of the referents in question.										
1	2 Marcus	3.he	4. M	5. M	6 M	7.his-him	8 M	9 M	10M	11M	12M
2	2 M	3 he	4 M	5 he	6 M.	7his-him	8 he	9 M.	10 M.	11 he	12 he
3	2 Foster	3 he	4 M	5 he	6 he	7 his-him	8 he	9 he	10 F.	11 he	12 he
4	2 M	3 he	4 M	5 M	6 M.	7 his-him	8 he	9 M.	10 M.	11 he	12 he
5	2 Mr F.	3 he	4 M	5 M	6 M	7 his-M	8 he	9 M	10 M	11 he	12 F.
6	2 Mr F	3 he	4 Mr F	5 he	6 Mr F	7 his-him	8 Mr F	9 Mr F	10 Mr F	11 he	12 he
7	2 Mr F	3 he	4 Mr F	5 he	6 Mr F	7 his-him	8 he	9 Mr F	10 Mr F	11 he	12 he
8	2 F	3 he	4 F	5 he	6 he	7 his-him	8 Foster	9 F	10 F	11 he	12 he
9	2 M	3 M	4 M	5 M	6 M	7 his-him	8 M	9 M	10 M	11 he	12 M
10	2 Mr F	3 M	4 Mr F	5 Mr F	6 F	7 his-him	8 F	9 F	10 F	11 he	12 M
11	2 M	3 he	4 he	5 M	6 he	7 his-him	8 Mr F	9 M	10 M	11 he	12 he
12	2 Mr F	3 Mr F	4 Mr F	5 Mr F	6 Mr F	7 Mr F	8 Mr F	9 Mr F	10 Mr F	11 he	12 Mr M
13	2 M F	3 he	4 he	5 M F	6 M F	7 his-him	8 he	9 he	10 Mr F	11 he	12 he
14	2 F	3 he	4 F	5 F	6 he	7 his-him	8 he	9 M	10 F	11 he	12 he
Ori	2 Mr F	3 he	4 Mr F	5 Mr F	6 he	7 his-him	8 Mr F	9 Mr F	10 Mr F	11 he	12 Mr F

M= Marcus, F = Foster, M F = Marcus Foster, Ori = Original writer

3.2.2.1 Interim Summary
The qualitative analysis of the passages and the listings of the referential selections
demonstrated that the filling of NP slots involved considering such factors as referential
distance in contrast with recency, episodic organisation, potential ambiguity, complexity of
rhemic referential material, conveying one's attitude, formality of the contextual situation,
empathy indicated by stylistically different types of full NP, and finally the amount of attention
allocated to a referent because of being in focus. It was argued that conflicting factors make the
choice of a form indeterminable and subject to the writer's decision. We further found out that
infelicity of style is the result of inappropriate referential choices and was observed in the

subjects' performances on occasion. Since discourse constraints on the choice of anaphoric expressions are realised in terms of tendencies at work rather than strict principles, and that the amount of difficulty and the appropriateness of a choice is subject to the judgement of the text producer; discourses may be diverse with regards to the arrangement of anaphoric expressions. In the next section, we will report the statistical results of our comparisons. As will be demonstrated, referring expressions are arranged according to how strong a discourse constraint is; so only statistically averaged results display the effect of such constraints.

3.2.3 The Statistical Analysis of the Data

Statistical analysis confirms the involvement of formal constraints, recency, and some discourse constraints in directing formal selections; but discourse tendencies triggering referential choices are variably recognised. The effect of a formal constraint or recency are decisive in directing the choice of a particular device, but the presence of a discourse tendency was recognised in varying degrees. The diversity of referential selections indicates that, on the discourse level, some of the referential selections are up to the writers' discretion. Strong tendencies are detected by more than 90% of the subjects; intermediate tendencies are recognised by 68-90%; weak tendencies, which are subjected to a separate treatment, represent less than 68% conformity of selection. Very few slots displayed 100% conformity. Table 12 illustrates the original writer's nominal and pronominal choices in the NP slots of passage one, and the percentage of subjects who made similar selections. The mean measurement of the subjects' selections show that 86% displayed nominal choices identical to those of the writer; and 68% made corresponding pronominal selections in this passage.

Table 12 Comparison of the writer's choices of nominal and pronominal expressions and the subjects' agreement: Passage one (Albertson)

The Original writer		No of Subjects agreeing with the writer, out of the total of 14	
Noun	Pronoun	Noun	Pronoun
slot 4		12 out of 14	
	slot 3		9 out of 14
	slot 5		10
	slot 8		11
	slot 9		9
	slot 10		9
	slot 11		9
Total 1 slot	Total 6 slots	T. 12 (86%)	T. 57(68%)

Table 13 outlines the slots of the Aveling passage as filled in by the subjects. The nominal reference pattern of the original text was followed by 73% of the subjects. As is illustrated, only in the case of slot two did more than 90% of the subjects make a corresponding selection Two intervening paragraphs triggered a nominal choice in this slot.

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Table 13: Comparison of the writer's choices of nominal and pronominal expressions and the number and percent of the subjects who made referential choices in agreement with the original writer: the Aveling Passage.

The Original writer's choice		No of Subjects agreeing with the choice	
Noun	Pronoun	Noun	Pronoun
slot 2 slot 3 slot 4 slot 5	No instance of pronominal in this passage	13 8 10 10	
Total 4		Total 41 (73%)	

The Jackson Passage contained three tokens of empty NP slots; two slots required nominal reference which were filled by 71.4% of the subjects. However, in the case of the only pronominal slot, all the subjects agreed in their selections which was forced by a grammatical constraint (Table 14).

Table 14: The comparison of the writer's choices of nominal and pronominal expressions and the subjects' agreement: Jackson Passage

The Original writer's choice		No of Subjects agreeing with the choice	
Noun	Pronoun	Noun	Pronoun
slot 2 slot 3		12 8	
	slot 4		14
Total = 2 slots	Total = 1 slot	20 (71.4%)	14 (100%)

The Gillespie passage contained six nominal slots; 80.6% of the subjects filled the nominal slots in agreement with the writer. The subjects' performance in the only one pronominal slot demonstrated 71.4% correspondence (table 15). The instances in which more than 90% of the subjects selected a full NP in correspondence with the writer were slots four and 10. The nominal choice in slot 10 was triggered by the effect of referential formality and in slot four was triggered by a conceivable episodic break.

Table 16 displays the subjects' selections in the Foster passage. The mean number of subjects who made a nominal choice in correspondence with the writer is 90% and in the case of pronominal cases is a bit lower, 80.6%. The high score in nominal choices indicates that a discourse constraint can direct referential choice if it clearly represents contexts in which there are at least or more than two episodes intervening and there is no interplay of conflicting factors.

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Table 15: Comparison of the writer's choices of nominal and pronominal expressions and the subjects' agreement: the Gillespie Passage

The Original writer		No of Subjects agreeing with the writer's choice	
Noun	Pronoun	Noun	Pronoun
slot 2 3 4 5 9 10		11 11 9 13 11 13	
	slot 6		10
Total 6 slots	Total 1 slot	68 (80.6%)	10 (71.4%)

Table 16: The comparison of the writer's choices of nominal and pronominal expressions and the subjects agreement: Passage five (Foster)

The Original writer		No of Subjects agreeing with the writer's choice	
Noun	Pronoun	Noun	Pronoun
slot 2 4 5 9 10		14 12 9 12 14	
	slot 3 7 11		9 12 13
Total 5	Total 3	T. 61 (90%)	T. 34 (80.6%)

The mean number of subjects whose performances corresponded with the writers of the five passages used for data collection is displayed in Table 17. In 18 nominal instances and 11 pronominal ones of the entire five passages, the frequencies of the subjects' referential choices show that a significant percentage (80.2%) displayed correspondence in their nominal selections and also 80% showed they followed the pronominal choices made by the writers. It is notable that percentages ranged from 71.4% to the maximum of 90% in the case of nominal selections, while in the case of pronominal selections, this range is wider displaying a range of 68% to 100%.

Among the entire empty NP slots of the passages, there were seven in which subjects' selections did not indicate any general pattern of reference. These few instances represent environments in which referential selection was up to the writers' discretion and was thus unpredictable. From the minimum of 35% to a maximum 50% the referential choices agreed with the writer in these slots (Table 18).

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Table 17: Percentages of the subjects' choices that agreed with the original pattern in 5 passages.

original text			percentage of subjects' choices			
Passage No	noun	pronoun	No of nouns	%	No of pronouns	%
1	1	6	12	86	57	68
2	4	0	41	73	15	--
3	2	1	20	71.4	14	100
4	6	1	68	80.6	10	71.4
5	5	3	61	90	34	80.6
Total = 5	total: 18	total: 11	total: 202	80.2%	total: 115	80%

Table 18: The correspondence between the frequency of referential choices of the writers in comparison with the subjects.

Passage No	type of selection	original text in %	subj.s' choice in %
pass. 1	full NP	30	36
pass. 1	Pro	70	64
pass. 2	full NP	100	80.7
pass. 2	Pronoun	0	19.3
pass. 3	full NP	66	66.7
pass. 3	Pronoun	33	33.3
pass. 4	full NP	77	76.4
pass. 4	Pronoun	22	23.6
pass. 5	full NP	63.6	71.5
pass. 5	Pronoun	36.4	28.5
Mean	full NP	67.3	66.26
Mean	Pronoun	32.5	33.74

Table 19: The exceptional cases in which subject's choices disagreed with those of the writer: five passages

writers' selection		subjects' selections in disagreement with the writers			
pass. no & slot no	NP vs Pro	Corresponding NP selections	noun %	pronominal selection: No of subjects in correspondence	pronou %
passage 1 slot 6	pronoun			5	35
passage 1 slot 7	full NP	5	35		
passage 4 slot 7	pronoun			5	35
passage 4 slot 8	full NP	6	43		
passage 5 slot 6	pronoun			5	35
passage 5 slot 8	full NP	7	50		
passage 5 slot 12	full NP	5	35		
total	No of NP's: 4 No of Pros: 3	23	40.8%	15	35%

Table 20 illustrates the differing numbers of nominal and pronominal selections made by the subjects in contrast with the writers' referential selections. The first column contains those particular subjects whose referential selections did not reveal any conformity with the writers' referential selections in passages one to five, in the next two columns the writers' use of nouns

and pronouns is displayed, and in the last two columns the subject's choices are given for comparison. The performance of subject eight in passage one, for instance, displays how idiosyncratic a referential style can be, though unusual with regard to the characteristics of a normal style. The writer's use of three nominal and seven pronominal choices in this passage did not evidently agree with subject eight who made nine nominal and only one pronominal choices.

Table 20. Exceptions: slots in which the subjects' choices disagreed with the writer:

pass. and subject no	writers' referential choice		subjects' referential choice	
	noun	pronoun	noun	pronoun
passage 1. subject 8	3	7	9	1
passage 1. subject 9	3	7	8	2
passage 1. subject 12	3	7	10	0
passage 2. subject 11	4	0	1	3
passage 3. subject 2	2	1	1	2
passage 3. subject 8	2	1	1	2
passage 3. subject 10	2	1	1	2
passage 3. subject 11	2	1	1	2
passage 3. subject 12	2	1	1	2
passage 3. subject 13	2	1	1	2
passage 3. subject 14	2	1	1	2
passage 4. subject 4	7	2	4	5
passage 4. subject 10	7	2	2	7
passage 4. subject 11	7	2	3	6
passage 5. subject 2	7	4	5	6
passage 5. subject 3	7	4	3	8
passage 5. subject 8	7	4	5	6
passage 5. subject 11	7	4	4	7
passage 5. subject 13	7	4	4	7
passage 5. subject 14	7	4	5	6
Total = 20	T. 29 mean 4.6	T. 28 mean 2.8	T. 70 mean 3.5	T. 78 mean 3.9

The statistical analysis of the data substantiated the hypothesis that there is referential stylistic freedom. Empty NP slots differ in how they are filled, in the sense that some slots are filled with a pronoun because of the compelling effect of such factors as referential recency, a formal grammatical constraint, and the presence of a strong discourse constraint. A two episode distance accompanied by complexity of referential rhemic material almost always triggers a full NP; however, the identification of the referent of the empty slots is often possible through context. The results support the view that functional pragmatic tendencies trigger conforming choices, but the findings are probabilistic. In the next section, explanations will be provided for

why discourse referential choice is observable only through probabilistic results, and why some NP slots do not trigger a choice in conformity.

3.3 Explanation Of The Results

The examination of the data confirmed that: a) probabilistic results of the comparison of the data display the significance of the discourse constraints on the use of anaphoric expressions; b) referential freedom is observed whenever minor breaks are to be marks or conflicting factors are at work; c) the referential freedom is mainly related to NP slots in which context is revealing; and d) lack of attention of a few native subjects to the formality of the setting can lead to a careless pattern of reference.[7] Context, more accurately a part of a world spoken of, provides informativity to the extent that the function of the anaphoric expressions may appear superficial so far as clarity of reference is concerned. The identifiability of referents is often dependent on the informativity of context, while the predictability of the anaphoric expressions used may be consistent with the accessibility of the entity in question, if we interpret accessibility as different from identifiability. There are varying degrees of difficulty in identifying a referent which is moderated by the function of context. Estimating the degree of difficulty in the identification of a given referent is approximative and subjects differ. It is possible to assume that accessible entities are easily identifiable, while inaccessible entities are not easily identifiable, but they cannot be said to be unidentifiable in the texts we have been observing. In the light of this assumption, when the degree of the difficulty involved in identifying a referent increases, the predictability of the occurrence of a full NP increases too. How we can differentiate focus, accessibility and identifiability needs to be investigated.

According to the results of our quantitative comparisons, referential diversity pertains to the varying effect of discourse constraints on the choice of anaphoric expressions and is inherent in

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[7] This category was observed mainly in the Aveling passage in which a few of the subjects of the study felt free to refer to the referent in question using various less appropriate terms: mostly a first name, *Marian*, instead of a full name with a title. These instances yielded undesirable formal diversity. However, the methodology of the study ruled out the effect by not categorising the types of the full nominal expressions used (first names, last names, descriptions, etc). The subject's choices of different types of full NP might have been due to several reasons. Some possible reasons include: a) in the universities, many teachers are addressed by a first name; *Marian Aveling* [who was a teacher at Monash university at the time of the data collection] could be one such; b) any subject who had been taught by her could address and refer to her as *Marian*. The subject's fault lies in failing to recognise that while appropriate in casual spoken discourse, this would be inappropriate to the written published text. The problem with the Aveling passage was, thus, in the fact that subjects could have had close personal acquaintance with Marian Aveling.

reference patterns. One may believe that this diversity should be attributed to referential freedom in this type of task, which was a combination of receptive and productive performance. Where the subjects' choices did not result in an infelicitous pattern, differences among them should be attributed to the optionality of discourse constraints. The fact is that there are no strict criteria on which one can rule out some cases of pronominalisation as unacceptable. Unlike the instances of obligatory formal exigencies, on the discourse level, reference is occasionally subject to the writers' stylistic freedom. As mentioned before, stylistic differences observed between individual formal choices should be considered different from the differences relating to the few instances of infelicitous reference produced by less-skilled performers. The idiosyncratic referential choices were those in which the subject did not consider the pragmatic (stylistic) consideration pertaining to the formality of the context where the last name plus a title was to be preferred over the first name. Although the subjects who did not attend to the formal appropriateness of their referential choices were few, instances of inappropriate reference were a problem for this study. Through choosing longer passages in which topical referents are introduced by a single full NP; and through increasing the number of the participants possibly picked up from the same ability group, idiosyncratic performances would be better dealt with and consequently more reliable results would be achieved.

Referential diversity is connected with both referential maturity of the text producers and pure stylistic freedom. The subjects who displayed a careless referential pattern either over-specified the missing referents or did not appreciate the requirements created by the formality of the setting, i.e. in the Aveling passage which contained a higher percentage of such inappropriate choices, careful subjects did not prefer a first name over a titled last name: *Marian* vs *Dr Aveling*. The thing is, subjects who are aware of the several factors governing the choice of anaphoric expressions in discourse can make better judgements about which referential form to choose. Appropriateness of reference patterns can be a matter of degrees. Therefore, the question is how appropriate a referential choice in an environment. When there are clear reasons for a referential choice to be inappropriate, it can be judged that the subject making the choice has lacked the skill for recognising which factors should have been given preference.

The unpredictability of an anaphoric form is often the effect of an interplay of several competing factors. The choice of anaphoric expressions may be influenced by either one or more of major competing factors. Stylistic freedom is caused by the interplay of several conflicting factors. Distance, subject switch, structural discontinuity (in theme, action, time, or

place), referential ambiguity and rhemic complexity, referential salience, and focus all create conflicting influences which make maintaining a particular referential choice indeterminable on occasions. Factors such as referential recency, salience and focus motivate the use of a reduced formal expression; but major episodic breaks, potential ambiguity, and referential complexity in the rhemic material of a sentence trigger the use of an informative formal expression. Under the influence of the interplay of the discourse factors, diversity is expected and should not be viewed as problematical for the text's referential pattern. Only when a subject's referential choice violates the felicity expected from a text is the choice judged to be marked because less preferred; otherwise, it is natural for referential patterns to contain diversity in particular environments. The fact is that if the priority is given to salience and recency rather than to the episodic break, a pronominal choice is accepted. But when a producer gives priority to factors motivating a full NP, the full NP used is as natural as a pronominal choice. It is not predictable what will be the choice in environments where there is an integrative effect of competing factors. When there is sustained reference to a character and there is no switch reference, recency appears to have pronounced effect. But in many slots it is necessary to consider several factors. Because these sources of information are often used concurrently, we can eliminate assumptions which depend upon only one or a few of them.

Discourse tendencies are observed in varying degrees of strength. Formal constraints are obligatory, analogous to which is referential recency. Tendencies are realised as strong, intermediate and weak. Strong tendencies are followed by a considerable majority of the subjects, intermediate discourse tendencies are those which are followed by a fairly significant percentage of the subjects, and weak tendencies are those which are not recognisable and which do not contribute to the predictability of the anaphoric forms. It goes without saying that talking about the predictability of the anaphoric expressions is different from the identity status of referents; salient referents are normally identifiable through context, but the choice of a nominal expression to refer to a given salient referent is determined by at least three distinct requirements: a) maintaining the identity of a given referent when context is not informative; b) when context is informative, but the identification of the referent is not easy; and c) marking pragmatic tendencies which constitute discourse episodic organisation. In sum, stylistic freedom is observed in the following circumstances: a) when there is a minor organisational break to be marked, which is ignored by some but not all the subjects; b) when there is a conflict between conflicting discourse factors (cf. accessibility as a result of referential salience

and referential recency trigger a pronominal choice; but potential ambiguity and major episodic breaks motivate a nominal choice). The following hierarchy is upheld:

> ***Maximally Predictable*** Formal constraints > Referential recency > Strong discourse tendencies > intermediate discourse tendencies > Weak discourse tendencies ***Minimally Predictable***.

Individuals tend to avoid ambiguity when the characters are of the same gender; so they prevent confusion by using only full NP's. But this is not always the case, we find cases in which presence of same-gender referents does not per se create ambiguity. Individuals use pronouns in places where salience, recency, and syntax all fail to disambiguate pronouns. Even for cases when a given writer should clearly avoid pronouns, pronouns occur. Individuals use pronouns as often as possible if their referent is uniquely specified in the discourse. Discourse referential patterns meet at least two requirements: avoiding unreasonable ambiguity and observing the principle of felicity. Between these two borderlines, pronominalisation may be subject to free choice. The ambiguity domain prompts the use of informative forms, the felicity domain directs writers not to use nominal and pronominal forms interchangeably, and the optional domain allows writers' referential desire to be acknowledged. There is an accepted obligatory boundary associated with the formal characteristics and recency in coreference; violating either leads to ungrammaticality and clear infelicity. The discourse motivation for the use of these linguistic devices forms a scale containing at least three points: a) some discourse constraints form strong tendencies which are more clearly followed; b) some NP slots may occur in environments where an intermediate tendency is less strong but is prototypically recognisable by a majority of more than 50%; and c) weak discourse tendencies include those NP slots in which individuals do not display any conformity in their selections. A greater corpus of data is required to further proclaim precisely under what conditions discourse tendencies are strong, intermediate and weak. The important point about these tendencies is that although they are observable and are substantiated in statistical ways, their violation does not seem to lead to equally perceivable unacceptability. In the case of weak discourse tendencies, even a particular writer's productive performances may vary across different occasions.[8]

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[8] This was observed when I was accidentally faced with two performances which belonged to one of the subjects in doing the same task on two different occasions. This subject had selected a different referential form in filling the same slot on each occasion.

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3.4 Summary And Conclusion

This study investigated idiosyncrasy in individual performances. On the discourse level, there are quite a number of instances in which last and first names, last names alone, first names alone, or definite descriptions are interchangeable, even with zero, so far as clarity of reference is concerned. Pronominalisation is a process of reducing the inbuilt redundancy in discourse and, on occasions, is subject to the writer's discretion. Two parameters for reducing and elaborating referential redundancy are conspicuous: ambiguity determines the limit of referential reduction, and felicity determines the limit for both reduction and elaboration of referential redundancy. There is an optional domain which characterises environments where referential choice is stylistically variable.

The hypothesis of referential stylistic freedom will be verified in our next experimental study through the same experimental procedure; the difference between this and the next chapter is, the next chapter examines the function of context and shows that the choice of referring expressions is independent of identifying referents that are retrievable through context. The hypothesis of chapter three was that surface arrangements of referring expressions do not always correlate with the identifiability status of the referents. On the surface, anaphoric expressions are on occasions interchangeable and even eliminable. We shall argue, in chapter four, that the function of context is to complement discourse anaphor resolution. Such a complementary role makes the presence of a proportion of referring expressions in discourse superfluous.

Given the resources at my disposal, it was not possible to apply other experimental methods for a cross-comparison of individual performances. One would be to have subjects do an empty NP slot filling task and request them to apply their own style to choose from expressions provided for them within the parentheses to fill the empty NP slots; thus limiting their choices to the nominal and pronominal expressions presented to them. In sum, this study supports a moderate version of a hypothesis of recognisability of discourse constraints on anaphor resolution. The claim is that we should give preference to a context-based investigation of coreference resolution. The formal arrangements of anaphoric expressions are not sufficiently reliable for basing claims about how discourse coreference is resolved.

CHAPTER FOUR

The Complementary Role Of Context In Anaphor Resolution

4.0 Introduction

In referring to discourse entities, speakers can choose more or less explicit forms depending upon what other information in the discourse will help the addressee to identify the referents in question. There are two major sources of referential information that are available and used: a) context and b) referring expressions. Anaphoric expressions are used to supply referential information when the referent is not identifiable through context. Context is a supplementary source of information and provides clues which are essential for resolving coreference relations where the informativity of the referential expression used does not resolve the coreference links.

This chapter compares the performance of native English informants in a twofold task involving: (a) the comprehension of a piece of expository text with empty NP slots pertaining to salient referents and the identification of the ellipted referents; and (b) the production of appropriate patterns of reference to fill the empty slots with appropriate referring expressions. The ability to identify the uncoded referents of the empty NP slots of a piece of expository text indicates the significance of the function of context in anaphor resolution; and the ability to choose appropriate linguistic coding devices indicates the recognisability of the pragmatic functional tendencies triggering the appropriate choice of the linguistic referential elements. We shall show that the actions and attributes of salient entities reveal the identity of the referents associated with them.

Resolving long-distance anaphoric relations depends heavily upon inferences based on the contextual information. The varying degrees of ease or difficulty with which referents are identified are determined by whether or not context provides information. Within a discourse in its entirety, a topical referent develops through being associated with the predications made in the sentences constituting a discourse. In the reference pattern of a naturally produced oral narrative quoted below (Prince 1981), the long distance pronoun *she* (Jan) in (bb) returns to *her* (Jan) in (oo) when resumption is made. The story's topical referent changes in line (ff) where Jan is not mentioned any more and it is Jane who is the central character up to the (oo) line in which reference is resumed to Jan again. Within the world spoken of, both Jan and Jane are linked with certain actions that they undertake or undergo through which ambiguity is removed. Coreference is not resolved on the basis of the pronominals used per se; it is indeed the function of context and what is happening in the

world spoken of according to which the patient of *get her up*, the agent of *screaming,* and *be in such pain* are inferred.

> c. last week she called and said, "Well, you have
> d. company. Jan fell down four flights of steps." They
> e. have a house like this, and she was going to a
> f. luncheon and the women were honking the horn outside;
> g. She heard them right? And usually she lets the door
> h. open but she didn't this time. So she comes
> I. running down the steps and she fell down four and
> j. landed on her side. Her right side's fractured. She's...
> (Sixteen lines omitted)
> z. ... "Well, try the kitchen window,
> aa. that-- that's open." *She* [Jan] said. "Tell Jane," who's a tiny
> bb. Little thing (she's only about four feet ten), she said,
> cc. "Tell--can you hike Jane up and get her--go in the
> dd. Garage and you'll find a stool or something for her to
> ee. get on and then hike her through the kitchen window."
> ff. So that's what they did. So *she* [Jane] goes through and she says
> gg. she landed in the sink. Well, naturally, it's like
> hh. our kitchen. So she had taken her shoes off, right?
> ii. She had heels on and she took them off when they hoisted
> jj. her. She was on a step ladder but then they still
> kk. had to give her a little push, right? So she got in, she said she sat right in the sink. So she had
> mm. to work her way out of that and she got in and here she opened
> nn. up the front door and it took the four of them to get
> oo. her [Jan] up and she [Jan] was screaming, she was in such pain.
> (Wolfson, 1976, pp. 160-61, cited in Prince (1981:238))

While the form of discourse anaphors may be unpredictable, the referent's identifiability appears to be relatively independent of the predictability of the type of the formal expression employed for marking it. Extra-linguistic context which incorporates any available sources of information other than the informativity of the referring expressions is used as a source of referential information to narrow down the candidate referents of an NP slot and consequently to increase the plausibility of only one referent. Given a narrow definition of context, the accumulation of actions and attributes pertaining to a salient referent, it is claimed that inferences regarding the identity of referents are made according to actions and attributes associated with the referents in question, in the sense that focus and inferences regarding the salience of referents are directed mainly by context. The verbal elements that form the communicative dynamism of a discourse are assumed to entail the referents associated with them in a network of information we describe as "the world spoken of". Unless we consider the action-referent association and the semantic connection between the propositions that represent parts of the world spoken of, the anaphoric expressions arranged in a given discourse do not convey sufficient information for anaphor resolution.

The functional studies dealing with discourse coreference generally investigate constraining factors such as: (a) distance between a pronoun and its antecedent and (b) episode boundaries which are realised by major and minor breaks in the continuity of the referent, theme, action, place, or time sequence. These factors determine the choice of an anaphoric expression in correlation with the accessibility of a given referent. Accessibility is determined by whether or not a referent has been mentioned immediately in the previous textual context, intermediately earlier in the text, or much earlier; alternatively, accessibility is correlated with the break caused by one or more episodes intervening between two subsequent mentions of a given referent. If the intended referent is maximally predictable, ellipsis is used; and if it is minimally predictable, a full NP is employed. Between the two extremes of accessibility, there are intermediate points. These are indeed functional pragmatic considerations which comprise two well known theoretical frameworks focusing on how anaphoric expressions are arranged in texts.[1] Referent accessibility is constrained by the limited functions of the short term and episodic mental storage, while identifiability is a lasting status which is strongly associated with context. Most referents are identifiable through context; however, referents identifiable through context are not always pronominalised because they may not be highly accessible.

Numerous studies on the function of focus of attention in anaphor resolution were reported in chapter two (cf. Chafe 1976, 1987, Grosz 1977, Marslen-Wilson et al 1982, Tomlin 1987, Tomlin and Pu 1991, Hinds 1979, Van Dijk 1982, Fox 1987, Kintsch and Van Dijk 1978, Van Dijk et al 1983). Clancy (1980) conceded that speakers may choose nominal devices to change focus. Pohl (1982) pointed out changes from one plan to another can create a notable boundary. Reichman (1978) remarks that drastic changes in topic, even when the referent has just been mentioned in previous discourse must be marked with a full NP. Yet, when returning to a previously unfinished discourse unit, speakers may mark the break with a pronoun. Reichman (1981) also notes that in "respecifications" of referents in resuming an already closed episode, the choice between a full NP or a pronoun is up to the discourse producer's discretion. Grosz (1981), Sidner (1983), and Fox (1987) come to the same conclusion. The focus paradigms appeal to the ability of the analyser to infer the one referent that is central; however, the problem is that focus is not always determined by the choice

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[1] There are certainly functional pragmatic tendencies that force some discourse referents to be placed in the subject slots as opposed to non-subject slots; these tendencies influence the linear order of referential expressions within sentences. The linear order of linguistic coding elements within minimal discourse units, e.g. active vs passive constructions, have a functional basis. However, in this work, we are less concerned about why these construction types are used and how referents are marked; we will focus on the role of context. While this study reports important supporting findings regarding the functional aspect of discourse reference, the primary role of context in resolving coreference is the main focus.

of linguistic referential markers. There is not always a one-to-one mapping between focus and the use of anaphoric expressions.

Chafe (1987) claims that new information is negotiated with old information functioning as staging points. The staging of discourse adds new information to the already recorded information by creating a link between the already shared information and the new portion. This is called "grounding" (Givón 1989, 1990). In implementing this process, repeated concepts are formally reduced, the actual reduction of repeated information being done under certain constraints. Complete reduction of old information is not always possible, since the addressee may lose the point of linkage, while appropriate reduction makes the textual exchange reasonably economical and felicitous. There are constraints on the use of discourse givenness markers which determine their arrangement in relation to the accessibility status of the referents. There are at least three points on an accessibility scale and, correspondingly, three classes of accessibility markers: high, mid, and low (Chafe 1987, Ariel 1988, 1990, 1991).

In addition to the functional studies in discourse coreference that view the choice of anaphoric expressions as indicators of the accessibility of referents, there are theories of context which deal with how information is negotiated while discourse proceeds. Stalnaker (1979) contends that the more assertions that are added to the list of propositions shared, the more the amount of pre-supposed information will be at a given point in the discourse or narrative. This process ends when no assertion is left and the text is entirely presupposed. We as participants in any discourse assume a set of propositions about the way the world is; and how the world of the discourse we are decoding may be different from our real world. These propositions may be introduced explicitly in the course of the production of discourse and mutually agreed upon; or they may be implicit presuppositions which all participants share and make use of in their communication. These explicit and implicit assumptions together make a discourse file and are called "the common ground".

Common ground excludes quite a few possible worlds; those in which any of the propositions in the common ground are false. These are our premises. The larger the common ground in a given discourse, the smaller the set of possible worlds compatible with all the propositions presupposed, the closer we come to being able to fully characterise the actual world. The set of possible worlds compatible with the common ground of a conversation is called the 'context set'. These are the remaining candidates for the actual world. Every time we accept some assertion about the actual

world, we come closer to being able to completely characterise that world, and the context set of the remaining possibilities becomes smaller. Given this framework, Stalnaker characterises assertions as follows (1979:323):

> To make an assertion is to reduce the context set in a particular way... The particular way in which the context set is reduced is that all of the possible situations incompatible with what is said are eliminated. To put it in a slightly different way, the essential effect of an assertion is to change the presuppositions ... by adding the content of what is asserted to what is presupposed.

The process of pragmatic inferences involves a definite set of procedures. In Stalnaker's terms, the textual context (the set of assertions) is integrated with the semantic shared context (common ground) to enable subjects to recollect the implicit propositions left to be inferred (diminishing context sets). The longer portion of the text is presupposed, the easier will be the identification of referents in the portion to be asserted. In the end, the readers end up with a more complete structure of the discourse than the one explicitly presented. This process enables the reader to predict the identity of topical referents (eliminating the non-compatible worlds). The most important referent of a text is the one that has the highest record of actions, in the sense that frequency of mentions is replaced with frequency of actions undertaken and undergone by the salient referent.

Clark and Marshal (1981) maintain that there are three context types involved in any communication situation. The 'semantic shared context', the 'context of situation', and the 'textual context' are the three sources of information in a communicative exchange (see chapter one for a brief explanation). These three context types are hierarchically ordered and interconnected, characterising a world spoken of. Consistent with this view, Prince (1981) suggests a taxonomy for the assumed familiarity, in which she argues that referents can attain one of three familiarity states: new, inferable, or evoked. The familiarity hierarchy which contains subcategories is a more comprehensive outline of the three categories of context (see chapters one and two). The textual context is more directly related to what has gone on in a discourse. It is vital to assume that the three types of context comprise a world spoken of within which inferences are made to figure out which characters are related to which actions, either done by them or acted upon them by other characters in the discourse. For the communication to proceed, it is essential that a world is characterised through eliminating the context set of the remaining possibilities; constraining the context set is accomplished through accepting more assertions, through which the common ground increases.

The efficient marking of the identifiability of referents requires that speakers follow the cooperative principle. It is when the speakers intend to be cooperative that functional predictions come to be realised. Given the significance of cooperative principle and its component maxims, appropriate reduction of referential information enables the speakers to convey as much information as possible at the minimal cost; thus making their 'contribution as informative as is required while avoiding ambiguity' (Grice 1975). Sperber and Wilson who replace the component maxims of cooperative principle with one single cognitive principle of relevance (1987:3) point out that "human cognitive processes are geared to achieving the greatest possible cognitive effect for the smallest possible processing effort." This study intends to investigate how achieving the maximal cognitive effect for the smallest possible processing effort is actualised in the process of marking and accordingly retrieving discourse referents.

4.1 Methodological Remarks

4.1.1 Method: subjects, data, procedures and Plan

In this study, we analyse the performance of native Australian English speaking subjects in a task involving the identification of the ellipted referents of a piece of expository text and the selection of appropriate anaphoric expressions. The participants for this study consisted of 14 female and 10 male university students with their ages ranging from 25 to 38; and they were paid for their participation. They either already had a university undergraduate degree or were doing one. Social class and education were assumed to be roughly constant.

A piece of expository text with empty NP slots pertaining to topical participants was given to the informants to study carefully and to identify the ellipted referents of the empty NP slots. The subjects, who were different from the subjects who took part in the experimental project reported in chapter three, were asked to note the written instructions attached to the handouts; the instruction sheet showed them how to perform the task. They spent as much time reading the text as they wished. They were requested to first read the passage carefully, and after they made sure of their identification of the uncoded referents, choose the most appropriate referring expressions. Only the first mention of the topical participants of the expository text was given; all of the subsequent references were indicated by empty NP slots left for the subjects to spell out. Our selected text is a report about an ex-husband, Malaysian Prince Raja Bahrin Shah, who has abducted his children, Iddin and Sahirah, the custody of whom has been given to their Australian mother. The wife has appealed to the Australian justice system for help in getting her children returned and the father

extradited from Malaysia. The NP slots pertaining to the subsequent mentions of the salient characters of the expository passage are as follows:

The uncoded topical characters of the text are as follows:

1) Duffy [Attorney General]	3 slots
2) Prince Raja Bahrin Shah [father]	2 slots
3) children	11 slots
4) Iddin	4 slots
5) Shahirah	1 slot
6) Mrs Jacqueline Gillespie [mother]	12 slots
7) Mr Keating and Dr Hewson [Prime Minister & Opposition Leader of the time]	5 slots
8) Australian kids [generic]	1 slot

The non-topical referents of the selected expository text included: 1 The Australian Government, 2) the Australian Family Court, 3) solicitors, 4) Director of Public Prosecutions, 5) Australian electorate, 6) Australia's future. The English Expository text with empty slots used for the data collection is quoted below:

The federal Attorney-General, Mr Duffy, yesterday announced that the Australian Government was making inquiries in Malaysia about the possibility of extraditing Raja Bahrin Shah, the father of Iddin and Shahirah Gillespie.

(1.___), 10, and (2.___), 7, were abducted in defiance of Australian Family Court order last July by their father, a Malaysian prince, who was divorced from their mother and custodial parent, Mrs Jacqueline Gillespie, in 1986.

(3.___) said yesterday that following a request from the director of public prosecutions that the extradition of Raja Bahrin Shah be considered, his department had written to (4.___) solicitors on 12 January, seeking (5.___) views on a possible extradition request.

(6.___) said this step was taken after concerns were expressed that any such action might adversely affect (7.___) attempts to gain access to the (8.___).

(9.___) said (10.___) solicitors had advised his department on 2 March that, on instruction from (11.___), they wanted the extradition question to be pursued.

(12.___) said yesterday that (13.___) wanted nothing less than a solid commitment from the Prime Minister, Mr Keating, and the Opposition Leader, Dr Hewson, to bring (14.___) home. "I demand that (15.___) prove to the Australian electorate that (16.___) have a heart and some humanity and make a commitment now, before the election. I want (17.___) to make a commitment to bring (18.___) home.

"I also want (19.___) to make a commitment to extradite (20.___). Apparently there is nothing holding up the extradition except the spinelessness of the Australian Government," (21.___) said. "I have not been allowed to speak to (22.___), or see (23.___), or receive any sort of information about (24.___) since 9 July, the day (25.___) kidnapped (26.___).

"(27.___) don't even know that (28.___) nana died last month. (29.) won't let me speak to (30.___). My (31.___) turned 10. It's the first birthday I've never spent with (32.___). I couldn't even ring (33.___)

"I'm sick and tired of waiting. Australia's future is with its kids. If (34.) are not willing to protect (35.___) and to make a stand then I don't see how we can trust any of them," (36.___) said.

Speaking to an ethnic news conference yesterday, Dr Hewson said he would not "make a decision on the run" when asked if he would respond to (37.___) call for help. But he said he would phone (38.___) within days.

Mr Keating has said that the Federal Government's ability to help (39.___) was "regrettably limited." (*The Age*, Thursday 4 March 1993)

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The difference between the experimental data elicited and analysed for this chapter from the data analysed in chapter three is that in chapter three we did not examine the role of context, i.e. we deleted some, not all, of the referential expressions pertaining to one or two salient characters of each passage; thus we made sure that the ellipted referents were identifiable to the readers. In chapter three, the aim of the study was limited to the effect of discourse constraints on the choice of anaphoric expressions. The subjects were requested to show how they mark a referent considering the need of the readers who should judge the text as being referentially cooperative. But the experiment did not involve testing the subjects' ability to use contextual information in retrieving the ellipted referents. The question was how the patterns of reference produced by the subjects of the study compare without dealing with how contextual information is used. There was no intention to draw a contrast between referent identification through context and the identity marking considered in the light of discourse pragmatic constraints.

The subjects' ability to benefit from contextual sources of information is tested in this chapter. By omitting all the subsequent mentions of the six salient characters of the text, we can force the readers to use contextual clues when inferring the identity of the ellipted referents as intended by the writer. Through the identifying procedure, subjects' ability to benefit from available sources of information can be tested. Meanwhile, their recognition of discourse constraints on the use of anaphoric expressions will also be examined. The subjects' performances were compared by dealing separately with the two aspects of the task: (1) identification of the ellipted referents of the NP slots; and (2) the selection of the linguistic devices to refer to the uncoded referents in question. It was assumed that the former involved a receptive performance and the latter a productive one. In order to fill the empty slots correctly, the subjects had to first identify the ellipted referents. Thus, the first sub-task was to identify the uncoded referents of 39 empty NP slots which pertained to the topical participants of the text.

We subjected the elicited data to a qualitative examination to discover what enabled the informants to manage the identification task and what functional factors were involved in directing the subjects in their conformed choice of anaphoric expressions. We will argue separately for referent identification and anaphor selection and show how, in general, the referent identification task displays more conformity than the anaphor selection task, a fact which implicates the significance of the role of context. We will also demonstrate the role of several implicit sources of information utilised for making inferences in identifying ellipted referents. We will further

examine the cognitive effect of distance and discourse organisation as the major hypotheses posed for the arrangement of anaphoric expressions, and finally underline the significance of the role of context.

4.2 A qualitative examination

It is hypothesised that there is an association between salient referents and the actions they undergo or undertake; this association brings about a type of accessibility that is maintained across episode boundaries and reaches the limits of an entire text. Action-referent association is particularly helpful in pragmatic inferences made in long distance anaphor resolution. Provided the verbal predicates bear links which are presumed to establish a world spoken of, the ellipsis of repeated referents is a feasible option. But if the verbal predicate does not possess the property of being linked to a frame based network, and the referent has not been mentioned in the immediately previous context, the referent associated with that verbal predicate is difficult to identify and should be spelled out. Only logical inferences are made in accordance with the common ground, in the sense that the identified referents are either identical to what the writer intended or are possible candidates for the actions that are to be attached to them.

The impact of previous actions does not fade away once the episode is closed down. When the roles to be played throughout the text are determined in relation to the topical entities, the episodic boundaries do not cause complete suppression of the activation state of such entities in the reader's mind; the information available to the reader depends in part on the recorded discourse world. Although episodic closures suppress the activation of entities, the identity of referents pertains to their association with the actions and attributes they undertake or undergo, not only the current action conveyed by the predicate of the clause but also the previous ones. Through this association, referents gain salience neutralising the suppressing effect of episodic discontinuity and limiting the conflicting effect of potential ambiguity. This implies the significant involvement of the long term memory storage in the identification task.

Section 4.2.1 will discuss the subjects' performances in both identifying the uncoded referents and selecting formal linguistic markers to fill the empty NP slots. But before beginning to present our slot by slot analysis of the subjects' referential performances, a point is worth mentioning. We will have to make frequent mentions of the referents and the referring expressions which are used to refer to them. That is, the referring expressions are used to either refer to the referring expressions themselves or to the referents of the expository discourse. Therefore, we have to use the same term

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to refer to either a given referent or a given referring expression, e.g. *Mr Duffy* is a referring expression, while at the same time Mr Duffy is a referent. We will make this difference explicit by using normal font for pointing to the referents; and we will use italic otherwise.

In addition, the terms *full NP* and *noun* will refer to any definite referent marked by a non-pronominal expression, whether or not the expression in question is a first name, a last name, a noun without any attachments, or a noun with a determiner, a title, a description, etc.

4.2.1 The Data

Extract 1
The federal Attorney-General, Mr Duffy, yesterday announced that the Australian Government was making inquiries in Malaysia about the possibility of extraditing Raja Bahrin Shah, the father of Iddin and Shahirah Gillespie.

(1.   ), 10, and (2.   ), 7, were abducted in defiance of an Australian Family Court order last July by their father, a Malaysian prince, who was divorced from their mother and custodial parent, Mrs Jacqueline Gillespie, in 1986.

The referents of slots one and two from extract one initiate a break in the episodic structure of the passage. A switch in the subject referent and the change of episode both cause a shift in focus. But it is not clear how a break in the organisational unity suppresses a referent; in other words, how much suppression is enough for the producers to feel it necessary to use a full NP. These referents could hardly have been rementioned by a plural pronoun *they*, because initiating the new episode has a cognitive cost, so the use of a full NP serves the structural organisation. One expects the subject referent of a sentence initiating a new episode to begin with a full NP. Both the grammatical and stylistic criteria prevent the referents of these NP slots being referred to by *he* (slot one) and *she* (slot two). The order of the mentions of the two referents is indeed an unmarked order according to accessibility considerations. The social status hierarchy determines the order of adjuncts according to formal status pertaining to sex, male before female; or age, older before younger (see chapter two for a review of accessibility hierarchies, also Allan 1987). One source of information for identifying the missing referent was the previous text, but the predicate of the clause in which the second mention of Iddin and Shahirah is made, *were abducted,* is helpful.

2
(3. Mr Duffy) said yesterday that following a request from the director of public prosecutions that the extradition of Raja Bahrin Shah be considered, his department had written to (4. Mrs Gillespie's) solicitors on 12 January, seeking (5. her) views on a possible extradition request.

The subjects' performance in slot three indicated correspondence with the writer, who marked the referent of this NP slot with the full NP, *Mr Duffy;* the full NP was used to signal the beginning of a new episodic unit. Subjects agreed with the writer in both identification of the referent of slot three and selection of the referential form to mark the referent identified. The verb *say*, with which only one referent, Mr Duffy, is associated, displays to the reader who should be chosen as the referent. The fact that subjects succeeded in identifying the ellipted mentions pertaining to Mr Duffy in all subsequent occasions demonstrated the informativity of context. The clause intervening between the two mentions of Mr Duffy itself contains referents such as Iddin and his father, a Malaysian Prince, that can potentially create an ambiguous environment. But potential ambiguity is neutralised by the organisational property of the text, in the sense that the degree of plausibility of referents determined by the verbal predicates makes competition extremely restricted. Mr Duffy has only been mentioned once previously and initiates a new episode, so this referent is marked with a full NP both by the writer and the subjects. The full NP is chosen under the influence of referential complexity, episodic break, and possibly low salience.

The fourth slot is one of few slots in which subjects demonstrated difficulty in identifying the referent of the missing expression as intended by the writer: Mrs Gillespie's solicitors, Malaysian solicitors, Duffy's department solicitors, Government solicitors, Bahrin Shah's solicitors, and top solicitors were all considered to be equally plausible referents for this slot. In the subsequent text, after slot four, information is presented about who wants the extradition to happen and hires solicitors for this goal; however, the majority of the subjects did not correctly work out who is expected to hire, instruct, and seek advice from solicitors.

In this particular slot, there is more than one plausible referent associated with the predicate, because the contextual information does not reveal the identity of the most plausible referent. In this particular environment, the complainer, the complainee, or the justice department each may have solicitors, so all are more or less plausible referents. The function of a full NP in this slot is vital for providing informativity necessary for referent identification. Notice that subjects' identified referents are not randomly selected, i.e. referents chosen can be plausibly associated with the particular type of action predicated. Knowing who is entitled to do what in the justice system would enable subjects to recognise whom the solicitors are working for, so some implicit propositions assumed to be part of readers' shared knowledge could help narrowing down the context set and consequently the plausible referents. Although the referential distance between the previous mention of Mrs Gillespie and her current mention (slot four) is fairly low (four clauses

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constituting one sentence), ambiguity is null, and salience is reasonably high, the role of a full NP is essential. A thorough understanding of the episode, in which the phrase *seeking views on a possible extradition* is a cue, would indicate whose views should be sought. But the subjects' performance revealed that, when there is conceptual complexity in the environment, not all the explicit information is accessed in a reading task.

3

(3. Mr Duffy) said yesterday that following a request from the director of public prosecutions that the extradition of (Raja Bahrin Shah) be considered, his department had written to (4. Mrs Gillespie's, *Malaysian, their* (Duffy's department), *his* (Duffy's), *Government, Bahrin Shah's, the, top, its* (Department's), *the Malaysian),* solicitors on 12 January, seeking (5. her--their?) views on a possible extradition request.

Likewise, none of the available sources of information provided any help in distinguishing between the two equally plausible referents (Gillespie as opposed to the solicitors) for the fifth slot. Knowing whose views are sought depends on the readers' knowledge of the legal system as noted earlier; in the absence of such knowledge, identification of the referent intended appears to be more difficult. The phrase *seeking (....) views on a possible extradition request* did not distinguish between Gillespie as opposed to solicitors, since both can plausibly express views on an extradition. Only eight (33%) of the 24 subjects identified the writer's referent in this slot. The significance of the role of the explicit reference in this slot and in slot four is much greater than in other nominal slots which subjects did not find difficult. So referential distance is not at all an indication of ease or difficulty in reference resolution in such cases. If all the 39 NP slots of this expository written passage were as difficult as slots four and five, we would have to conclude that the referential system operates withou any assistance from context. Indeed, it is when plausibility of only one referent is not determined by context in environments where two equally plausible referents compete that ambiguity is effective. In most environments, the mere presence of several competing referents contributes only to the degree of complexity. Effective ambiguity is created irrespective of where in the foregoing text the competing plausible referents have been mentioned. The subjects in this study displayed difficulty only when there was more than one plausible referent for the slot in question.

It is clear that ambiguity is caused when there is competition between several characters for being the antecedent of a proform. Ambiguity is not removable when context is not informative and so for a discourse referent to be identifiable, a full NP is the only device to use. The retrievability of a given referent is connected to whether or not a particular form supplies sufficient coding

information for the reader to prefer the entity in question among potential antecedents. Since informative referential devices are used to both enable the reader to retrieve entities and to achieve functional pragmatic ends, definite NP's are not always used to specify their referents unambiguously. They often seem to be over-specifying the entities they refer to, because most referents that are marked by a full NP are identifiable through context. Indeed, it is often the case that verbal elements select their referents from a set of potentially competing referents. Some referents are easily identifiable regardless of the length of the gap from their previous mention and a high measure of ambiguity. For example, slots 18, 19, 25, and 26, depend on the inferences based on shared knowledge of the world spoken of characterised by the textual context.

> 4
> (3. Mr Duffy) said yesterday that following a request from the director of public prosecutions that the extradition of Raja Bahrin Shah be considered, his department had written to (4. Mrs Gillespie's) solicitors on 12 January, seeking (5. her) views on a possible extradition request.

When there are not sufficient cues for the readers to infer which one of the two plausible antecedents, Gillespie or solicitors should be preferred for slot five, the choice is biased toward the one potentially eligible referent closest to this slot. The subjects tended to choose *their* (solicitors') in slot five which is different from the writer's intended referent: *her* (Gillespie's). Even the eight subjects who managed to identify the writer's referent of slot four selected *their* to refer to solicitors in order to fill the fifth slot. It is simply not possible for the reader to work out whether solicitors' views should be sought or Mrs Gillespie's. In this particular context, a plural antecedent is competing with the only salient female singular character of the text.

> 5
> (6. He (Mr Duffy)) said this step was taken after concerns were expressed that any such action might adversely affect (7. her) attempts to gain access to the (8. children).

In slot six, the writer pronominalised the third mention of Mr Duffy initiating a new episode. However, only four (17%) subjects agreed with a pronominal selection, the rest (15 subjects, 63%) preferred to use the title + last name, *Mr Duffy*. Some of the subjects' identification differed from that of the other subjects and the writer's. These subjects identified such referents as Gillespie (referred to as *Mrs Gillespie* (three subjects), and *Mrs Jacqueline Gillespie* (one subject)), and a Government spokesman (one subject). But evidently their preferred referent was of low plausibility. Needless to say, such expressions as *announcing*, *saying*, and *expressing concerns about possible adverse effects* are associated with Mr Duffy more plausibly than Mrs Gillespie.

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6
(6. He (Mr Duffy)) said this step was taken after concerns were expressed that any such action might adversely affect (7. her) attempts to gain access to the (8. children).

Slot seven presents a good example of stylistic variation in making a referential selection. This slot was filled with a remarkably wide variety of devices by different subjects: ellipsis, pronoun and full NP were all viewed as acceptable. The missing referent was identifiable through context. However, only twelve (50%) subjects chose the pronoun *her* to refer to Mrs Gillespie identical to the writer's selection; five (20.7%) subjects specified the referent more explicitly and selected *Mrs Gillespie's* or *Jacqueline's*. Four (16.6%) subjects used ellipsis, filling the slots with zero (4.2%), *the success of any attempt* (4.2%), only an article *the* (4.2%), and *any* (4.2%). The diversity observed in selections implies that the use of a referring expression can simply be optional. The choice of expressions such as *the success of any attempt* (4.2%), an article *the* and *any* may imply a different stylistic interpretation of the text than that the writer had in mind; however, in accordance with the subjects' judgements, one can eliminate a full NP or replace it with a non-referential expression. The optionality is related to the readers' knowing, through context, *who is attempting to gain access to whom*. From the list of the referents introduced so far, the highest degree of plausibility is allocated to Gillespie. Thus the focus of attention is directed by context.

In slot eight, all 24 participants of this study managed to identify the missing referent and made an identical formal selection too. Long referential distance and an episodic break would determine a nominal selection here; however, what motivated the subjects to use a nominal choice was the particle *the* present before the empty slot. The plural referent is anaphoric to *Iddin* and *Shahirah* of slots one and two. The implicit anaphoric relation is resolved through an inference based on the semantic shared knowledge. Since it is easily figured out who wants the access to whom, the identification of the missing referent appears to be easy.

7
(6. Mr Duffy) said this step was taken after concerns were expressed that any such action might adversely affect (7. her) attempts to gain access to the (8. children).

(9. He) said (10.) solicitors had advised his department on 2 March that, on instruction from (11.), they wanted the extradition question to be pursued.

Mr Duffy, this time referred to by a pronoun in slot nine, makes another announcement. The subjects identified the missing referent but only 11 (44%) selected the writer's selected pronominal device, whereas 11 (44%) subjects decided that the full NP *Mr Duffy* is an appropriate device to

use, one erroneously identified the referent and used the pronoun *she* to refer to Mrs Gillespie, and one subject identified a different referent, Gareth Evans (the Foreign Minister at the time) extending the boundary of inference beyond the text. Both the full NP and pronoun are considered as felicitous for marking the referent in slot eight. The referent was identifiable through an inference: for this particular verb, there is only one plausible referent among the list of characters so far introduced.

8
(9. He) said (10. Mrs Gillespie's) solicitors had advised (his) department on 2 March that, on instruction from (11. Mrs Gillespie), they wanted the extradition question to be pursued.

In slot 10, context supplied the information for successful identification, but diverse selections indicated that choice of the linguistic device was up to the individuals' discretion. This slot demonstrates that an explicit mention could have even been stylistically as appropriate as ellipsis. 12 subjects (50%) made an explicit reference, while three subjects (12.5%) thought a third person pronoun *her* referring to Mrs Gillespie was clear enough, one used ellipsis believing there would be no need for marking who the solicitors are connected to here; they wrote *the solicitors* instead of *her solicitors* seemingly seeing no need for pointing to Mrs Gillespie here at all, and three subjects (12.5%) inferred differently that solicitors were Mr Duffy's or his Department's. If reference were to be resolved according to recency, the possessive pronoun *his* referring to Mr Duffy in slot nine would be the appropriate referent; indeed, three subjects preferred to make an identification according to recency. But the upcoming information reveals that the one who wants the extradition, and instructs the solicitors she has hired for the task is reasonably inferred to be Mrs Gillespie.

The referent of slot 11 was identified correctly by seventeen subjects (71%). The writer's choice was Mrs Gillespie; while eight subjects (33.3%) coded the referent identically to the writer, six subjects (25%) used a third person pronoun *her*, two subjects (8.3%) used a different full NP *their client* referring to Mrs Gillespie. However, another potential referent might have been Mr Duffy identified and marked by one subject as *him* (Mr Duffy), and *them* referring to solicitors by three subjects. As the subjects' performances demonstrate, different degrees of plausibility of Gillespie, Duffy, and solicitors are attested. The subjects found it difficult to identify referents associated with verbs pertaining to legal actions, *advising, instructing,* and *writing to*. These actions do not reveal the referents associated with them, since knowledge of the legal system, which did not appear to be equally shared by the subjects of this study, underlies them. Two subsequent

references to Mrs Gillespie are made by full NP's in slots 10 and 11. The full NP in both slots is used because in slot 10, Mr Duffy, rather than the writer who is quoting, refers to the solicitors and makes a mention of Mrs Gillespie in this relation; and in slot 11, the solicitors are actually referring to Mrs Gillespie quoted by Mr Duffy. Here, different worlds of the characters are being reflected by the writer; so only ad hoc explanations can be offered for two subsequent coreferring full NP's. The selection of a pronoun by some subjects reflected referential recency, while the full NP selected by the writer and some of the subjects needed ad hoc explanations.

The textual context, not recency, enabled the subjects to understand, without having the referring expressions available in these NP slots, that the referent of slots nine and 10 is not the same character; but slots 12 and 13, in clauses with the same grammatical construction as clauses containing slots nine and 10, corefer. The minimal referential distance for both slots results in the use of a pronoun rather than a full NP; but it is obvious that the reader would need contextual information to resolve coreference.

9
(12. Mrs Gillespie) said yesterday that (13. she) wanted nothing less than a solid commitment from the Prime Minister, Mr Keating, and the Opposition Leader, Dr Hewson, to bring (14. her children) home.

In slot 14, the subjects found it easy to identify the uncoded referent, but there seems to be no discourse constraint to motivate the subjects to make one common nominal selection in correspondence with the writer. The writer, along with 10 (42%) of the 24 subjects, used the full expression *her children* for this slot, five subjects (21%) confined their selection to *the children*, assuming the kinship relation could be left implicit, two subjects (8.2%) referred to the missing referent by using the full NP *the kids,* and seven subjects (28.7%) reduced a long expression, *Mrs Gillespie's children,* to a plural pronoun, *them*. The nominal selections totaled in 71.2%, if we disregard the differences in the types of nominal expressions used, rendering the slot intermediate in terms of the tendency strength. The pronominal preference by 28.7% subjects should be viewed as a deviation from a felicitous choice; it was made in spite of a distance of five clauses between the two mentions of the children, and presence of referential complexity caused by two potentially competing referents, (solicitors, and the plural referent prime minister Mr Keating and Opposition leader Dr Hewson).

10
"I demand that (15. they) prove to the Australian electorate that (16. they) have a heart and some humanity and make a commitment now, before the election. I want (17. them) to make a commitment to bring (18. my children) home."

The third person plural pronouns, *they*, *they*, and *them* in Slots 15, 16, and 17 referred to a generic unidentified referent.[2] 16 subjects (66.6%) recognised the referential intent of the writer; a few chose such definite plural referents as: you, the government, the court, and our/the politicians which have varying degrees of plausibility. Slot 16 was filled with a third person plural pronoun by all subjects. The subject-verb agreement in this sentence indicated to the subjects the need for a plural referent. A general tendency observed among all subjects was that all preferred to identify a plural referent for these slots, either to refer back specifically to the plural referent, Prime Minister and the Opposition Leader, or to point to a conceptual referent, referred to by the plural pronoun *they*.

11
I want (17. them) to make a commitment to bring (18. my children) home. I also want (19. them) to make a commitment to extradite (20. Raja Bahrin Shah)". Apparently there is nothing holding up the extradition except the spinelessness of the Australian Government", (21. she) said.

The mention of the full NP, *my children*, in slot 18 is made after a gap of five clauses from the previous mention, but the full NP which was the writer's selection was chosen by 15 (62.5%) subjects: *the children*, *the kids*, and one subject used the first names of the referents, *Iddin and Shahirah*; but two male and seven female subjects (36.5%) used pronouns. The NP slot was easily identified, but in using a formal device, subjects display that the environment is not a strong one in motivating all the subjects to make a nominal choice. Marking the children involves stylistic options; *my children*, *the children*, *the kids*, and *Iddin and Shahirah* are all attested as possible referential choices for this NP slot; however, the majority preferred a full NP which indicates that great referential distance does suppress the referent and decreases referential salience.

Two plural referents are mentioned in slots 17-19; the referent of slots 17 and 19 is indirectly implied by marked by the plural pronoun *they*, and the referent of slot 18 is the children. Context determined unambiguously the referential connection between slot 17 and slot 19 which is more distant than slot 18, both referents of the three NP slots (17, 18, and 19) being plural. The subjects easily distinguished the referent of slot 19 (generically referred to by *they*), previously mentioned

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[2] The reference by the plural pronoun *they* is used when the writer intends to point to a class of plausible referents whose exact identity is not of concern. The use of the term refers not to a definite antecedent, but to a generic unidentified category of particulars whose exact identity is not in question (see chapter 1).

in slot 17, from the more recent referent in slot 18, the children. The use of plural pronoun *they* in such environments does not remove ambiguity emerging from the presence of two competing plural referents in the environment, while referential recency triggers the use of unstressed pronoun representing unmarked coreference. It is context that determines the coreference between NP slots filled with the plural pronoun *they*.

The readers gathered easily that there was a distinctive association between extradition, and the undergoer of this action: Prince Raja Bahrin Shah in slot 20. This slot is a clear example of how a referent in a discourse is identifiable through the predication made of it. In such environments, the antecedent of the reduced form can be extremely distant but no impact is made on the ability of the reader to identify the referent intended. Despite the presence of several competing characters in the text, the effect of ambiguity against identifying the referent of this particular slot is null. The reason is simple: the action of *extradition* is uniquely associated with the only plausible referent, Raja Bahrin. This is why there is no ambiguity in slots in which *extradition* is the predicate. Compare the semantic function of a full NP in this slot with slots four and five in which identification depends exclusively on the use of a full NP. The semantic function of a full NP in this slot is much less than it was in slots four and five.

The subjects displayed their selectional agreement by only using a full NP, but they did not show any agreement upon the choice of a full name, *Prince Raja Bahrin Shah*, which was the writer's selection. The choices were *Raja Bahrin Shah* (11), *Bahrin Shah* (5), *Raja* (2), *the Prince* (2), *Raja Bahrin* (2), *Shah* (1), *the children* (1), and the plural pronoun, *they* (1) (the last two being errors). The varying types of full NP selected by the Native Australian subjects reveal their unfamiliarity with foreign names; and this impacts on stylistic appropriateness. Within the same episode in slot 21, Mrs Gillespie who is quoted directly is accessible. The writer used a pronoun to mark this referent in relation to the predication *said*, but nine (37%) subjects selected a full NP. This slot represents an intermediate tendency for using a nominal device. The quotation and the quoting sentence both contain mentions of Mrs Gillespie; so, as far as identifiability is concerned, context reveals the identity of the only plausible referent of this sentence: Mrs Gillespie.

12
Apparently there is nothing holding up the extradition except the spinelessness of the Australian Government", (21. she) said. "I have not been allowed to speak to (22. my children), or see (23. them), or receive any sort of information about (24. them) since 9 July, the day (25. he) kidnapped (26. them).

Slot 22 contains the object referent of another quotation of Mrs Gillespie; therefore, the environment is discontinuous and hence a full NP is a more likely option for this slot. The minimal distance between slots 22, 23, 24, and 26, containing the mentions of the children in the object slots of the coordinate clauses connected by the use of *or*, created a strong preference for pronominal selections in slots 23, 24, and 26. In slot 25, the writer used a pronoun *he* to refer to Prince Raja Bahrin with a distance of six clauses back to the last mention. The presence of other interfering referents such as the Australian Government and the kids did not appear to create problems. The verbal expression, *kidnap*, itself reveals the referents associated with it; this is again a clear example of the referents' plausibility being determined through what is predicated of them: it is easy to work out who kidnapped whom; and this is free of the cognitive constraints imposed by referential distance and structural discontinuity.

> 13
> "(27. The children) don't even know that (28. their) nana died last month. (29. they) won't let me speak to (30. them).

In slot 27, the writer used a full NP, *the children*; however, three subjects found it stylistically desirable to use a possessive construction, *my children*. The referential distance between NP slots 26 and 27 containing the mentions of children is minimal, but it is reasonable to believe that the sentence containing slot 27 initiates a new episode. Marking the discourse structure by using a full NP is a strong motivation for most subjects, but in this case the break in episodic organisation was judged to be minor. Sixteen subjects (66.6%) coded the referent with a pronoun, disagreeing with the writer's nominal selection to mark this minor break. The difference may have pertained to the conflict between referential recency and discontinuity, thus creating a fairly indeterminable context for uniform selection. Both the writer's referential selection and that of the subjects can be explained through stressing either the effect of action discontinuity or referential recency. Referential recency is often observed in compound sentence structures such as clauses joined by connectives, subjunctives, and coordinators; or in two consecutive simple sentences of an episode containing mentions of a common referent. There is a subject switch in the sentences containing NP slots 27 and 29; but since context is informative, the switch is done by a pronoun.

In slot 29, all the individuals managed to figure out the missing referent. But the referent they identified for the NP slot was different from the one intended by the writer whose choice was a conceptual referent marked by the pronoun *they*. The conceptual referent's exact identity is not made explicit. Different from the writer who pointed to an implicit referent, the subjects identified

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the referent to be Raja Bahrin and filled the slot by the third person pronoun, *he* (13), *Raja* (3), *Raja Bahrin Shah* (1), *Bahrin Shah* (4), *their father* (1), and *Bahrin* (1). Only one subject agreed with the writer's generic conceptual referent marked by the plural pronoun *they*, leaving the exact identity of the referent implicit. Recognising the conceptual referent intended by the plural pronoun *they*, whose exact identity is not explicitly exposed here, can be part of one's cultural knowledge implicitly represented in the world spoken of. It is very likely that within the Gillespie's world, family affairs such as the one described in this text are considered to be affairs related to close relatives. So the pronoun *they* refers reasonably to the Prince's family who are known to be involved, given the implicit cultural norms. In the western framework, this may not be the case. The explanation accounts for the subjects' identifying the referent as Prince rather than the implied Prince's family.

14
(27. The children) don't even know that (28. their) nana died last month. (29. They) won't let me speak to (30. them).

Slot 30 represented the effect of recency in motivating the subjects to make a pronominal preference. The children and the generic referent marked by the plural pronoun *they*, referring to the Prince's family, are two plural referents. The effect of verbal selectiveness of the predicates *let* and *speak* signifies the referents associated with them. Consequently the competition between the two potential antecedents is neutralised, such that the subject switch in slots 27 and 29 is done with a pronoun.

15
"(27. The children) don't even know that (28. their) nana died last month. (29. They) won't let me speak to (30. them).

Identical to the writer's intended referent in slot 31, the full NP *little boy*, which was the writer's device was coded by subjects as *son* (19), *daughter* (3), and *Iddin* (2). Apparently, the unfamiliarity with non-anglo names made it difficult for some to distinguish the gender of the name bearers. The subjects who used the first name *Iddin* tried to avoid a possible mistake by using a gender determined term such as *son* or *daughter*, sacrificing felicity for avoiding an incorrect choice. The same problem was observed in slot 32, in which only 15 subjects used the third person pronoun (*him*) like the writer, the rest used gender-free terms. The full NP in 31 is correlated with the effect of a large referential distance between the current mention and the last mention of the referent marked by the full NP *little boy*. No subject in this case disagreed with the full NP; here the use of a pronoun seems uncooperative, although the identity of the referent is

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recoverable from context. Subjects tended to agree that in very large distances such as in slot 31, the full NP is a much preferred option.

16
(31. My little boy) turned 10. It's the first birthday I've never spent with (32. him). I couldn't even ring (33. him).

The effect of recency in motivating a pronominal choice in slots 32 and 33 appears to be dominant; in slot 33 a pronoun was selected by all the subjects under the compelling effect of recency, while in slot 32 it was violated by six subjects who had difficulty with distinguishing the gender of the referents and decided to use full NP's. When the two consecutive clauses are independent simple sentences, the pressure of recency seems to be reduced.

17
"I'm sick and tired of waiting. Australia's future is with its (kids). If (34. they) are not willing to protect (35. them) and to make a stand then I don't see how we can trust any of them," (36. Mrs Gillespie) said.

In slot 34, the plural pronoun *they* corefers with a plural referent 13 clauses back, if we take the pronoun as referring to Keating and Hewson. There are competing referents intervening between the two mentions: Raja Bahrin, the Australian Government, kids, their nana, they (the prince's family), little boy, and its kids (Australian kids). The writer used a pronoun either to reintroduce Keating and Hewson, or as a generic term referring to a referent whose exact identity is not made explicit. The verb determines the referent, making long distance coreference possible here. The plural pronoun *they* in slot 34 was identified as Keating and Hewson by eight subjects, the government [authorities] by five subjects, the politicians by six subjects, and the first person plural referent (we) by five subjects. The subjects who did not choose a conceptual referent marked by a plural pronoun identified only plausible referents for this slot.

The pronoun referring to the children in slot 35 used by the writer and 20 subjects exhibits the effect of recency realised in two consecutive sentences. Notice that the plausible referents are identifiable according to an enormous amount of common ground; coreference in the clause, *34 should protect 35*, is resolved based on the premises formed on the basis of the previously mentioned text. These premises remove the effect of referential ambiguity which is present because of two third person plural pronouns, one referring to Keating and Hewson and the other to Australian kids. The contextual association between the predicates and continuing referential concepts on the one hand, and the semantic linkage in the set of verbs associated with a particular

referent together provide abundant information which reveals the referents of the ellipted expressions.

18
"I'm sick and tired of waiting. Australia's future is with its (kids). If (34. they) are not willing to protect (35. them) and to make a stand then I don't see how we can trust any of them," (36. Mrs Gillespie) said.

Speaking to an ethnic news conference yesterday, Dr Hewson said he would not "make a decision on the run" when asked if he would respond to (37. Mrs Gillespie's) call for help. But he said he would phone (38. Mrs Gillespie) within days.
Mr Keating has said that the Federal Government's ability to help (39. Mrs Gillespie) was "regrettably limited."

The uncoded referent in slot 36 was given by the writer as the full NP *Mrs Gillespie*; and the referent was identified easily by the subjects; but only eight subjects (33%) coded the referent with the same device as the writer; the rest, 16 (66.6%), filled this NP slot by the pronoun *she*. The subjects' disagreement indicated that both nominal and pronominal choices were possible in this slot. Direct quotations are usually composed of the directly quoted material and a sentence which conveys the quotation. In this case the quoted material contains mentions of the quoting person; thus a switch is possible from the first person pronoun to a third person coreferring pronoun both marking the same referent, Mrs Gillespie. In such circumstances, the choice of a full NP and a pronoun appears to be either at the writer's stylistic discretion or under the influence of some ad hoc factors, e.g. the requirements for being formal demand that a last name to be used rather than a first name or a pronoun.

In the case of slots 37, 38, and 39 in which identification appeared to be easy, the selections of referential markers were somehow diverse. The use of the full NP *Mrs Gillespie* in NP slots 37 and 38, both of which being in object position, reflects the style of reference that Dr Hewson chooses to refer to her which should naturally suit the needs of the environment: the status of the referent in Dr Hewson's view rather than the writer of the text. Two different worlds are contrasted in such environments. In slot 39 also Mr Keating's world is represented rather than the writer's. The choice of a full NP suits the need of this specific environment rather than any thing else. Sixteen subjects made a pronominal choice in NP slot 36, 18 subjects made a nominal choice in slot 37, 20 subjects chose a pronoun in 38, and 17 subjects used a nominal device in slot 39, while in all these four slots the writer made nominal choices. The disagreement of the subjects regarding the referring device in slots 36 and 38 cannot be considered to be accidental, neither can the choice be viewed as inappropriate.

In brief, our examination of 39 NP slots filled by 24 participants of this study revealed the following general points:

a) in some environments identification is difficult regardless of short referential distance (cf. slots four and five);

b) there may be NP slots in which the majority of subjects identify the referent differently from the writer (cf. slots five and 29);

c) the presence of a grammatical constraint dictates full selectional conformity, (slots one, two, and eight);

d) recency of prior mention strongly determines the selectional performance (slots 15 16, 22, 23, 26, 28, 30, and 35);

e) long distance use of third person plural pronoun by the writer is made in order to refer to referent or referents whose exact identity is not at question. The subjects identified definite plausible referents in contexts where the writer used a plural pronoun *they* to refer to such generic referents (slots 15, 19, 29, and 34);

f) a reduced form may represent a counter-example for accessibility measured by distance (slots 18, 20, 25, 27, 36, and 37);

g) NP slots may contain referents whose mentions are purely optional (e.g. slots seven, nine, 10, 11, 27, and 36); and

k) a long referential distance, between five to 20 clauses intervening between the two subsequent mentions of a given referent, may not impact on the difficulty of identification of the referent (slots eight, 10, 20, 25, 29, 31, 34, and 37).

By viewing actions and events as instructions to infer topical participants, bearing in mind that actions of salient referents create a rich common ground within which inferences are made, we can provide a comprehensive account of how discourse anaphor resolution proceeds. The divergences in identification do not appear to be true errors. The referents identified for the NP slots are, in varying degrees, plausible. Contextual information constrains the plausibility of the candidate referents, in the sense that potential ambiguity is not unconditionally created by the competing referents in the textual environment. The choice of anaphoric expressions in several NP slots can only be explained through ad hoc explanations and are inconsistent with regards to such cognitive factors as referential distance, persistence, and potential ambiguity.

Referential distance and discourse organisational structure signify a functional pragmatic negotiation between the text producer and the intended addressee. Changes of accessibility status within such boundaries trigger the use of informative marking devices, but the problem is that such discourse units are not always a true representation of activation changes of the salient characters. In long discourses viewed in their entirety, certain participants are associated with particular actions. The informativity of such association is readily applicable in anaphor resolution. The most feasible answer to long distance anaphor resolution is: through context, one can identify ellipted referents whose prior mention was made much earlier in the text. This is often

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free of the effects of distance and episode boundaries. Inferences are made based on context in combination with the shared semantic knowledge of the interlocutors. In this way, most NP slots are identifiable without even the need for overt referential markings. In a considerable number of NP slots, the surface arrangement of linguistic coding devices appears not to reflect the referents' identifiability.

The two cognitive statuses which are connected to anaphor resolution are identifiability, which depends on both the informativity of context and the referring expressions used, and accessibility, which depends only on the use of the referring expressions in relation to the episodic unity of discourse. Accessible entities are identifiable; however, the point is that not every entity which has been marked with a full NP would be unidentifiable if ellipted. An accessible entity is certainly identifiable and attenuatable, but not every identifiable entity can be said to be accessible, given a narrow definition of accessibility and restricting it to short term and episodic memory. The writer judges the ease or difficulty involved in identifying a referent by the reader. It is evidently when the writer thinks it is difficult for the reader to retrieve an entity from memory that an appropriate nominal expression is used. Since it is not easy to accurately estimate how easy or how difficult retrieving a referent is to the reader, some flexibility is always to be expected in the use of referring expressions.

Non-adherence to a common selectional strategy results in an inappropriate anaphoric arrangement; however, even inappropriateness is variable. Often the referential formality is violated by some subjects, e.g. they use first names where the formality in the particular text point requires the choice of a last name. Furthermore, some individuals, apparently those with less interpretive skill, could not recognise the necessity of using a preferred referential pattern, especially where the episodic break was not a major one, or the shift was from one salient character to another. However, referential recency and formal constraints in determining the pronominal choice were followed by all regardless of the developmental skill in following and recognising the episodic structure of the text. It is important to note that individuals, who did not appear to have any difficulty using contextual information in retrieving the uncoded referents, displayed difficulty in recognising the discourse constraints when marking their identified referent. Where the language skill did not help a given subject to recognise what referential choice is the most appropriate to make, the outcome was an idiosyncratic referential style.

The conflicting effect of conceptual complexity, referential distance, the major vs minor episodic break points, and referential salience, could create environments of indeterminacy. Awareness of the discourse constraints on anaphoric reference, as opposed to the grammatical constraints which are obligatory constraints and are generally recognised and followed, does not appear to be a conscious concern. In general, non-conformity was caused mainly by the purely stylistic nature of some of the NP slots, e.g. Mrs Gillespie's children were coded as *the children*. Non-conformity in selections can result in the infelicity of style, but it may also be the result of stylistic indeterminacy.

In the next section, we will make a quantitative comparison of the data collected from our subjects and will argue that functional pragmatic tendencies are observable in this type of data; however, we limit the functional claims to probabilistic projections represented in populations of performers as prototypical. The claim is that the recognition of discourse constraints depends on a more advanced discourse level awareness of language structure than the grammatical constraints. There should be conscious understanding of the need to choose anaphoric expressions on a pragmatically acceptable basis.

4.3 A Quantitative Analysis Of The Experimental Data

The subjects' performance in the identification task was categorised into four different groups: Whether or not the missing referent of the empty slot was identified by 75% or more of the subjects, and whether or not the subjects' identification of the referents conformed with the writer's intended referent (conformity between the subjects and the writer). Thus four possibilities were examined in our comparison: conformity vs non-conformity within subjects, conformity vs non-conformity between the subjects and the writer (see table 1 below). As for the anaphor selection task, which is connected to the identification task, the same criteria were used: Whether or not the selection of a device for a particular case conformed within subjects, and whether or not the conformed selection of a device by the subjects to refer to a particular referent corresponded with the writer's referential selection for the slot in question. It goes without saying that recognising the identity of a referent is distinct from the selection of an identity marker. Conformity in identification can be followed by conformity in selection but not vice versa. Thus, a design with such variables as slot, selection, and identification is formed:

1 (slot) x 2 (selection vs identification) x 2 (+ identical vs -identical) x 2 (Within subjects vs between subjects and the writer).

Table one below illustrates the types of connections between the above-mentioned variables. As an example, if identification of the uncoded referent does not display conformity among subjects ($-\alpha$), we don't expect any identificational conformity between the subjects and the writer for that particular case either ($-\beta$); in other words, the identification task of the subjects is not comparable to the writer's referent if the subjects do not agree on a specific referent ($-\alpha$ implies $-\beta$). Also in (2) below, it is implied that within-subject-conformity in identification does not necessarily mean within-subject-conformity in selecting an identity marker, so: $+\alpha$ implies $\pm x$; i.e. the two are independent from each other. It is inferred that $+\alpha$ (conformity in identification within subjects) is followed by $\pm x$ (either conformity in selectional performance or non-conformity in selectional performance within the subjects) and $\pm y$ (either conformity or non-conformity in selectional performance between the subjects and the writer); likewise, we may draw more logical inferences. These all reflect the independence of identification from marking the identification, and also possible difference between the writer and the informants of the study.

Table 1. The plan of the comparison of the data

Selection of a marker for the identified referent		Identification of the uncoded referent	
± Identical		± Identical	
x. Within	y. Between	α. Within	β. Between

(+) identical indicates selection/identification was in conformity, whereas (-) identical implies that the selection/identification did not display identicality within subjects or between subjects and the writer. (Within) indicates within subjects' identicality of selection/identification. (Between) indicates identicality of identification/selection between the subjects and the writer.

1. $-\alpha$ implies $-\beta$
2. $+\alpha$ implies $\pm x$ and $\pm y$
3. $-\beta$ implies $\pm y$
4. $+\beta$ implies $\pm x$, $\pm y$, and $+\alpha$
5. $-\alpha + \beta$ impossible
6. $-x +y$ impossible

The Variables

1. Subjects (10 male and 14 female)[3]
2. Task (identifying the uncoded referent vs. selection of anaphoric forms)
3. Comparison (within subjects' comparison and between subjects and writer's comparison)
4. Within subjects' comparison (± conformity within subjects)
5. Subject-writer comparison (± conformity between subjects and the writer)

4.3.1 Discourse Tendencies: On the predicability of anaphors

A discourse pragmatic tendency[4] is intended to signify the prototypical observance of some functional constraints, chief among them are the predictions that: a) in the beginning of a new discourse unit, individuals tend to use a nominal NP to mark a referent, because the discourse boundaries are environments where change of orientation is costly and results in the deactivation of the concepts which belong to the previous episode; and b) alternatively, the functional role of linguistic coding devices is to mark the accessibility of referents which is determined mainly by referential distance along with salience and potential ambiguity. Unless an episodic break decrees otherwise, whenever the entity is reinstated with low referential distance, the coding device used is an attenuated one. As a result of the iconicity principle in coding (Givón 1983), long distance coding of subsequent mentions of a referent necessitates the employment of a full NP. Natural texts must manifest the effect of discourse constraints in directing the subjects of this study toward a common referential selection for filling the empty slots. In brief, this section deals with a) the effect of context in referent identification as demonstrated by the subjects of this study; and b) the recognisability of functional pragmatic tendencies.

As is to be inferred from the design, the support for a strong functional pragmatic hypothesis would require full conformity in cells (+x) (selectional conformity within the subjects) and (+y) (selectional conformity between the group of subjects and the writer) of Table 1 above. The conformity in x and y will indicate that subjects realise when and where to follow a discourse tendency; this will consequently support the predictions by distance and the more advanced discourse structural models of anaphor resolution. For an ideally predictive model, all the 4 X 39 cells of Table 1 above would be

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[3] One of the purposes of this data analysis was to make a comparison between males' as opposed to females' referential behaviour. However, since our limited data did not display any significant differences, we had to concede to the limitation and leave it for future studies.

[4] We make use of terms such as functional, functional pragmatic, discourse tendency, and discourse constraints on the use of anaphoric expressions to imply that a) the issue at question belongs to the pragmatics of the language use, b) discourse anaphora, unlike sentence anaphora which is dominated with syntactic rules, are determined by constraints that are recognised as tendencies, c) pragmatic is a more general term for functional, and d) constraints are in practice the tendencies at work when discourse characters are marked and retrieved.

filled with pluses which is pragmatically unlikely. It will consequently uphold: a) the full significance of the informativity of context in supplying information required for referent retrievals; b) the absolute independence of the identity of the referents from the marking devices used in referring to them; c) the equal tangibility of pragmatic tendencies in all NP slots; and d) the supplementary role of anaphoric elements to context. As mentioned earlier (see chapter one), the concept of 'context' in this study refers to any source of information pertinent to referent identification other than the information conveyed by referring expressions. If cells α and β of the outline are filled with pluses, but cells x and y with minuses, the indication is that whereas context contains the information necessary for successful identification of uncoded referents, the recollection of the discourse functional tendencies will not be supported through this task type. If all the four cells of the above Table are filled with minuses, it will indicate independence of referential system in discourse and the minimal role of context.

The subjects' referential performances displayed successful identification of the ellipted referents of the empty NP slots whenever context was informative and inferences about the identity of the ellipted referents were thus possible; and the relatively successful selection of anaphoric expressions with varying degrees of conformity. In both task types (see Table 2), the comparison of the cells as filled by subjects revealed that 100% conformity is not possible all the time. The reasons are: (a) the identification of the discourse referents is dependent on both the informativity of the referring expressions and the informativity of context, so the subjects could not successfully identify the referents of a few of the NP slots because the intended referent was not revealed by context (5.5% of the cases of identification). The informativity of a rich referring expression was required in these slots for figuring out who is the most plausible referent. And (b) the selection of the identity markers is determined by some optional discourse constraints and is correlated with how informative context is; therefore, the subjects' selections of the referring expressions conformed in prototypical terms, in the sense that predicting what form is selected by the entire subjects is not possible all the time.

In the next section, we will discuss the subjects' performance in making formal selections to fill the NP slots. We will subject the formal selections to a quantitative analysis implementing the distance measurements for finding out how the subjects' selections of the formal devices compare. Then, in section 4.3.2, we will examine the subjects' performance in the identification task. It will be shown that context is a rich source of referential information and is frequently accessed in successfully identifying the ellipted referents in ambiguous environments. The identification process involves inferences regarding which one of the referents introduced is most plausible. And finally section 4.4

will present a summary of the findings of the study and concludes that context is as important in resolving discourse coreference as is the informativity of the rich formal expressions. The two sources of information complement discourse coreference.

Table 2: The slots pertaining to *Mr Duffy*, the subjects' conformity with the writer.

slot	3		6			9		
writer	N*	--	--	P	--	--	P	--
subjects	N 24	P 0	N 18	P 4	M 2	N 11	P 11	M 2
percentage of conformity	100%			18.2%		50%		

N => nouns, P => pronouns, M => mistakes; this category accounts for those slots in which the subjects' identification of the ellipted referent did not conform with the writer's referent. These cases were excluded from the comparison.
*The expressions are classified as either full NP's (Nouns) or pronouns. Every non-pronominal expression was considered to be a noun. The difference between Noun and full NP is ignored for the purpose of NP vs pronoun contrast.

The selectional performance indicated that varying percentages of subjects appeared to agree on a common referring device in filling different NP slots. This indicates a scale of predictability which ranges from strong in which more than 75% of subjects responded positively, to intermediate where 50-74% of the subjects showed agreement, and weak in which less than 50% displayed conformity (Tables 2 and 3). Table 2 illustrates the conformity of the subjects in their choice of anaphoric expressions to refer to *Duffy* ranging from a percentage of 18.2% representing a weak tendency to 100%. These results indeed indicate important differences in responding to the discourse tendencies in various slots and by various subjects.

The percentages of conformity are more revealing in the case of *Prime Minister and Opposition Leader*, in which a range of 80% to 100% is displayed (Table 3). Recency and presence of a formal constraint resulted in full conformity in these cases.

Table 3: The percentage of conformity pertaining to PM and OL; mistakes excluded from calculations

PM & OL writer	slot 15 pronoun		slot 16 pronoun		slot 17 pronoun		slot 19 pronoun		slot 34 pronoun	
subjects	P	19	P	24	P	20	P	15	P	13
	N	5	N	0	N	0	N	0	N	0
	Mist	0	Mist	0	Mist	4	Mist	9*	Mist	11*
percentage of conformity when no mistakes	80%		100%		100%		100%		100%	

*High number of mistakes in these cells may seem misleading, these did not represent true mistakes. Slots 19 and 34 contained conceptual anaphors, *them* and *they*, pointing to generic referents, the subjects; however, made a definite selection for the referents, Paul Keating and Dr Hewson in 19, and *Prince* or Prince's family in slot 34. The influence of these apparent mistakes were removed from the results, so they did not bring about any unjustifiable difference in the percentages.

As Table 4 illustrates, the percentage of selectional conformity in the slots pertaining to *children* ranges from a minimum of 30.5% to intermediates of 62.5% & 70.8 to the maximum of 100%. This scale was manifest in all the cases of referential selections. The diverse range in these cases suggests that although the mean conformity of subjects shows support for discourse pragmatic tendencies, comparisons pertaining to individual cases do not reveal strong supporting results, but as reported in chapter 3, three points are marked in a scale constituting weak, intermediate, and strong degrees.

Table 4: The percentage of conformity pertaining to *children*

Slot No	8	14	18	22	23	24	26	27	28	30·
writer	N	N	N	N	P	P	P	N	P	P
subjects	24/24	17/24	15/24	24/24	24/24	23/24	21/24	7/23*	23/23*	22/23*
% of conf	100%	70.8	62.5	100	100	95.8	87.5	30.5	100	95.5

* In this Table, there were no disagreement cases in identifications; therefore, we did not insert a category for what we termed 'mistakes' which are indeed disagreements among subjects about referents' identity. The only accidental mistakes were in these three marked slots by only one subject which were excluded from our comparison.

A detailed comparison of the subjects' performances including the prototypical arrangement of the referential forms is displayed in Tables 5 and 14 which illustrate prototypical performances in most slots. Table 5 illustrates our classification of NP slots into six groups. In the second row of the Table, one represents slots in which both identification and selection were in agreement among the subjects and between the subjects and the writer. Obviously, this condition is the most desirable for a strong hypothesis regarding the effective role of context and full recognition of discourse pragmatic tendencies. What warranted the slots being categorised in this group are a) the informativity of

context, that indicated who the most plausible referent is; and b) strong tendencies, recency of prior mention along with grammatical constraints, where applicable, that prompted the subjects to make a common referential choice. Slots categorised in row two represent the environments where the role of identity markers is most decisive in identifying the ellipted referents; in these slots the function of full NP's is semantically essential in supplying the informativity required in identifying the referent. In these slots, subjects did not succeed in identifying the most plausible referent for the empty NP slots; context did not reveal the identity of the most plausible referent. The third row shows an environment in which subjects displayed conformity in their identification and selection, but their choice of referent and the identity marker they selected were both in disagreement with the writer. Likewise, row four represents slots grouped as cases where referents' identity was discovered by subjects, but the selection of identity markers varied.

The slots categorised in row four show clearly that the choice of anaphoric expressions cannot be explained through the cognitive factors of distance and salience; some of the referential selections require ad hoc explanations because they are influenced by factors which trigger unusual referential selections, not consistent with the hypothesis of distance. Slots classified in five were the cases in which identification was successful, but the majority of subjects were in disagreement with the writer in their choice of identity marker. Difference in referential choice between the subjects and the writer indicates that on occasions, a professional writer's referential selection may not be acceptable for a majority; this might be a reason for believing that both selections are natural and are explainable. Finally those classified as group six agreed in recovering a common referent different from the one intended by the writer; and in addition the formal choice shows no agreement between subjects and the writer. This category indicates that according to the subjects' semantic knowledge and the world spoken of in this discourse, inferences are major operations in the process of referent identification; identification involves inferencing and the result depends on the circumstances and the readers' ability to figure out which one of the referents should be attributed to a particular event.

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Table 5. The prototypical performance of subjects in identifying the ellipted referents and selecting the identity markers to fill the slots.

No	selection & identification	The slot numbers
1	+ + + +	1 2 3 8 13 16 23 24 26 28 30 33 35
2	- - - -	4 11 15 19 34
3	+ - + -	5
4	++ - -	6 7 9 10 12 14 17 18 20 21 25 27 32 36 37 39
5	+ + + -	22 31 38
6	+ - - -	29

The four - or + signs indicate the success or failure of subjects in both identification of the missing referent and conformed selection of referential devices; the order of the cells is identical to the order represented in Table 1.

The subjects displayed differing degrees of conformity in their selections. Several factors can contribute to a dissimilar selectional performance. It is possible that the subjects were not equally familiar with the legal scenario, displaying varying interpretive abilities. This could impact their knowledge of the text structure and result in an idiosyncratic referential pattern. In addition, within some particular slots, referential choice appears to be indeterminable. It is not equally easy in all NP slots to work out what type of referring expression is most appropriate. The marking of referential entities is done by the writer according to an approximative estimation of the needs of the addressee. Subjects may simply decide to leave less or more to the reader for the identifying task (see example 19, slot 8). In cases in which interpretive skill of the subjects was involved, the disparity resulted in a fairly infelicitous referential pattern; whereas in all other cases diversity in the formal selections reflected the optionality in marking the discourse constraints.

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Mr Duffy said that any such action might adversely affect (7. *her, the,* vs *Mrs Gillespie's*) attempts to gain access to (8. *the children* vs *her children*). (9. *Mr Duffy*) said (10. *Mrs Gillespie's*) solicitors had advised his department on 2 March that, on instruction from (11. *their client* vs *Mrs Gillespie, her*), they wanted the extradition question to be pursued.

Given the assumption that discourse constraints on the use of identity markers are realised as tendencies, one may assume varying degrees of strength attributed to them. The obviousness of the referent did not always appear to be correlated with selectional conformity; the function of a full expression is not always to clarify the referent to which it refers to, but if a referent is not clarified by context, the full expression functions to clarify the said referent. In few NP slots, however, full expressions had the serious task of clarifying the identity of the referent to which they referred. In the next section, the elicited data will be subjected to an application of the continuity hypothesis (Givón

1983). We will show that the continuity hypothesis accounts convincingly for the constraining effect of referential distance on referential selections; but supportive findings are prototypical not absolute.

4.3.1.1. Distance Measurement of Referential Selections

In order to investigate the distance predictions, we applied the quantitative measures employed by Givón (1983) to the 39 slots filled by 24 subjects totalling 695 tokens of referential selections. Relative clauses and noun clauses were counted as part of the clauses they were embedded in. The devices were categorised as full NP, pronoun, and zero. Three kinds of measurements were taken. 'Look back' is the size of the gap which separates the two mentions of a referent in question as the topic at issue. The value of 20 represents maximal discontinuity and 1 represents maximal continuity. In the measurement of persistence, the number of consecutive occurrences of the intended referents in subsequent clauses in which the referent in question persisted to occur was counted. Ambiguity was measured as either present, a score of one, or absent, a score of zero; whether or not one or more potentially competing referents interfered in the interval between two subsequent mentions of a referent in question was considered as presence or absence of ambiguity. The topical characters of this discourse were all human; the types of clauses within which referents occurred and grammatical case roles of the referents in question were not at issue.

Table 6. Means of referential distance and persistence pertaining to Mrs Gillespie. Referential ambiguity is null.

NP Type	Distance	Persistence
Noun	2.60	0.270
Pronoun	2.07	0.004
Zero	1.90	0.100

325 tokens pertaining to Gillespie, the only salient female participant of this passage for whom ambiguity was null, were subject to the continuity measurements. Given the continuity predictions, the mean referential distance was found to be greater for full NP's than zero and pronominals (Table six). The distance and persistence measures were also revealing in the case of other salient characters. Table 7 outlines the results of the continuity measures pertaining to the only female referent of the text. Each of the slots in Table 7 represents a different degree of conformity; in some particular cases distance does not at all account for the difficulty of identifying the ellipted referents. As Table 8 illustrates, the distance and decay measures suggest confirming results for the continuity predictions.

Table 7: Distance and persistence counted in number of clauses as observed in the data collected from our 24 subjects' selections of referential devices referring to Mrs Gillespie, for whom no considerable ambiguity was assumed.

SLOT	4	5	7	10	11	12	13	14	21	36	37	38	39
% of Conform	100	100	52	66.5	61	95.5	91.6	48	62	36	76	12.5	75
Writer	N	P	P	N	N	N	P	P	P	N	N	N	N
Distance	4	1	4	3	1	2	1	3	1	1	6	2	2
Decay	0	0	0	1	0	1	0	0	0	0	0	0	0
Noun	9	-	7	12	11	20	2	-	9	9	19	3	18
Pronoun	1	25	13	4	7	1	22	12	15	16	4	21	6
Zero	-	-	5	2	-	-	-	12	-	-	2	-	-
Mistakes*	15	-	-	7	7	4	1	-	1	-	-	1	1
Total	25	25	25	25	25	25	25	25	25	25	25	25	25

* 5.5% Mistakes were excluded from continuity measurements. Slot row represents the serial number of the mentions of Mrs Gillespie.

Table 8.
Distance measurements of *Gillespie* in the original text. Referential Ambiguity is null

mentions in slot no.	distance	persistence
4 Noun	4	0
5 Pronoun	1	0
7 Pronoun	4	0
10 Noun	3	1
11 Noun	1	0
12 Noun	2	1
13 Pronoun	1	0
14 Pronoun	3	0
21 Pronoun	1	0
36 Noun	1	0
37 Noun	6	0
38 Noun	2	0
39 Noun	2	0

Average referential distance of full NP's:	2.50
Average referential distance of pronouns:	2.40
Average referential persistence of nouns:	0.25
Average referential persistence of pronoun:	0.00

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Tables 9, 10, and 11 outline the results of the measurements of the average referential distance as represented by the writer, female subjects, and male subjects. The representative mean for referential distance displayed by both male and female subjects shows an average of 5.63 for full NP's and 3.16 for pronouns;[5] the writer's mean referential distance is a little different from the subjects (4.95 vs 3.43). Since there were very few instances of ellipsis and because ellipsis in English is constrained by formal rather than discoursal principles, we excluded the few instances of zero. In order to attain reliable results, we accounted for the few instances in which subjects' identification of the uncoded referents was not successful. Slots which contained conceptual *they* were identified by subjects as definite referents marked by full NP's such as *the Prince's family* or *the Prime Minister and Opposition Leader*. Whether or not the conceptual anaphors in slots such as 34 and 29 were recognised made a significant difference between the subjects who used full NP and the writer who used *they*; therefore, it was decided that the deterring effect of the mistaken cases including conceptual anaphors should first be neutralised and be included in the final results. The Tables clearly reveal a meaningful correlation between the form of the identity markers used and the referential distance of the character from its antecedent.

Table. 9: The distance comparison of the writer's, female subjects' and male subjects' referential selections.

	Selections		Mistakes		Mean Dist Raw*		Mean distance Mistakes		Mean of Mistakes & non Mistakes		Mean Dist Representative	
	1	2	3	4	5	6	7	8	9	10	11	12
	N	P	N	P	N	P	N	P	3+5	4+6	N	P
writer	89/18	72/21	—	—	4.95	3.43	—	—	89/18	72/21	4.94	3.43
F. subj	1189/212	546/269	90/24	422/31	77.51/14	27.71/14	33.08/14	191.8/14	1279/236	968/300	5.32	3.25
M. subj	887/158	389/179	74/18	262/34	56.92/10	21.44/10	31.99/10	80.5/10	961/177	651/213	5.95	3.06

The raw measure of referential distance is the result of calculating the subjects' selectional performances exclusively in slots in which the majority did not make mistakes in their identification.
F= female, M= male, subj = subjects, P = pronoun, Dist = distribution
Figures in columns one and two display the average distance measures (89 & 72 in the case of the writer) in number of clauses of the total of 18 nominal and 21 pronominal slots. The distance measure is divided by number of the slots filled by either full NP's or pronouns. The division gives the average referential distance attributed to full NP's as opposed to pronouns; and this figure belongs to the original writer, the same procedure measures mean referential distances for female and male subjects. Through the same procedure, the average distance measure is calculated for the slots which were categorised as mistakes, and for the slots categorised as non-mistakes (raw in the case of columns five and six). Columns

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[5] The mean referential distance for nouns and pronouns given in Table 9 is 5.32 and 3.25 respectively for female subjects; and for the male subjects, the distance result is 5.95 and 3.06. The averaged result for all the female and male subjects is 5.63 and 3.16 for nouns and pronouns.

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nine and 10 contain the averaged results of columns three and four, and four and six; and represent the real results of referential distance of nouns and pronouns. The mean referential distance calculated through dividing the distance in number of clauses by the number of nominal and pronominal expressions is presented in columns 11&12.

Table 10: The distance comparison of the writer and male subjects' referential choice.

Subj.	Selections		Mistakes		Mean Dist. Raw		Mean Dist Mistakes		Dis of non-mistakes plus mistakes		Mean Dist	
1	2	3	4	5	6	7	8	9	10	11	12	13
	Noun	Pro	Noun	Pro	N	Pro	N	Pro	3+5	4+6	Noun	Pro
1	99/20	60/17	--	3/2	4.95	3.53	--	1.50	99/20	63/19	4.95	3.32
2	84/13	31/19	1/1	46/6	6.46	1.63	1.00	7.66	85/14	77/25	6.07	3.08
3	100/19	22/16	--	40/4	5.26	1.37	--	4.00	100/2	62/20	5.26	3.1
4	94/19	41/17	24/2	3/1	4.94	2.41	12	1.00	118/2	44/18	5.62	2.44
5	83/15	48/16	10/4	20/4	5.53	3.00	2.50	5.00	93/19	68/20	4.89	3.4
6	77/13	56/22	9/3	20/1	5.92	2.54	3.00	20.00	86/16	76/23	5.37	3.30
7	102/15	18/15	5/2	36/7	6.80	1.20	2.50	5.14	107/2	54/22	6.29	2.45
8	93/18	23/15	4/1	41/5	5.16	1.53	4.00	8.20	97/19	64/20	5.11	3.2
9	85/14	32/20	8/3	36/2	6.07	1.60	2.66	18.00	93/17	68/22	5.47	3.09
10	70/12	58/22	13/3	20/2	5.83	2.63	4.33	10.00	83/15	78/24	5.53	3.25
T	887/158	389/179	74/19	262/34	56.92	21.44	31.99	80.5	961/177	651/213	T59.5 / M5.95	T30.63 / 3.06

Just to remind the reader of how distance measures are compared: figures such as 99/20 (column two, row one) represent the total result of calculating referential distance (99) and (20) represents number of slots out of the total of 39 filled with a noun by the male subject No one. The result of the division gives the average distance pertaining to this subjects' nominal selections. This procedure will be followed in Tables 10 & 11 too.

There are features which may distinguish expository discourse from other genres, e.g. formality in addressing some salient characters and frequent direct quotations are observable features in expository texts. The reason that the text's only salient female character, Mrs Gillespie, got a lower score for distance despite lack of ambiguity was the fact that distance was occasionally overruled by stylistic formality. Whenever the text contained a character's direct quotation, the formal expression used in the sentence conveying the quotation appeared to be used based on ad hoc reasons (eg. slots 36, 37, 38, 39). In addition, the character who is expressing his views about Mrs Gillespie's request refers to her using a formal term which suits the preferred style of the character in question rather than the accessibility status of Mrs Gillespie in the expository text. It is evident that the more participants there are in a text, the greater the nominal distance measure will be; in a short expository

text such as the one we analysed, there were six salient referents subject to distance measurements, so we expected a greater score for the average distance pertaining to full NP's in this expository piece than we would be expecting in a narrative genre. The reason is, each characters' introduction into the story is considered as maximal discontinuity and is given the maximal value for discontinuity (20), the more characters introduced, the greater will be the mean referential distance attributed to full NP's. For six characters, 6 multiplied by 20 makes a considerable difference in the averaged results pertaining to full NP's. The measure of referential salience could not give us reliable results, since in expository texts, deciding which one of the characters is most salient and topical can be tricky.

Table 11: The distance comparison of the writer's and female subjects' referential selections.

Subj	Selections		Mistakes		Mean Dist. Raw		Mean Dist Mistakes		Dis of non-mistakes & mists		Mean Dist representative	
1	2	3	4	5	6	7	8	9	10	11	12	13
	Noun	Pro	Noun	Pro	Noun	Pro	Noun	Pro	2+4	3+5	Noun	Pro
F1	41/7	76/27	24/3	21/2	5.86	2.81	8.00	10.50	65/10	97/29	6.5	3.34
2	83/13	50/22	8/3	20/1	6.38	2.27	2.66	20.00	91/16	70/23	5.69	3.04
3	93/20	32/17	--	36/2	4.65	1.88	--	18.00	93/20	68/19	4.65	3.58
4	97/14	57/22	6/2	1/1	6.93	2.59	3.00	1.00	103/16	58/23	6.44	2.52
5	87/15	34/21	4/1	36/2	5.80	1.62	4.00	18.00	91/16	70/23	5.69	3.04
6	66/10	46/23	8/3	41/3	6.60	2.00	2.67	13.66	74/13	87/25	5.69	3.35
7	95/19	30/18	--	36/2	5.00	1.66	--	18.00	95/19	66/20	5.00	3.3
8	87/15	34/21	4/1	36/2	5.80	1.62	4.00	18.00	91/16	70/23	5.69	3.04
9	59/11	34/20	20/5	40/3	5.36	1.7	4.00	13.33	79/16	74/23	4.94	3.22
10	108/25	17/12	--	36/2	4.32	1.41	--	18.00	108/25	53/14	4.32	3.79
11	105/23	35/14	--	21/2	4.56	2.50	--	10.50	105/23	56/16	4.57	3.5
12	76/13	35/19	13.4	37/3	5.84	1.84	3.25	12.33	89/17	72/22	5.24	3.27
13	99/20	19/13	3.2	40/4	4.95	1.46	1.50	10.00	102/22	59/17	4.64	3.47
14	93/17	47/20	--	21/2	5.47	2.35	--	10.50	93/17	68/22	5.47	3.09
T	1189/212	546/269	90/24	422/31	77.51	27.71	33.08	191.82	1279/236	968/300	T74.53 M5.32	T45.55 M3.25

Table 12. The Comparison of the referential devices used to refer to Raja Bahrin Shah. Maximal distance in slot 29 is at odds with the pronominal selection.

SLOT	20 Dis. 18 Per. 0 Amb. 0		25 Dis. 6 Per. 0 Amb. 0		29 Dis. 20 Per. 0 Amb. 1	
SUBJ	N	PRO	N	PRO	N	PRO
1	N			P		P
2	N		N			P
3	N		N		N	
4	N		N			P
5	N			P		P
6	N			P		P
7	N		N			P
8	N		N		N	
9	N		N			P
10	N		N			P

Table 13 tabulates the writer's choices in 39 slots and the continuity measurements, the mean referential distance, persistence and ambiguity all confirm the continuity predictions.

Table 13. The referential Devices of the expository text which were left for the subjects to identify and mark by appropriate NP types.

Slot devices in the text	Slot	DIS.	PER.	AMB	Slot devices in the text	Slot	DIS.	PER.	AMB
1. Iddin,	1	1	0	1	21. She	21	1	0	0
2. Shahirah	2	1	0	1	22. my kids	22	4	6	1
3. Mr Duffy	3	3	0	1	23. them (kids)	23	1	5	1
4. Mrs Gillespie's solicitors	4	4	0	0	24. them (kids)	24	1	4	0
5. her views(Mrs Gillespie)	5	1	0	0	25. them (=)	25			
6. He(Mr Duffy)	6	2	0	0	25. he (PRBS)	25	6	0	0
7. her attempt (Gillespie)	7	4	0	0	26. them (the kids)	26	1	3	0
8. Children	8	10	0	1	27. the children	27	1	2	0
9. He (Mr Duffy)	9	5	0	0	28. their nana	28			
10. Mrs Gillespie's solicitors	10	3	1	0	29. they (PRBS's family)	29	20	0	1
11. Mrs Gillespie	11	1	0	0	30. them (kids)	30	1	0	1
12. Mrs Gillespie	12	2	1	0	31. My little boy	31	20	0	1
13. she	13	1	0	0	32. him (My little boy)	32	2	1	0
14. children	14	5	0	1	33. him (my little boy)	33	1	0	0
15. they (PM and OL)	15	3	3	1	34. they (PM and OL)	34	16	0	1
16. they (PM and OL)	16	1	2	1	35. them (Aust's kids)	35	2	0	1
17. them (PM and OL)	17	1	0	0	36. Mrs Gillespie	36	1	1	0
18. My children	18	5	0	1	37. Mrs Gillespie's call	37	6	0	0
19. them (PM and OL)	19	1	0	1	38. Mrs Gillespie	38	2	0	0
20. Prince Raja Bahrin Shah	20	18	0	0	39. Mrs Gillespie	39	2	0	0

Distance : Full NP: 89/18 = 4.94, Pronoun: 72/21 = 3.43
Persistence: Full NP: 11/18 = 0.61, Pronoun: 20/21 = 0.95
Ambiguity : Full NP: 8/18 = 0.45, Pronoun: 8/21 = 0.38

4.3.2 The Identification Task

The subjects' identification performance revealed that information concerning the identity of the uncoded referents is available in context; there are degrees of difficulty in identifying the referents making identification not equally easy. In 5.5% of the slots, subjects showed they had difficulty in identifying the missing referents. Referential distance and episode organisation do not always appear to be correlated with the referents' identifiability status. The overwhelming finding of the analysis of the identification data was the indication that context plays a complementary role in anaphor resolution. Inferences are made by the subjects to know which referent is the most plausible one for a given NP slot. There is always contextual information available; but unless the ellipted referent is easy to identify through context, the preferred linguistic device to make identification easy for the reader is a full NP. However, the presence of a full NP does not imply that context is not at all informative.

In 32 slots (82%), a majority of subjects succeeded in identifying the referents as intended by the writer. In three (7%) of the remaining seven slots, the writer had used a third person plural pronoun *they* referring to a conceptual referent whose exact identity was not made explicit; but the subjects differed in their recognition of the writer's generic referential intent and identified different but plausible definite referents. The use of conceptual reference in three NP slots in the expository passage shows that this is a quite observable linguistic phenomenon. The writer shows, by using a generic unidentified referent marked by the plural pronoun *they*, that it is possible to refer successfully without pointing to any particular person explicitly. Mrs Gillespie, by saying *they don't let me talk to him*, implies that she is confronting a group of people who consider themselves involved in the affair, rather than only the Prince.

The reason for this type of reference may be variable: it may be for brevity; the exact identity of the referent is irrelevant or unimportant; or it is the intention of the speaker not to name a specific person because of some reason. For example, rather than naming persons whose mention may not pragmatically be justified, a plural pronoun *they* invites the reader to infer who might be the implied referent or referents of the expression. Therefore, Mrs Gillespie uses an implied referent marked as *they* instead of naming Prince's family or his entourage.

Table 14: The comparison of the identification and selection of empty NP slots

Identification Of The Referent		Selection Of Formal Device			Identification Of The Referent		Selection Of Formal Device	
±Identical		±Identical			±Identical		±Identical	
No.	Wit.	Bet.	Wit.	Bet.	No.	Wit.	Bet.	Wit.	Bet.
1	+	+	+	+	20	+	+	-	-
2	+	+	+	+	21	+	+	-	-
3	+	+	+	+	22	+	+	+	-
4	-	-	-	-	23	+	+	+	+
5	+	-	+	-	24	+	+	+	+
6	+	+	-	-	25	+	+	-	-
7	+	+	-	-	26	+	+	+	+
8	+	+	+	+	27	+	+	-	-
9	+	+	-	-	28	+	+	+	+
10	+	+	-	-	29	+	-	-	-
11	-	-	-	-	30	+	+	+	+
12	+	+	-	-	31	+	+	+	+
13	+	+	+	+	32	+	+	-	-
14	+	+	-	-	33	+	+	+	+
15	-	-	-	-	34	-	-	-	-
16	+	+	+	+	35	+	+	+	+
17	+	+	-	-	36	+	+	-	-
18	+	+	-	-	37	+	+	-	-
19	-	-	-	-	38	+	+	+	-
					39	+	+	-	-

Among the seven slots representing the subjects' difficulty in identifying the ellipted referents, in two (5.5%), subjects displayed conformity among themselves in their choice of the referent, but their selected referent differed from the writer. Among the entire 39 empty NP slots, only in two slots (5.5%) subjects showed they truly had difficulty in recognising the writer's intended referent, the reason for which could only be that the verbal predicates forming the context were not informative. In instances where the prototypical referent identifications were different from the writer's, the writer's intended referent was not recoverable through context. In such cases, the function of a full NP appeared to be vital, e.g. in the case of slot four, plausibility of a particular referent was not revealed by the associative property of the verb *written*; therefore, Mrs Gillespie's solicitors were not preferred to the Prince's solicitors. There is a significant difference between the verb types; in the sense that *written* did not reveal who is the receiver of the action, the likelihood for several characters to occur in the object slot is equally considerable, while *extradition, bringing back, kidnapping* and a few other verbs indicate to the reader precisely which one(s), among a list of potential referents, is (are) the most plausible.

Overall, a discourse should be considered as a model of a world in which actions are carried out and are attributed to a limited number of referents. The actions, which can be unlimited in number, are associated with a limited set of referents. Ambiguity is effective where a referent cannot be identified through his/her action/s. And ambiguity is effective when either a rich referring expression or context

does not remove it. Where the competing referents are located in the previous context, whether or not the competing referents match the intended referent with regards to number and gender, and the number of competing referents creating ambiguity do not necessarily indicate the presence or absence of ambiguity. It is when context is informative revealing which referent is the most plausible that ambiguity is removed. One cannot estimate accurately the degree of potential ambiguity by considering the above factors. When a referent is uniquely associated with only one action, every time that action is mentioned, the referent in question is easy to identify free from the effect of distance. The most salient referent of a discourse is the one who has a greater number of actions uniquely associated with it. The least predictable referent is the one that has not been uniquely associated with any of the events of the discourse.

It is not possible to claim that referential distance is always correlated with identifiability of referents. Immediacy of prior mention requires a pronoun, but coreference requires the reader to judge according to context. We examined many instances in which a pronoun was used as a consequence of recency, but coreference was inevitably determined by context. In a great number of cases of anaphoric relations, the unmarked use of an unstressed pronoun is identical to ellipsis and is not informative. In very short distances, where the short term and episodic mental storage is involved, immediacy of prior mention is a factor which, independent of the function of context, solves unmarked coreference. But in long distance anaphor resolution, the use of pronominal expressions is not sufficient, unless the anaphoric device used is a full NP. In ellipted cases of long distance resolution of anaphora, it is certainly the inferences made according to contextual information that makes the coreference links possible.

4.4 Summary and Conclusion

The present study was conducted to examine the role of context in referent identification in a task involving both comprehension of a piece of expository text and production of appropriate linguistic referring devices, the former being a receptive performance and the latter a productive one. The subjects' performance in identifying the uncoded referents indicated the importance of pragmatic inferences based on verbal predicates. The subjects showed that they guess, whenever necessary, in order to identify the most plausible referent for the empty NP slots. In the identification of referents with a long referential distance, support was found for a strong inferencing process based on action-referent association indicating active involvement of semantic memory. Inference is associated with the attempt to resolve *who did what* and what the topical protagonists are expected to do next within a

framework constructed. Given the general progress of discourse, the unmarked discourse development predicts that the topical entities' subsequent actions are consistent with their previous actions. Actions function as hooks for topical participants, in the sense that the mention of the predication reveals the referent/s associated with it uniquely. Clarity of reference depends on context while the semantic function of referring expressions is required where context does not reveal the identity of a referent. Referent identification involves degrees of difficulty in making inferences and is monitored by the informativity of context. A full NP is optionally used because either a pragmatic constraint requires its use or when it would not be easy to identify a referent through context if it were ellipted.

As for the predictability of the occurrence of anaphoric expressions, the data analysed revealed that there are degrees in the recognisability of these tendencies in expository discourse. Since there are no obligatory principles determining the choice of anaphoric expressions on a discourse level, only prototypical suggestions can be made. The formal devices are used in various contextual circumstances which make each NP slot a particular case requiring ad hoc explanations. Suppression because of episodic discontinuity and decrease in referential salience accounts for general prototypical uses of referential formal devices; however, when identifiability of referents is examined in discourse, a correlation is sought between degrees of referential difficulty, determined by the informativity of context, and the probability of the preference for a full NP over a pronoun.

We further demonstrated that the distance theory's claims for the topic continuity hierarchy was supported, but only probabilistically. Subjects' prototypical performance exhibited a positive correlation between referential distance and referential choice. Variable interpretive skills resulted in variability among some individual subjects' selectional performances, sometimes resulting in infelicity of style. The conflicting effect of referential distance, salience, referential complexity, and episodic breaks could also cause variability; this type of variability was expectable and natural. As the third source of referential diversity, where context provided information for resolution, stylistic variability was the result of optionality of a referent's presence in some particular contextual environments. These were the three major causes of diversity in selections; only when the subjects failed to recognise some pragmatic constraints, e.g. in cases of referential formality, did the resultant style appear to be variably infelicitous; the latter two factors, however, demonstrated optional stylistic differences.

CHAPTER FIVE
Discourse Anaphora And Ambiguity: On The Retrieval Of Ambiguous Referents.

5.0 Introduction

Discourse generally deals with characters who perform actions and are acted upon by other characters in their environment. As a consequence of the interaction of competing referents, the potential for ambiguity can be perplexing without reference to context. When effective ambiguity is caused by a competing antecedent, it can potentially undermine the effect of referential salience and the recency of prior mention on determining the choice of a pronoun. However, discourses are assumed to possess the required strategies to express the meaning distinctions that underlie the ambiguities. Referential plausibility determined by context sets up restrictive conditions for the ambiguity caused by one or several competing referents. This study investigates how the potential interference of a competing referent undermines the influence of referential salience and the recency of prior mentions, and proposes to show, through the investigation of context, that unless it is constrained by context, potential ambiguity is the most decisive factor in determining the choice of nominal expressions.

5.0.1 The Problem of Referential Ambiguity
5.0.1.1 The Functional And Discourse Structural Views Of Ambiguity

The interference of potential ambiguity has been recognised as one of the factors that dominate the choice of referring expressions in discourse (Chafe 1976, 1987, Clancy 1980, Givón 1983, 1984, 1988, 1990, Fox 1987, Tomlin 1987, Ariel 1988, 1990, 1991). Chafe (1976, 1987) pointed out that referential concepts that are given (old information) are formally attenuated; but in contrastive environments where two or more given referents compete for the same pronoun and no other clues remove the ambiguity caused, a full NP is used in order to avoid ambiguity. In ambiguous environments, the speakers tend to adjust their speech with respect to the addressee's ability to interpret the referents of pronouns correctly. Both the speakers' assessment of the addressees' consciousness, and the addressees' ability to interpret the referents of pronouns correctly are the requirements for pronominalisation. Speakers may err in their estimations (Chafe 1976:31).

Clancy (1980) observed that referential complexity detracts from identifiability; no ambiguity is assigned when there are no intervening referents between the anaphor and the antecedent, full NP's are more favoured when there is one intervening referent; when intervening characters accumulate and reach five, pronouns and zero anaphors do not occur. In his study of how topic continuity correlates with code-quantity, Givón (1983) considers three measurable factors drawn from "inspired

guesses, intuitions, and insights gained from previous and less rigorous work" (Givón 1983:13). One of the measurable factors of topic predictability is potential ambiguity. Referential ambiguity is defined by Givón as the measurable effect of the presence of other semantically compatible referents within the preceding five clauses: "The potential disruptive effect caused by clustering of a topic with other participants in the immediate register" which makes the task of correct identification and filing of a topic difficult (1989:230). A referent with a low look back, low competition and high persistence in the subsequent text is assumed to be highly predictable.

Ambiguity is measured by counting the number of competing referents in the immediately preceding register between one to five (or one to three according to Givón 1989) clauses to the left. Lack of competition in one to five clauses back receives the value one, the presence of one or more semantically compatible competitors within one to five clauses is assigned the value two. The distance between a pronoun and its antecedent can reach 20, while potential ambiguity is limited to the effect of competing referents in only three clauses back regardless of where the antecedent is mentioned in prior context. The projections made by topic continuity account for general tendencies observed in long narrative discourses and are supported by statistically averaged results.

Consistent with the continuity hypothesis, Gaser's measurement of ambiguity for Amharic narrative (1983) was made by first replacing the referring expression used for a given topical referent by zero and then identifying the referents in the preceding five clauses which could replace that of the referent; a value of two was assigned when there were competing referents and one when there were not any competing referents (1983:99). Brown (1983) designs a three level system of ambiguity measurement for written English. Level one assigns a one and represents the tokens in which within five previous clauses only one logically possible referent appears. Level two assigns a two if there are two or more logically possible referents in the register. Level three represents the most ambiguous environment where no referent is found in the near context; this level is assigned for indefinite referentials. The following hierarchy reflects the effect of potential ambiguity:

Least Ambiguous Zero> Unstressed Pronoun > Definite NP> Generic NP > Names > Demonstratives alone> Demonstrative + NP > Passive > NP's after Possessives > Existential/Presentatives > Right-Dislocation > Indefinite Referentials *Most Ambiguous*

Ariel (1988, 1990, 1991) advanced the same definition for referential competition as the one proposed by Givón: "The more competitors there are, the less the specific antecedent intended by the speaker is uniquely accessible to the addressee" (1991:445). She maintains that in ambiguous environments where more than one referent competes for the role of antecedence, a low accessibility marker must be used (1988:83). Competition is viewed as the interfering effect related to the number

214

of other antecedents that can potentially be coreferenced. Tomlin (1987) and Tomlin and Pu (1991), tackling the role of episode boundaries as the triggering factor causing a nominal choice, decided not to deal with referential ambiguity. So they screened out all the tokens of full NP in which the cause of the choice was ambiguity rather than episodic discontinuity.

1
Jane liked Victoria because she... .

2
a. John can open Bill's safe. He knows the combination.
b. Mary asked Jill to place her book on the desk.
c. Mary met the principal before she left town.
d. Mary wanted to lend Jane a book on linguistics but she had already bought it herself.

Much experimental work has been done on how the verb and the conjunct can create bias in coreference resolution and comprehension ease (Au 1986, Ehrlich 1980, Caramazza, Grober, Garvey and Yates 1977, Garvey, Caramazza and Yates 1975, Springston 1975). One technique used is to have people read sentences of the form: NP1 VERBED NP2 CONJUNCT PRONOUN, and make a judgement about who it is that PRONOUN refers to, (*she* in example 1). Some verbs and conjuncts make most people interpret the pronoun as tying with NP1, and the use of other verbs and conjuncts shift judgements towards NP2. Hobbs (1979:78) makes the point that mere verb-conjunct plausibility often doesn't distinguish between potential referents, as example 2 shows. In 2 (a), both *John* and *Bill* know the combination, and so the plausibility of a person's knowing the combination is not useful for the purpose of finding out who *He* is. In 2 (d), however, the verb phrase *but she had bought* influences the resolution. In support of verbal plausibility, Vonck (1985) suggests that people resolve the pronominal reference when they can, and when they can't they skip ahead in subsequent text that is likely to contain helpful information. Ehrlich and Rayner (1983) advanced a similar hypothesis. But as this study shows, sentence based conclusions cannot be convincing, since the sentence level effects can disappear when the sentences are used in a larger context with an opposite bias.

In her extensive treatment of ambiguity, Fox separated three contexts for pronominalisation: no competition, different-gender competition, and same-gender competition. (Fox 1984, 1987). The pattern of reference in competing environments with different-gender referents is restricted to active patterns and return pops.[1] The active pattern representing the use of a pronoun in an issue structure is illustrated in example 3. In return pops, in which a proposition is not tied to the one preceding but is separated by other propositions separating the two containing the referent in question, the intervening popped over material should either be structurally simple or contain

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1 A return pop is a tying between two propositions containing the same referent which are separated by a number of other propositions forming a digression. For a description of active pattern, controlling pattern, return pop, and R-structures refer to chapter two; also see Fox (1984 &1987).

repeated mentions of the referent in question. In example 4, a distant tying with a pronoun is illustrated.

> 3
> 1. At three *Vanessa* had *a baby brother* aged one and a half. 2. *She* mothered *him*.

> 4
> 1. "The most ridiculous *boy*," said Strachey, 2. when *Lytton* reached the age of speech, 3. for *he* spoke his fantasies aloud.[2] (1984:214)

The structural organisation of discourse determines whether or not the presence of another same-gender referent creates difficulty. The effect of more than one competing referent in active patterns is not accounted for; therefore, it is not clear what type of effect is expected when the number of competing referents increases in the popped over material. Pronominalisation in controlling patterns is not possible, if a same gender referent occurring between the two mentions of the referent in question competes for being the antecedent. In the same gender environments, the repeated mentions of the referent in the popped over material do not lead to the use of a pronoun. Where in the interval of the two mentions of a given referent the competing referent is located is not at issue. The fact is that the competing referent may be located beyond the two subsequent mentions of the referent in question (see chapter two, example 36 from Fox).

In the active pattern, when two same gender referents are mentioned in the same proposition, two conditions for the use of a pronoun in the next proposition in active relation are suggested to hold: "a) If the referent mentioned in the second proposition was the grammatical subject of the first proposition or b) the referent mentioned in the second proposition was not the grammatical subject of the first proposition, but is mentioned in the next highest nucleus" (1984:221). The stronger mental status of subject justifies why under normal circumstances the writer's tendency is to choose a full NP over a pronoun when the previous mention of the referent is not the subject of the previous clause. However, in example 5, both the full NP, *Clive,* and the pronoun, *he,* can be used in specifying the referent, because the clausal semantic meaning reveals the identity of the referents. In 6, the full NP *Violet* is favoured because the formal characteristic of the slot in which it is used requires a full NP (i.e., one can not write: *she, 18 years older*). In 7 (a) and (b), it is the context that determines coreference; the same pronoun can co-refer with two different antecedents if the semantic information of the verb changes. The difference is not captured by R-structure

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2 Fox describes the R-structure of this extract as follows: 1 is the nucleus of both the higher and the embedded structure, 2 ties to 1 and is the adjunct of the embedded circumstance structure, and 3 is the adjunct of the higher reason structure. 1 is the tied to nucleus for both 2 and 3. The use of a pronoun is possible as the popped over adjunct is structurally simple.

analysis because the theory is concerned only with centrality vis-a-vis peripherality of information in forming a rhetorical tree.

5
But Lytton could not control Clive's appetite for life. *Clive* (or *he*) was a hungry-for-experience heterosexual. (Fox 1984:228-229)

6
She had lied to keep shock and suffering from *her* [i.e., Violet]. But *Violet, 18 years older*, needed no such defence.

7a
Desmond gave *him* the Oxford miniature Shakespeare and four volumes of Milton, so that *he* would carry into remote parts the immortal utterances of the English tongue.

7b
Desmond gave him the Oxford miniature Shakespeare and four volumes of Milton, so that *he* would be able to show his love.

In list structures (example 8), an expectation is created that the referent is returned to. "As the list-member grows in complexity, the expectation of immediate return diminishes; hence the writer risks a possible misinterpretation if a pronoun is used for a return after a structurally complex adjunct" (1984:227). In any other distant situation, this expectation does not exist; therefore, a full NP is used. In example 8(a), a return pop returns the reader of proposition 4 to 1. In all of the four propositions, there are mentions of *Leonard*, so the condition for return pop with a pronoun is met. But why shouldn't we consider example 8(a) as pairs of clauses which form active patterns? Using a full NP in proposition 4 will be utterly infelicitous; how can we argue for neutralising ambiguity in this context? Proposition 8 is a return to 1 by a pronoun in spite of the presence of another same-gender referent in 5. Since the referent in question has been continuously mentioned in the intervening propositions, resolution is easy. In proposition 9 also, a return is made to 1 although there is another same-gender referent in 8. Why should we not claim that proposition 6 is a return to 5, or 4, and so forth? It is not clear why the subsequent mentions are not considered to be instances of active pattern. The extract does not represent the effective function of ambiguity in making an urgent nominal choice; neither does it represent a considerable degree of referential difficulty, since the referent is easily identifiable through context. Indeed, a nominal choice in proposition 6 would have clearly been infelicitous, since the referent's previous continuous mentions make it highly accessible and plausibility of the other referent is nullified by the predications made.

8a

> 1. We see many *Vanessas* in the portraits that remain of *her*, especially those painted by Duncan Grant. 2. *The young face* was smooth, with firmly lined brows and liquid grey-green eyes. 3. *She* had sensuous lips. 4. *She* rarely used make up. 5. Somewhere Virginia speaks of "*her* passionate mouth," 6. *Her* voice was beautifully modulated; 7. *her* words were carefully paced. 8. Virginia, so often *her* historian, likens *her* to a bowl of golden water which brims but never overflows--or, as we have seen, to the sedate volcano. 9. In another image *she* has a "queer antique simplicity of surface".[3] (Fox 1984:225-226)

In example 8a, the reader is directed to expect some descriptions of *Vanessa* as portrayed by *Duncan Grant*. This expectation is followed by a list of eight propositions within each of which there is a mention of *Vanessa* occupying the subject position except in propositions 5 and 8 in which *Virginia* is the subject. As for the accuracy of the structure, rhemic complexity of the propositions varies widely, e.g. proposition 2 contains the descriptions concerning *Vanessa's face*, *brows*, and *eyes*; while in proposition 3 only *lips* are described. The stylistic differences in how meaning is packed inside propositions leave an impact on the rhetorical structure, while the amount of meaning conveyed remains the same. In proposition 5, it is *Virginia's* descriptions of *Vanessa* and not *Duncan's portraits* that are referred to; but this difference in the content does not impose any influence on determining the structure type. 6 and 7 again contain descriptions of *Vanessa's* voice and talking. In proposition 8, it is again *Virginia*'s descriptions not the portraits painted by *Duncan*. Finally in 9, it is either descriptions mentioned from the portraits remained from *Duncan* or one of *Virginia's* literary images. Such differences are not considered in the structural organisation of the texts.

Linear order of propositions impacts upon the pronominalisability of referents, but, in principle, the R-structure remains intact and is often not susceptible to changes in linear order of propositions. R-structure is dependent on a division of information based on the core and the adjunct. And since this is a list structure, we are dealing with an R-structure in which all the propositions are adjuncts. An alternative organisation of the extract is illustrated in example 8(b): proposition 3 is incorporated into 4; and the linear order of some propositions is changed: 6 and 7 are moved to neighbouring 4; consequently, 5 and 8 are juxtaposed, so *Virginia* in 8 is pronominalised.

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[3] According to Fox, 1 is the nucleus, and 2-9 are members of a list structure all making a list functioning as an adjunct tying to 1.

8b

1. We see many *Vanessas* in the portraits that remain of *her*, especially those painted by *Duncan Grant*. 2. *The young face* was smooth, with firmly lined brows, liquid grey-green eyes and sensuous lips. 4. *She* rarely used make up. 6. *Her* voice was beautifully modulated; 7. *her* words were carefully paced. 5. Somewhere *Virginia*, so often *her* historian, speaks of *"her* passionate mouth", 8. *She* likens *her* to a bowl of golden water which brims but never overflows --or, as we have seen, to the sedate volcano. 9. In another image, *Vanessa* has a "queer antique simplicity of surface".[4] (Fox 1984:225-226)

If proposition 9 contained a different verb, *she* could easily co-refer with *Virginia* rather than *Vanessa*. This would then be a change of structure because of a switch in subject; otherwise ad hoc explanations would be required. The question is R-structure analysis is not sensitive to this type of change in meaning; so how the difference in coreference can be accounted for is not clear.

8c

.... In another description, *she* associates *Virginia* with a "queer antique simplicity of surface.."

In sum, a) the possible non-objectivity of judgements of the R-structures and b) the presumed correlation between the rhetorical structure of the R-units and corresponding anaphoric choices, which does not practically acknowledge optionality in referential choice, can reduce the validity of the predictions made. Moreover, the shared textual knowledge of the written piece is not complete for the reader, because the part cited for the purpose of linguistic exposition does not show the entire written text. The R-structure analysis deliberately excludes the portions beyond the controlling pattern. It ascribes higher levels of structure to embedding, which is rarely an environment for pronominalisation. It is claimed that since embedding forms controlling patterns in most of which pronouns are not used; therefore, it is possible to leave out portions that are beyond the limits of such structural relations as active, return pop and in controlling relations constrained with conditions. However, one cannot ignore the salience of prior mentions when pronouns and topicality are at issue.

The contextual study based on action-referent association conducted in this chapter shows that, within very long referential distances, although not pronominalisable, the referents' identifiability can be attained through context. We will show in this chapter that from the beginning of the discourse, the actions undertaken or undergone by salient referents contribute to long-term accessibility and restricting the referential plausibility. We will show that it is the entire textual context which reveals the salient referents of a given discourse. Full NP's are not always means of

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[4] 1 is the nucleus, and 2-9 are members of a list structure all making a list functioning as an adjunct tying to 1.

revealing the identity of unidentifiable referents. R-structure analysis does not differentiate environments in which effective ambiguity causes the use of a full NP and environments in which the referent of a given full NP is identifiable through context. The fact is that any full expression does not possess the characteristic of being the only source for clarity. When coreference is constrained by contextual conditions, RST's structural explanation does not provide any solution, i.e. when two competing referents are within a clause, a pronoun used in the subsequent clause reflects recency of prior mention, but coreference in such an environment is determined by semantic content of the clause. As referential choice is a compromise determined by several conflicting factors on particular occasions, whatever form the writer selects for a particular environment may not be indicative of some generalisable principle.

In chapter two, we demonstrated that the relation between full NP and ambiguity is not straightforward (see examples 36 and 37 of chapter two). It is simply not possible to argue for ambiguity in relation to the general usage of full NP's without considering how context mediates. Clearly it is the role of context not the strictly constrained role of structural organisation built on centrality and peripherality of semantic information. Where there is explicit and urgent need for clarity in the absence of the informativity of context, it is supplied by the full NP used. This type of use should be distinct from environments in which contextual informativity could be used, but there is referential difficulty which motivates the choice of a nominal expression. In some environments, verbal associativeness is null, so coreference is fully dependent on specifying the referent explicitly.

5.0.2 On The Language Properties Countering Ambiguity

When the gender and number of third person competing referents match, a considerable degree of conflict results. On the sentence level, English provides certain language specific cues such as the use of phonological stress, and the use of zero anaphora in coordinate and subordinate constructions; these are the environments in which English speakers can eliminate local ambiguity created by the presence of plausibly competing referents. In addition, subjecthood prevalence connected with the topic of discourse and the clausal semantic information are informative sources which potentially remove local ambiguity and constrain global ambiguity. Phonological stress on pronouns is used to remove local ambiguity in the environments of subject switch. In 9(b) and (c), stress conflicts with ambiguity. But in 9 (d) and (e) the gender is a helpful feature, and stress is additionally used to remove ambiguity. English ellipsis is structurally bound and is at times more informative than unstressed pronouns if potential ambiguity exists. Referential ambiguity does not limit the use of ellipsis in English, e.g. 10 (a) and (b).

9
a) Jack; came home. Later on he; left.
b) Jack; talked to Bill. Later on he; left.
c) Jack; talked to Bill,. Later on HE; left.
d) Jim took Mary; to see a movie he had seen. SHE; hadn't though.
e) Jim; and Mary, went to see a movie. HE; had already seen it, though SHE; hadn't. (Givón 1990:218)

10
(a) Jim; bought the house from Kim and then he; (?) left the country.
(b) Jim; sold the house to Kim and then Ø; left the country.

Grammatical subjecthood neutralises ambiguity; the influence of subject priority in coreference resolution is a significant way in which ambiguity is removed in English discourses. The reason why intuitively we would make *John* and not *Bill* the referent of *he* (example 11) is because *John* occupies grammatical subject position and is most foregrounded in memory. Hobbs (1979) claimed that commonly (75% in dialogue, and 90% in written text) for cases of ambiguous antecedence, we favour an NP in subject position over an NP in object position.

11
John; can open Bill's safe.
He; is an interesting fellow.

The role of clausal semantic information in subject switch environments, where the referent mentioned in the subject NP slot is not the subject referent of the previous clause against the expectation of the typical referential linkages, is used as one way of neutralising ambiguity.

12
a
Jack thought about Jill (a) [Ø] giving birth to their baby, (b) [Ø] playing touch football with the gang, (c) [Ø] sitting alone on the porch. (Givón 1990:906)

b
After the waiter served the food for the client, he received/left a big tip.

In brief, coreference may be constrained by local ambiguity. Local ambiguity may be neutralised by (a) language specific properties, (b) the prevalence of subjecthood, and (c) clausal semantic information which determines the coreference possibilities and can be used in environments in which the switch subject requires more costly processing than the unmarked coreference. In what follows, we will exemplify the possibilities for competition among the active referents of a discourse. The thrust of this study is that topical referents grow through the actions which they undertake or undergo; therefore, a given anaphoric expression representing a referent marks a dynamically growing body of information. A full NP may be used because the referent to be identified by the

reader is a) impossible, b) very difficult, and c) difficult to identify through context. A full NP is infelicitous if used when the intended referent is a) easy and b) very easy to identify through context.

5.1 Analysis Of The Data, Results, And Explanations

5.1.1 Coping With Potential Ambiguity

It is important to know how referential competition is realised and how it is removed. The maintenance of the identity of referents is a shared function of context and referring expressions used. Through repetition, the topical entities dynamically develop, in the sense that the surface succession of the anaphoric expressions in a discourse is a manifestation of an underlying semantic continuity. Through semantic continuity, topical referents become known to the readers; and as a result of this type of development, ambiguity created by their clustering in discourse is considerably constrained. Although ambiguity is constrained by the interplay of context and the use of rich anaphoric expressions, it is so strong a factor that it can determine a nominal choice overruling the effect of referential salience and recency of prior mention on prompting the use of a pronoun. Even referential distance is an indication of referential complexity, because of the effect of the intervening material.

Example 13 illustrates the effectiveness of ambiguity in ruling out the function of other relevant factors in determining the referential choice and demonstrates the need for a new approach. By taking a close look at the extract, one can detect differing degrees of potential ambiguity in different NP slots. A hierarchy of ambiguity emerges as a result of the role of context, in the sense that a referent is expected to be easy, difficult, or impossible to identify. In contrast with ambiguity as the triggering source of a nominal choice, whether or not a full NP is appropriate in marking a given referent can be a felicity concern implying that too much informativity is not cooperative for reference in a cooperative discourse exchange. In ambiguous environments, the full NP may not be replaceable with a pronoun; in contrast, if the referent is easily identifiable through context, a full NP is infelicitous and should be replaced with an inexplicit expression. The choice of a nominal expression may occur with variable degrees of necessity indicating degrees of urgency of a nominal choice. Since the environment is contrastive and the verbal associativeness is variably available in environments involving subject switches, there are varying degrees of conceptual complexity present. In the NP slots marked with ????, it is imperative to use a nominal expression; while in the NP slots marked with ?, it is a preferred option. In brief, given the informativity of context, a given ellipted referent is a) easy, b) difficult (? to ???), or c) impossible (????) to identify; while in this scale a) and b) may allow for intervening degrees of ease (slightly easy and

very easy) and difficulty (slightly difficult, difficult and very difficult) which are perceivable but not accurately definable through intuitive measures.

[?] following a pronoun indicates 'difficult' to identify the intended referent.
[?] following a noun stands for 'inappropriate to use'

[????] following a pronoun indicates 'impossible to identify'
[??] following a noun stands for 'very inappropriate to use'

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John/he [????] and Jim/he [????] came out of the house. John/he [????] started the car and Jim/he [????] [distinction is possible if John is reinstated but Jim is pronominalised, or better, John is pronominalised but Jim is reinstated] got into the car. John/he [???] suggested that they go to the Museum, but Jim/he [???] preferred the swimming pool. John/he [??] did not think it was a good idea to go to the swimming pool, because John [??] /he[5] did not know how to swim. Anyway, John/he (both appropriate) accepted Jim's/his [?] idea; and Jim/he [???] was pleased with that.

John/he [???] /zero [???][6] drove to the city's largest swimming pool. It wasn't so much fun for John/him [?] because John [?]/he didn't know how to swim. After swimming, John [??] /He told Jim/him [??] that it was time for them to have something to eat after an hour of swimming. John/He [?] said that it was his [???] /Jim's turn to agree with his/John's [?] suggestion. Jim/he [?] promised to agree with his [??] /John's suggestion. John/he [?] decided that they go to a Chinese restaurant to have lunch. This time Jim/he [???] drove the car to the restaurant that John/he [????] knew. At the restaurant, Jim/he [???] went straight to the rest room and then John/he [???] chose a table to sit at. He [?] /John waited for him/Jim to return, so that they could order. Jim/he [?] came back but he/Jim [??] didn't sit at the table, because he/Jim [??] had remembered that he/Jim [??] had an important appointment. John/he [???] got upset and he [?] /John [??] / zero decided to have his lunch alone.

In example 13, two important features make the frequent use of full NP's essential for maintaining the clarity of coreference. One is that the text is composed of a collection of actions which could not be associated uniquely with one of the two characters of the story; therefore, action-referent association did not indicate one character uniquely. The more the conditions for the intervention of context are met, the greater will be the possibility for the use of pronouns. The other feature of the above story is the frequent subject switches which do not allow the unmarked same subject coreference to create the environment for the use of pronouns. Subject switches are variably difficult or impossible for the reader to resolve without a full NP available. In this particular example, information about the identity of the referents emerges either from the oncoming textual context or from the nominal expressions used. The vital need for clarity overrides recency of prior mention, in the sense that the function of referential distance and topical salience in determining

[5] Specification of John depends on the way its previous mention was marked, so both *John* and *he* can be used interchangeably depending on what form was used in the previous slot.

[6] In pro-drop languages, ellipting this NP slot would make it 'very difficult to identify' while in English which is not a pro-drop language, ellipsis would make this NP slot 'almost impossible to identify' since the English reader would find subject ellipsis ungrammatical.

the choice of referring expressions is minimal. Since both characters have interactive and equally important roles and there are frequent referential switches, the necessity for removing ambiguity requires that one undermines other pragmatic functional factors prompting the use of pronouns.

Measuring the continuity of each of the two topical referents of this story will obviously create quite a low score for full NP's, despite the continuity hypothesis regarding the positive correlation between referential distance and the use of nominal devices. The reason is clear: in this story, a full NP is often used to remove ambiguity and not just to mark a large referential gap. The effect of ambiguity in determining nominal choice rules out the effect of topical salience and calls for a new treatment.

Figure 1: The unmarked same subject relations trigger pronouns. (NP's. R = Referent, N = Noun, Pro = Pronoun, O = Object)
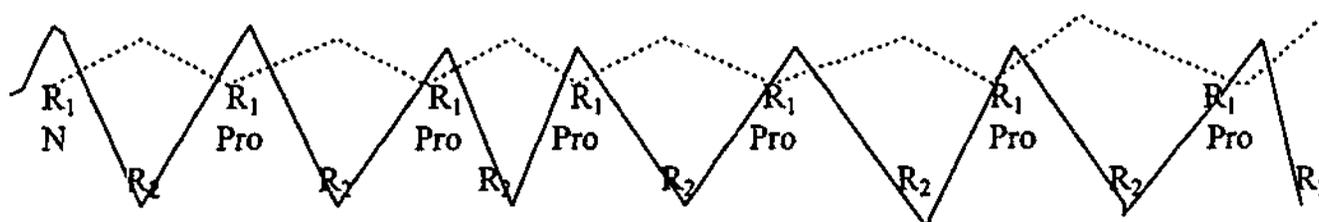
Figure 1b: The marked switch subject relations which are cognitively costly and require full
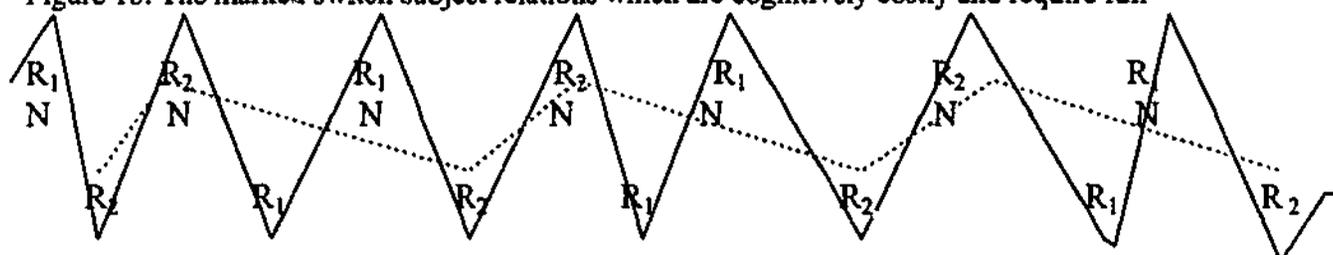
The unmarked linkage between referents is that the subject referent remains the subject of the subsequent clauses; in that case competing referents in the object slot of the clauses do not create effective ambiguity and the use of pronoun is possible. But, as is clear in Fig. 1b, subject switch requires a marked type of anaphor resolution and involves greater cost of processing and is usually done with a full NP. Switch subject is possible when referents other than the subject and the object of the previous clause fill the subject slots; and this creates more possibilities for ambiguity and hence increases the semantic significance of the full NP's. The chance for a pronoun to be used decreases in environments of subject switch, if context does not constrain the ambiguity caused by interactive referents. Indeed, all the plausible referents introduced at various stages in previous discourse can potentially be the candidate referents for a NP slot in subject switch environments. This indicates that there are many ways of switching between referents; and the most significant determiner in the plausibility of one or more subject candidates is context.

If inferences from context do not help resolving coreference in making switches across competing referents, a full NP is used to clarify coreference between two subsequent mentions of a given referent in a minimal referential gap (see extract 14). In 14, context is informative because the three interacting referents are associated with three different sets of actions within a world evoked by the story. One referent is trying to help, one is in need of help, and the third is associated with different actions than being the helper or the recipient of the help. Unlike the story in 13, in 14 the three competing referents create less ambiguity; simply because the informativity of context can be readily used in resolving the anaphoric relations. In this particular story, each character is associated with a particular action, so inferences based on context are possible and switches among three characters do not create serious ambiguity. Likewise, context mediates in dealing with potential ambiguity through making inferences about which one of a list of more or less plausible referents is the best candidate for a given NP slot. Following is an illustration of switch subject with three referents:

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Jim, Jason and John knew how to live a peaceful life together. The boys had discovered the secret for having a fruitful cooperation to make life easy and nice. They would always make a fair division of work, through which housework was taken care of and food was always prepared. One day, Jim/he [????], who was to do the kitchen work, got sick and Jason/he [????] was busy working in his office. John/he [????] then had to do the kitchen work and take care of him/Jim; he/John [?] had to make soup for Jim/him and something else for Jason/him [????] and himself/John [??]; while he/John [??] was taking care of him/Jim. Jason/he [???] called from work and said that he/Jason [??] would try to come back home a little earlier and help. But Jim/he [??], who was shaking with high fever, needed attention. John/he [????] wanted to help, he/John [??] tried to find some pain killers for Jim/him; but he/John [??] didn't find one. The only thing he/John [?] could do at that minute was to call Jason/him [???] and talk to him/Jason [??]. He/John [??] said to him/Jason that it was urgent that he/Jason [?] brought some medicine with him/Jason [??]; and in case it was possible for him/Jason [??], he/Jason [??] had to drive the car back home for him/John [?] to be able to take Jim/him [??] somewhere to see a doctor. Jason/he [???] wanted to help but unfortunately, he/Jason [??] was in the middle of an important meeting. At this moment, Jim/he [??] started to vomit. Jason/he [??], who had become terribly nervous, left the phone and jumped into the bathroom to bring a dish for the vomit, while Jason/he [??] was hanging on. All of a sudden, there was a power cut. John/he [??], who had rushed to the basement to bring some medicine, fell down the basement stairs and zero/he/John [??] broke his leg. Jason/he [???] waited for a few minutes but he/Jason [??] did not hear from John/him [?] so he/Jason [??] hung up. After four and half hours when he/Jason [?] came back home, he/Jason [??] found the other boys in agony.

In the slots containing the characters of the story in which action-referent association is helpful, the use of a pronoun is possible; but it is not used because the referent in question is difficult to identify through context. If it were impossible, the use of full NP would be absolutely necessary to avoid the ambiguity which could not be removed through the availability of contextual cues. In this particular story, context is helpful in moderating the effect of potential ambiguity; e.g. the one who is in his office is associated with being in a meeting, is expected to be far away, and is to be

called to help; and the one who is sick is expected to carry out actions which are not performed by the one who is expected to help. Going to the basement is expected to be done by the one who is helping, not from the one who is sick; but vomiting is an affliction on the one who is sick rather than the one who is helping the sick. The reader makes helpful inferences in resolving coreference in ambiguous environments.

Context constitutes parts of a world the evoking of which can lead to inferences about who did, does, and will do what. Three competing referents should, according to previous accounts of ambiguity, create the highest possible degree of ambiguity; however, in this example, the action-referent association is helpful; and full NP's are often used in environments in which ellipted referents would variably difficult to identify. Writers differ in their estimation and judgements about their addressee's needs. It is possible that one writer decides to use pronouns in some of the NP slots in which identifying the referent through context appears to be a slightly difficult task. In brief, inferences for finding out who is associated with what are quite natural and help in resolving coreference. Such notions as presupposition, implicatures, context types, scripts, and frames display different ways to account for how texts are structured and understood; and can take account of how ambiguity can be dealt with.

The interconnections present explicitly and implicitly in texts are determined by the context types available to the partners of a communication exchange. In addition, scripts have been argued to account for the implicit propositions that are normally drawn through inferences by the readers and are judged by speakers not to be necessary for being mentioned because of being presupposed (Schank and Abelson 1977, cited in Allan to appear). The semantics of such verb phrases as *getting sick, cooking,* and *living a peaceful life together* is such that by thinking about the meaning of them and how this meaning relates to other parts of the vocabulary, we surely invoke scripts. The role of scripts accounts for the difference between the text as presented as opposed to what is represented as an expanded script containing both explicit and implicit propositions. Almost always certain entities and events of a discourse are left implicit in the formal representation of texts; this indicates the importance of scripts in presenting and understanding discourse and narratives.

Allan (to appear), in showing how scripts, frames, and fields are ways in which vocabulary is connected, indicates that "scripts are structured information about dynamic event sequences that is conversationally implicated". Sequences of events in a particular context are structured into an 'interconnected whole' representing a script. Every normal situation contains an appropriate sequence of events. Scripts are useful in establishing relations within a text (for the purpose of this

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study, this relation is named *vertical semantic links between the predicates representing a script*). Scripts may overlap; and there are a great number of them relating to one another hierarchically, i.e. some scripts are general and some are specific. Knowledge of scripts is usually implicit in any text. Meaning in any context relates to other parts of one's knowledge; this is how scripts are realised, and so entities within them become accessible and definite from their first introduction. Frames also play a part in understanding and interpreting coreference (see the references cited in Allan). Frames should be distinguished from scripts; they are related to scripts by being elements constituting them. Every concept possess a frame. The home frame, the cooking frame, the office frame and the work frame each invokes certain entities which are accessible in Ariel's sense and may be first mentioned using a definite NP.

The stories in 13 and 14 demonstrate that the role of context in the retrieval of referents in ambiguous environments is important; or, put it in other words: the function of the scripts and the frames connecting the story to the reader's knowledge. Actions are associated with referents; continuity is considered on a semantic level, and topic is taken to be a dynamically expanding concept. In section 5.1.2 we will show how, in the reference pattern of a story with several participants, the informativity of context is realised. We will show that the identification of characters of a story depends on the link between the verbs that are put together to create a conceptual frame, and also in the associative power of verbs in pointing out the topical referents connected to them.

5.1.2 The Action-Referent Association
Discourse comprehension is a process of accumulating knowledge about topical participants. So far as ambiguity is concerned, once the world that the discourse represents is evoked and the verbal predicate is helpful in identifying the arguments, the role of anaphoric expressions is optional with regards to clarification of the referents' identity. Leaving aside the pragmatic functions of anaphoric devices as markers of discourse structure, at any stage of the discourse a referring expression is selected to accord with the amount of information provided (primarily) by the predicate of the clause it occurs in, and also from previous verbal predicates on the referent. If the predicate determines the identity of the referents that are associated with it, the referential form used need not be a full NP. Any immediate indeterminacy can be resolved by efficient text organisation; in other words, the conceptual structure of the text itself must have ways to disambiguate or prevent ambiguities from being communicated in the first place.

Two types of relations determine how anaphor resolution is accomplished: the relation between verbal elements conveying the organised sequence of events and constituting a world spoken of, and the horizontal associative relation between the verbs and their arguments. The associations between verbs and arguments are of two types: the associations constrained by the coherence of the discourse world, and those which are global assumptions, i.e. the knowledge which enables one to sort out what predicates can apply to what arguments. For instance, in the real world humans can plant turnip seeds, but not vice versa. On the discourse level, the referent may restrict the kind of action attributed to it, and likewise, the verb is selective of its referent among a set of competing referents within the boundaries of the discourse. When one referent is associated uniquely with several different actions, the association is strong. But when one action is associated with several topical referents, the association is weak. In the next sections, this hypothesis will be exemplified and illustrated.

A short piece of narrative in which a main (topical) character, *the old man*, a secondary (sub-topical) character, *the enormous turnip*, and six less important characters take part in a good number of actions (about 60 tokens involving 10 different verbs) provides the minimally sufficient data for demonstrating the function of verbal links and action-referent association in referent identification. The informativity of gender is constrained in this story because several referents are of the same gender; and some characters are human while some are non-human. The topical character is pronominalised half of the time, the sub-topical character is pronominalised only once, and the rest of the characters of the story are not pronominalised at all. As mentioned earlier, anaphoric expressions are assumed to play two roles: maintaining the identification and fulfilling the functional pragmatic aspect of reference; the former is exclusively the focus of this study.

The Enormous Turnip is a children's story in the form of a folk-tale. An old man plants turnip seeds and one grows enormous. The action concerns the repeated attempts to pull the enormous turnip out of the ground. In the body of the story, there are repeated actions of pulling which are performed by successive characters. This problem is helpful in showing two things in this study: a) in contexts in which a predication is associated with several referents, action-referent association diminishes so that it does not sufficiently constrain ambiguity; and b) discourses are produced to be understood; this involves decisions about how much elaboration and explicitness is pragmatically necessary. Different individuals may make different decisions about which propositions should be made explicit and which propositions should be left implicit. One may decide to write a longer story in order to convey the same amount of information that can be incorporated into a smaller number of propositions. Greater elaboration leads to greater frequency of mentions of characters on the surface. Thus, the explicit reference to salient characters in some NP slots is not as significant as in others.

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In this study, the influence of context in anaphor resolution is accounted for. So, a full NP may be used to mark a slightly difficult to identify referent in the beginning of a new episode. In the conventional marking of referential difficulty in identifying ellipted referents through context, [?] positioned after a pronoun marks slightly difficult to identify through context, and [????] after a pronoun indicates impossible to identify through context. A [?] after a full NP indicates that a full NP is infelicitous as the referent is easy to identify through context.

5.2 The Story Of Enormous Turnip.

(Picture 1) 1. Once upon a time an old man/he [????] **planted** some turnip seeds. 2. He/The old man [?] **watered** them/ the turnip seeds [?] every day and they/the turnip seeds [?] **grew** well. (Picture 2) 3. But one turnip **grew** faster and bigger than all the others. 4. **This turnip**/it [?] **grew and grew** until it/the turnip [??] was so enormous. (Picture. 3) 5. The old man/he [?] **decided** it was time to **pull** it/the enormous turnip [?] up. (Picture 4) 6. But the enormous turnip/it **would not move**. (Picture 5) 7. So he/the old man [?] **called** to the old woman/her [????] **to come and help.** 8. The old woman/she [??] **pulled** the old man/him [?] and he/the old man [?] **pulled** the turnip. 9. They/ellipsis [????] **pulled** and they **pulled** but the enormous turnip/it [?] **would not move.** (Picture 6) 10. So the old woman/she [??] **called** to the girl/her [????] **to come and help.** (Picture 7) 11. The girl/she [???] **pulled** the old woman/her [???]. 12. The old woman/she [???] **pulled** the old man/him [???] and he/ellipsis [????] **pulled** the turnip. (Picture 8) 13. They/ellipsis [????] **pulled** and they **pulled** but still the enormous turnip/it **would not move.** (Picture 9) 14. So the girl/she [???] **called** to the dog **to come and help.** (Picture 10) 15. The dog/it [???] **pulled** the girl/her [???]. 16. The girl/she [???] **pulled** the old woman/her [???]. 17. The old woman/she [???] **pulled** the old man/him [???]. 18. And he/ellipsis [????] **pulled** the turnip/it. 19. They/ellipsis [???] **pulled** and they **pulled.** 20. But still the enormous turnip/it **would not move.** (Picture 11) 21. So the dog/it [???] **called** to the cat **to come and help.** (Picture 12) 22. The cat/it [???] **pulled** the dog/it [???]. 23. The dog/it [???] **pulled** the girl/her [???]. 24. The girl/she [???] **pulled** the old woman/her [???]. 25. The old woman/she [???] **pulled** the old man/him [???]. 26. And he/ellipsis [???] **pulled** the turnip/it [??]. 27. They/ellipsis [???] **pulled** and they **pulled** and they **pulled.** 28. But again the enormous turnip/it **did not move.** (Picture 13) 29. So the cat/it [???] **called** to the mouse/it [????] **to come and help.** (Picture 14) 30. The mouse/it [???] **pulled** the cat/it [???]. 31. The cat/it [???] **pulled** the dog/it [???]. 32. The dog/it [???] **pulled** the girl/her [???]. 33. The girl/she [???] **pulled** the old woman. 34. The old woman **pulled** the old man. 35. And he **pulled** the turnip. (Picture 15) 36. All of a sudden there was a strange noise and the enormous turnip/it **came flying out** of the ground.
(*The Enormous Turnip* Retold By Mary Shepherd, Illustrated By Sue Tong 1989, Collins Educational.)

The predications made throughout the story of Enormous Turnip are as follows:

PHASE ONE: Picture 1> 1 planted 2 watered 3 grew **Picture 2>** 4 But grew faster 5 grew enormous

PHASE TWO: Picture 3> 6 decided 7 pull up **Picture 4>** 8 but not move **Picture 5>** 9 So called to 10 come & help 11 pulled 12 pulled 13 but not move **Picture 6>** 14 called to 15 come & help **Picture 7>** 16 pulled 17 pulled 18 pulled **Picture 8>** 19 pulled 20 pulled 21 but would not move **Picture 9>** 22 so called to 23 come & help **Picture 10>** 24 pulled 25 pulled 26 pulled 27 pulled 28 PULLED 29 PULLED 30 but would not move **Picture 11>,** 31 called to 32 come & help **Picture 12>,** 33 pulled 34 pulled 35 pulled 36 pulled 37 pulled 38 PULLED 39 PULLED 40 PULLED 41 but not move **Picture 13>** 42 so called to 43 come & help **Picture 14>** 44 pulled 46 pulled 46 pulled 47 pulled 48 pulled 49 pulled 50 PULLED 51 PULLED 52 PULLED,

PHASE THREE: Picture 15> 53 came flying out

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Under ordinary conditions, subsequent mentions of topical referents are made with inexplicit forms unless ambiguity arises. Lack of the verbal links and verbal associativeness when other competing referents are present minimises the possibility of any inferences drawn on the basis of the world evoked. Issues such as how many salient referents create contrast, how they interact, and how distinctive the verbal elements are, play a role in the task of disambiguating implicitly marked referents. As we will observe, potential ambiguity may be caused by the presence of other interfering referents occurring within or outside the span between the two mentions of a topical referent. Competing referents intervening between two subsequent mentions of a referent may be one, two or more, but the effect of ambiguity can be created by the presence of only one plausible competing referent and leads often to a nominal choice. Selective pronominalisation of entities in text is assumed to reflect, among functional reasons, the way action-referent association eases identification in ambiguous environments. A relation links together verbal predicates representing the world spoken of (and perhaps one or more scripts), and a horizontal relation links these verbs with the plausible referents that are connected with them; these two link types are assumed to be the two major informative sources for extending plausibility to the topical referents.

We proceed to analyse the story from picture one representing the first episode, go through the sentences, and finally present a network within which the action-referent association is accomplished. We will make references to pictures of the story rather than to sentences, since change of pictures is considered as change of scene. And it is agreed that changes of the scenes of the narratives constitute cognitive divisions referred to as episodes. So a picture displays an episodic unit of the story; shift from one picture to another involves the deactivation of referential information pertaining to one and the reactivation of the referential concepts of the new scene.

> 15 (Picture one)
> 1. Once upon a time an old man **planted** some turnip seeds.
> 2. He **watered** them every day and they **grew** well.

The story of enormous turnip begins with two indefinite referents both associated with the verb *planted* followed by *watered*, the two verbs representing a script. The semantic associations of this script make accessible certain referents attached to it. The list includes the characters who were introduced into the story by definite NP's: *the old woman, the girl,* and so forth. There are some semantic associations related to the script, which may either be universal or local (file-specific) and hence conventional. This is how scripts are important in communication. Allan (to appear) points out that "the vocabulary used in describing the scripts constitutes a semantic field of words whose interrelationships are defined in terms of the frames and even sequences in the script".

There is a subject switch in the second clause of sentence two. The pronominal marking in the English subject switch is the least necessary marking; the use of ellipsis is constrained to same subject co-reference. According to the contextual information provided, the verbs *planted* and *watered* are linked representing a sequence of actions; they also establish the plausibility of *an old man* and *turnip seeds*; it is the plant frame that helps working out the association. Based on the story so far, the verbal link between *planted* and *watered* makes it evident for the reader to conclude that whoever does the *planting* does the *watering* too. *Grew* is included in the same conceptual package in the sense that, given the link between verbal elements, *planted* and *watered*, it is inferable that what was *planted* and *watered* would *grow* too.

While the arguments could constrain the kind of the verbal predicate associated with them, given that it is the topical referent that is the optional themic concept, the rhemic action can rarely be entirely optional; what can contribute to the predictability of the action word is the inferences based on the story's conceptual plan. The topical character who is definite, given, and continuous is the staging point necessary for the projective perspective of the story; the formal device referring to him is elliptable if his previous mention appears in the immediately previous clause and the verbal associativeness makes the referent easy to identify through removing the interference caused by the presence of other competing referents. So the referent of *grew* is elliptable for two reasons; first, the previous mention is in the previous clause; second, the verbal associativeness makes it the only plausible referent among the two so far introduced.

A simple model of anaphoric relations of picture one contains two types of connections between actions and referential concepts (Table 1). Three types of lines represent three types of associative relations determining the plausibility of the referents. The normal lines indicate that the verb indicates plausibility of the referent associated with it, or the slot is predictable due to predications made in the so far unfolded text. The dotted lines indicate that context is not informative and the use of full NP is indispensable. The broken lines indicate that some type of pragmatic inference is possible, but the informativity of the inference does not make the identification of the referent easy; it is still difficult to identify the referent through context.

Table 1: The abstract illustration of the story, horizontal and vertical relations constituting part of the world spoken of (Picture 1)

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INDEF OM    ······················  planted   ·······························INDEF TS



OM _____  watered  _____TS



TS _____    grew
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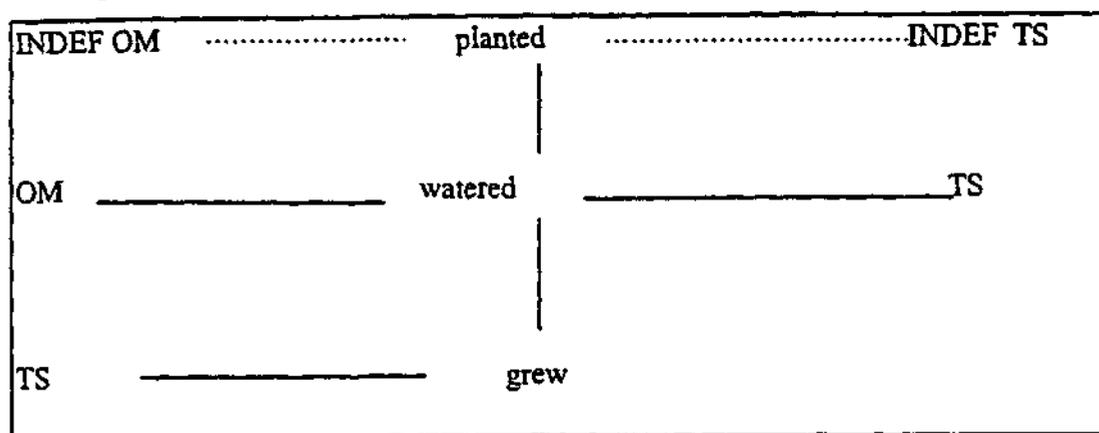
Dotted lines indicate that the referent is impossible to identify if not marked. Solid lines indicate that the referent of the NP slot is easy to identify if not marked. OM = old man, TS = turnip seeds,

16 (Picture two)
3. But one turnip grew :faster and bigger than all the others.
4. This turnip grew and grew until it was so enormous.

One member of the definite set is reintroduced by an indefinite NP, *One turnip*. The expression *the others* is anaphoric to the turnip seeds exclusive to the one which grew faster and is to become one of the salient referents of the story. The expression *but grew faster and bigger* motivates the reader to anticipate what will happen in the following episodes, leading to a more complete formation of the script within which predictions about both the future events and the topical referents involved are possible. The adversative *but* exposes a contrast between what is the natural process in general and what actually is in progress; and since all these projections concern the topic of the story, the consequential effect is salience of the referents in the developing world evoked by the story. In sentence 4, *one turnip* is marked as *this turnip*; the definite marker *this* indicates its cataphoric salience. Indeed, it is not the article *this* alone that marks the future salience of *turnip* here; the reader, upon facing *grew and grew until it was enormous,* comes to anticipate that *this turnip* will gain salience in subsequent stages of the story.

The role of adversative *but*, the adverb *faster* and *bigger*, and the attribute *enormous* in clauses in which the turnip is the argument is to expose better the new information and all contribute to the establishment of this referent further; the entire expressions are cues for characterising a world within which this turnip gets cataphoric salience. At this stage, the NP *this turnip* stands for: *the turnip among a group of turnips which an old man planted and watered, which grew faster and bigger than the others*. The old man is less established at this stage; the pronoun *he* stands for *an*

old man who planted turnip seeds and watered them. Some implicit propositions are also deduced from the world explicitly spoken of such as: *the old man observed the seeds and this took a fairly long time*, etc. The verbs *planted, watered, grew, but grew faster, grew enormous, decided,* and *pull up* indicate clearly the plausibility of the referents to be associated with them as either undertakers or undergoers. This means that the reader associates *planted* and *watered* with *old man* and *turnip seeds* as arguments in agent and recipient case roles, *grew* with only *turnip seeds, but grew faster* with *one turnip* as actor, *decided* with only the *old man* as agent, and *pull up* with *old man* and *enormous turnip*; as a result, no determining effect for ambiguity can be assumed for co-reference resolution.

Table 2: The abstract illustration of the story events in relation to the participants as far as Picture 2.
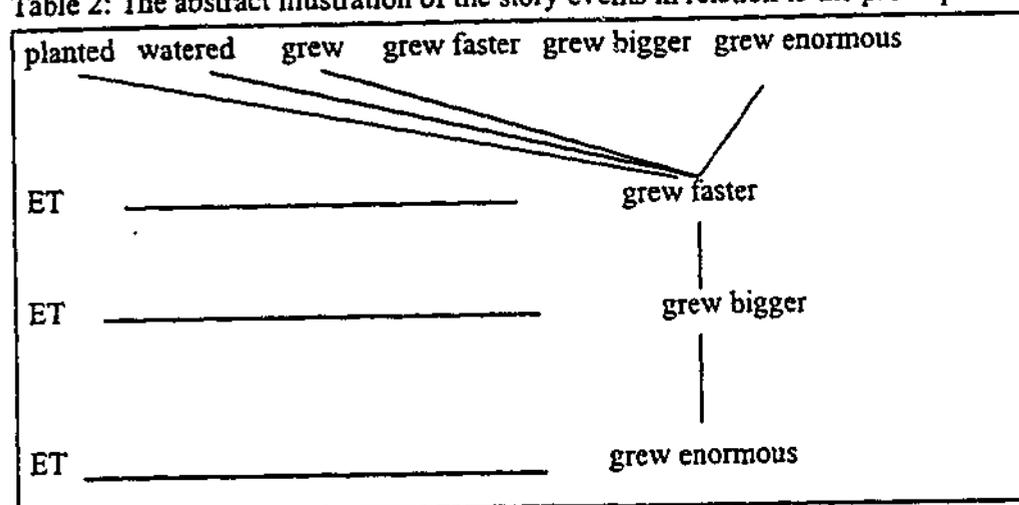
The solid lines indicate referents are easy to identify through context. ET = enormous turnip

On the surface, three referents have been introduced and create potential ambiguity, but the ambiguity is subject to the conditions which constrain its effect. If ambiguity is to be measured applying the method introduced by Givón (1983), the result will simplistically depict the environment as potentially ambiguous. The effect of competing referents brings about a degree of conceptual complexity; however, even the complexity caused is restricted: not every previously mentioned referent has the potential for competition; the referent of the full NP, *the turnip seeds*, for instance, is not current competing referents since they have effectively been deactivated. So it is anticipated that the story will probably not assign any further salience to *the turnip seeds*. Table 2 illustrates, in abstract terms, the action-referent associations and the vertical verbal links which contribute to evoking a world within which the referents are accessible through the growing help of the context.

17 (Picture three)
5. The old man decided it was time to pull it up.

Picture three is the beginning of a new phase in the story which is a transition from the introduction to the second phase: the action. The explicit reference by *the old man* marks the beginning of the second episode; the full NP is used for an easily identifiable referent, since *the old man* is the only plausible referent associated with the verb *decided* and *pull up*. The verb, *pull up*, in the second clause of sentence 5 is also indicative of its arguments, i.e. the one which *grew faster* and *enormous* is *pulled up* by the one who *planted* and *watered*, as is seen there is very little semantic role for the overt expressions. The expression *'time to pull'* sets out clearly the referential concepts involved, since both referents have been recently mentioned in the previous clause, the agent of *pull up* is eliminated and the patient is reduced due to the recency of its previous mention. It is conspicuous that the choice of a pronoun in contrast with an elliptical form is a grammatically constrained choice. Each of the two referential concepts, *the old man* and *the turnip* by now has a textually presented history attached to it.

In addition to how the dynamic structure of the sequence of events representing the script *planting, watering,* and *growing faster* enhances the accessibility of certain entities and attributes, the farm frame, which is very closely interconnected with the *planting* script, also indicates what kind of activities are expected to occur and what referents are projected for the predicates. The location, the kind of function a farm has, the attributes of a farm, the activities involved in a farming frame, and the purpose of the work done in a farm all are related to the text understanding and consequently to the anaphor resolution. One may assume frames are ingredients of scripts because each scene in a script constitutes a frame (Allan, to appear). Figuring out the constituents and the attributes of a frame involves encyclopedic knowledge and this is how the two sources of information, textual and semantic context, are interrelated. Both the characters of the story and the events have attributes; e.g. attributes for *plant* are the one who plants and what is planted. The frame of old man has some attributes that readers are expected to know about and are left implicit in the formal representation of the text. The attributes of both scripts and frames are those usually expected to comprise the implicit propositions of a discourse. The script invoked by the story is actually the dynamic structure of the events of the story creating semantic associations through which one identifies who does what. The frames are ways the story is connected to one's semantic memory through which the two context types are interconnected.

Table 3 tabulates the horizontal and vertical relations which enhance the identifiability of the topical characters. From this episode on, new referents are introduced into the story line for

repeating the same action, and since the same verb, *pull*, will be repeatedly used, verbal indication of plausibility will decrease dramatically making the nominal choice obligatory.

Table 3: An updated file of the development of the story as far as Picture 3

```
planted    watered  grew    grew faster  grew bigger   grew enormous


OM  ──────────────────────  decided


OM  ─────────────────────  pull up  ─────────  ET
```
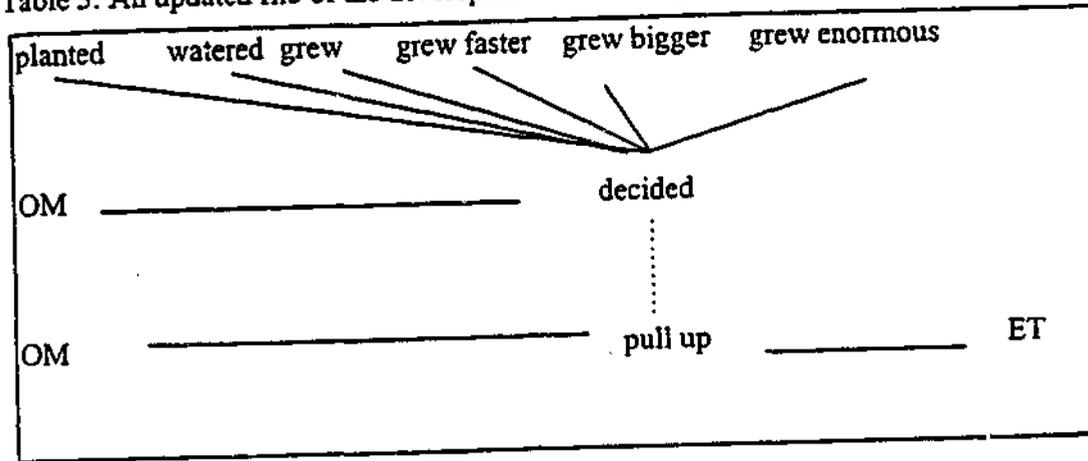
The solid lines indicate that action-referent association neutralises ambiguity; the dotted line indicates that no special link can be worked out between the two verbs *decided* and *pull up*. *Decided* could be followed by any action.

18 (Picture four)
6. But the enormous turnip would not move.

Given the inferring ability based on the reader's mutually shared semantic knowledge of the story, the verb *pull,* that is selective of *turnip* as its patient, is expected to be followed by its natural consequence: *move out of the ground* which again associates itself with *turnip*. But the role of '*But not move*' is to enhance the likelihood of an alternative consequence and as a result direct the story plot toward continuation of the actions. Table 4 displays the semantic link between the verbal expressions constituting a conceptual frame.

Table 4: An abstraction of the story plot as developed by the actions in relation to the participants; the file update as far as Picture 4.

```
planted  watered  grew  grew faster  grew bigger  grew enormous  decided  pull up


ET  ───────────────────  but would not move
```
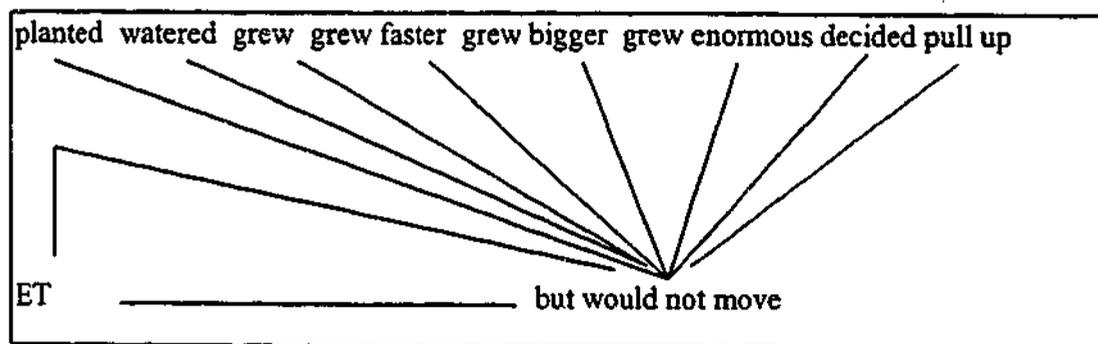
19 (Picture five)
7. So he **called** to the old woman **to come and help**.
8. The old woman **pulled** the old man and he **pulled** the turnip.
9. They **pulled** and they **pulled** but the enormous turnip would not **move**.

The reader figures out what will be the consequence of not moving out. It is likely that further actions of pulling are predicted to happen. For a successful pulling action, more characters are required to achieve the goal of pulling out the enormous turnip; hence, the reader is expecting more characters to be introduced. The more the ability of the reader to make such guesses, the easier will be resolving the coreference and making use of action-referent association.

In picture five which contains more actions than the previous episodes, the expectation of the reader is fulfilled by sentence 7 in which the one who does the act of pulling calls for help. The connective *so*, which precedes all the clauses in which *call* occurs, makes explicit the semantic inference that when the turnip does not move, calling on another person for help will be the natural act to do. The connective contains part of the new information by inviting the inference that there would be additional occurrences of the verb *pull*; it will hereafter function as the complementary part of the action denoted by the verb phrase *would not move*. The verb *call* and the connective *so* which exposes the consequence resulted by previous unsuccessful action of *pull* are both used as adequate means of introducing a new character into the story.

A new sub-topical referent is introduced in this episode but not by an indefinite NP as was the case for the other two characters that initiated the story. From this point on, all the characters introduced into the subsequent scenes are assumed to be part of the script and are situationally definite. In the world unfolded so far, it is predictable that the two referents will do further actions of pulling. So the reader expects what is likely to happen. However, the reader's guess about what will happen next will not necessarily identify which actor does which act; so ambiguity which should be resolved through this type of information drawn from the context is not effectively resolved. In order for ambiguity to be resolved, it is necessary that actions distinguish between referents; in this particular context, the verb *pull* does not have this property.

Table 5 illustrates an abstraction of what remains from the discourse file of the story up to picture five. From now on, the verbs *call for help* (five times), *pull* (six times), and *but not move* (six times) will be the three major actions at the following stages. This sequence is performed for the second time in pictures six, seven, and eight; and the verb phrase *but not move* provides the reader with a stronger expectation that there will be stronger *pulling* actions involving new topical participants entering into the story.

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If the verb belongs to the set of the verbs belonging to the story's conceptual plan, and it is associated with only one referent; the referent associated with it will be purely optional so far as referential clarity is concerned. For instance, the rich nominal expression *enormous turnip* in the previous sentences and hereafter functions as a directive to the future stronger *pulling;* the long expression is not intended to provide greater informativity serving the clarity of reference. This documents a contrast between the functional role of the referring expressions in signalling the pragmatic functional facet as opposed to the maintenance of the identity of the referent in question, both of which influence the referential choice and is subject to the writer's reaching a compromise. The writer decides upon pragmatic load of the expressions used and upon how much difficulty should be left for the reader; such judgements are made under the cooperative principle (Grice 1975) and are approximative.

Table 5: The story events and participants related to them as abstracted for the task of action referent association (development on Picture 5).

planted	watered	grew	grew faster	decided	pull up		but not move
OM _____				called to	....		the old woman
OW _____				come&help			
OW				pulled	....		OM
OM				pulled	-------------------		ET
ET _____				but not move			
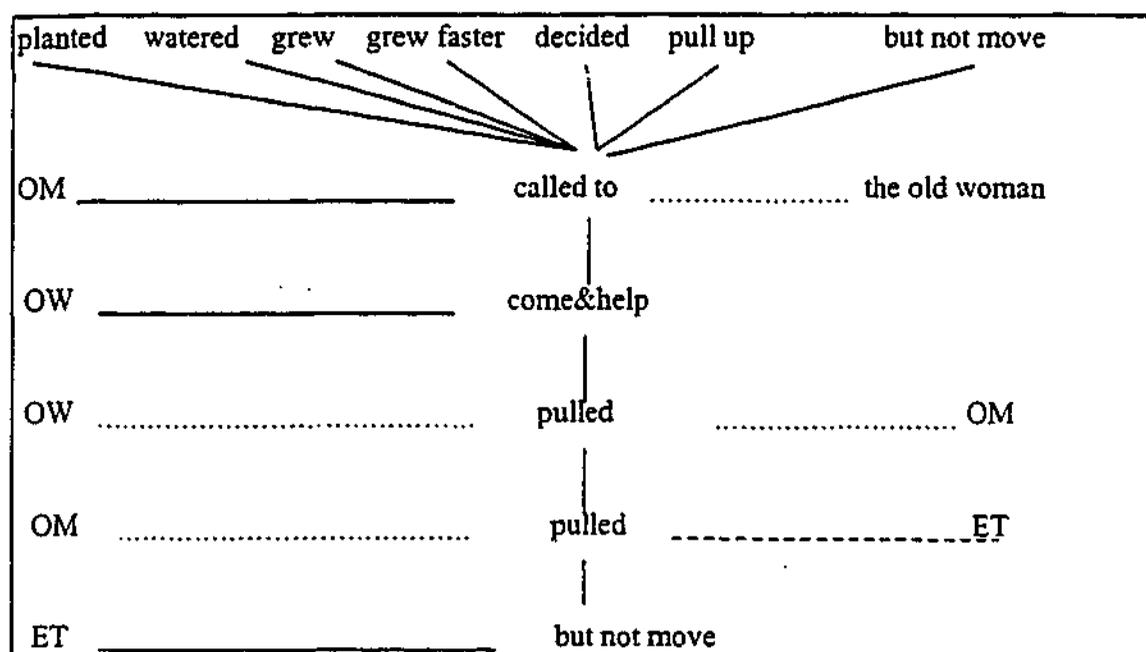
------ represents difficult to identify. OW = old woman

20 (Picture six)
10. So the old woman **called** to the girl to come and help.

In picture six, the story continues with the old woman calling the girl. Contrasted with the last calling action, in sentence 10, the calling is done by the old woman rather than by the old man; it initiates an inference that the act of calling will be done by whoever was last called on to come and help. The words that appear on the page form sentence units which are used by the writer as conventional means of reporting the story. Different writers may choose different styles of conveying the content of the story, e.g. in sentence 10, *to come and help* could alternatively have been written by a writer as *to help*. The question is how many explicit propositions should be written down on the page for the reader to figure out the story as intended by the writer. The point is that stylistic differences are always expected to exist. It goes without saying that writing down more propositions means mentioning characters more frequently.

The salience of the topical character overrides the deactivating effect of the scene change, so *the old man* is pronominalised in 7. When the subjects change, subject switch is marked by a sentential division. If the salience of the main topical character is high, subject switch may optionally be done with a pronoun; as is the case of the main topic of this story, *the old man*, for whom a connective *and* is used to display continuity and a pronoun, which is here more informative than ellipsis, is optionally used to reflect the focus allocated to him.

Table 6: An abstraction of the story file; the update of the file up to Picture 6.
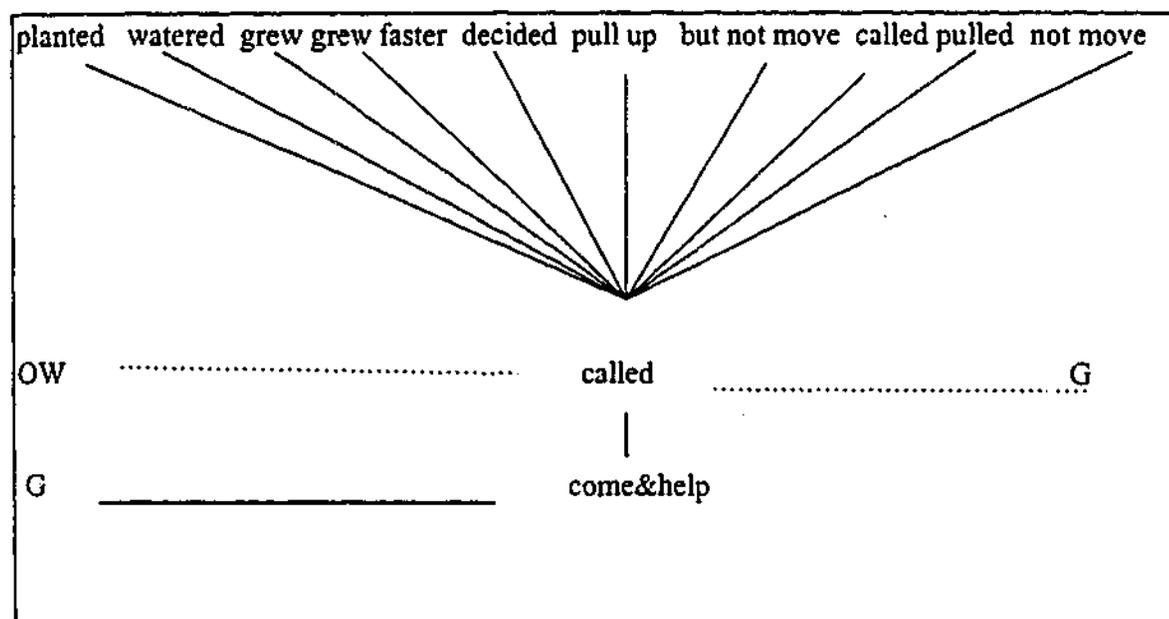

G = Girl

21 (Picture seven)
11. The girl **pulled** the old woman.
12. The old woman **pulled** the old man and **he pulled** the turnip.

At this stage, the referent-action association is much weaker than the introduction phase in which the verbs *planted, watered, grew, decided,* and *pull up*, could clearly indicate the plausibility of the referents to be associated with them. The expression *but not move* must again bring the inference that the same procedure will happen in the next episode. The order in which the characters perform their actions of *calling* and *pulling* may replace the lack of association between the verbs and their arguments. The ad hoc information would predict that the last person who was *called to come and help* is the one who initiates the next *pulling* action and is the one who will *call for help*. But the full NP's seem to be necessary since the pragmatic inference made, based on the systematicity of actions, is not sufficient for replacing the verb-referent association; furthermore, additional reasons for nominal choices may have been the frequent subject switches and the fact that non-human referents are of less salience than the humans. Indeed, all but the main topical referent are marked by nominal forms in the action phase. Although, at this stage, lack of association creates potential ambiguity, it is not as unconstrained as it looks; the fact is that *pulling* excludes *turnip* from the list of plausible agents and identifies it as one in the list of plausible patients; *calling for help* also excludes *turnip* from being a plausible argument.

Table 7: The discourse file representing the status of Picture 7. Two types of relations are displayed, easy and difficult to identify through context relations.
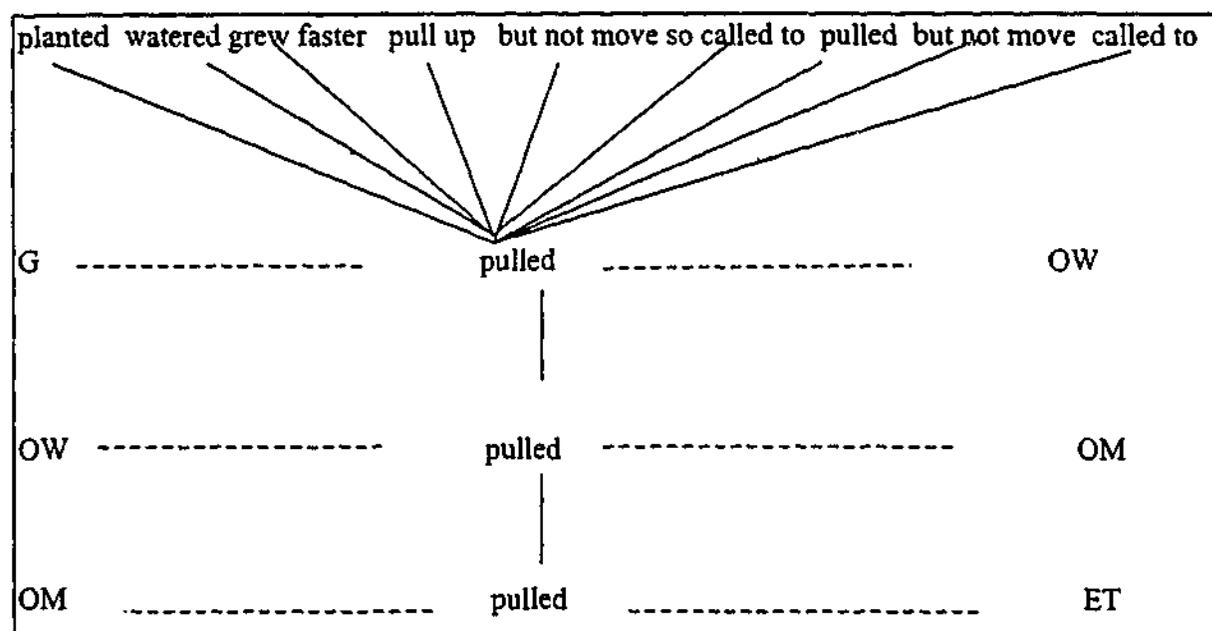

22 (Picture eight & Picture nine).
13. They **pulled** and they **pulled** but still the enormous turnip would not **move**.
14. So the girl **called** to the dog to come and help.

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In pictures eight and nine, the new information is a recurrence of the action of pulling, but the episode introduces one more referent, added to the referents already introduced. The communicative dynamism of the predications in this episode is to emphasise a point: this turnip is so enormous that the characters called upon so far cannot pull it out, so more powerful pulling is required. And this is pragmatically figured out, that the repetition of the action of pulling indicates a challenge which needs more of the actions done. In this way, the practical purpose of the repeated predications is to make it possible for the reader to pragmatically infer that this enormous turnip will need further pulling to come out of the ground. Without this inference, the repeated predications appear to be void of semantic dynamism which is the primary requirement for a predication. Practically no new information is practically added to the assertions, but pragmatic inferences are made as to why these pulling actions are being repeated. Indeed, it is the introduction of new referents and the accomplishing of further actions of pulling that is considered to be the communicative contribution of the clauses in this phase. Inferences of this type are naturally made on the basis of the interlocutors' knowledge of the world spoken of. Were the writer to ignore the cooperative principle, or were she to write for an audience who lacked the general knowledge, the number of explicit propositions would increase and the number of the implicit propositions would decrease.

Table 8: The abstract instantiation of the story. The display could identify the actions which contribute to the referent identification. At every stage, one group of actions are and remain associative (represented by normal lines) and one group is void of any association (represented by dotted lines).

```
planted watered grew faster pull up but not move called to pulled but not move called to pulled



PLURAL    ----------------------    pulled    ——————————    ET
                                       |
PLURAL    ----------------------    pulled    ——————————    ET
                                       |
ET        _____    would not move
                                       |
G         ----------------------    called to come&help    ............    D
```
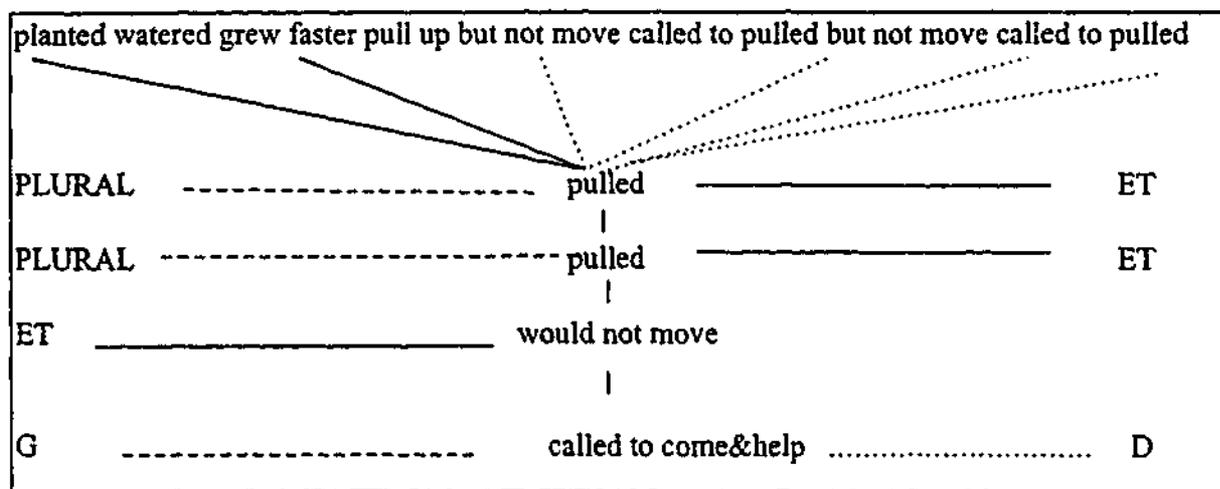
D = dog

If the order by which the characters of the story carry out the actions of pulling and calling for help were not helpful in order to resolve which action is associated with which character, there would be more urgent need for the use of full NP's. It would then be almost impossible to identify the referents of some of the NP slots through context. This would be an environment in which resolving coreference would be tightly dependent on the use of a full NP. Evidently, it is rarely possible for context to be devoid of referential informativity.

The maximal continuity of the referents because of being mentioned as the arguments of successive actions should make them pronominalisable, but the fact is that there are several factors involved in determining what type of expressions are to be used, e.g. the referent of *the dog* in clauses 15 and 21 cited below is of maximal referential continuity; but this referent is marked explicitly because the slot it is used in is not easily identifiable through context. Even if the systematicity of actions were of any help, initiating a new episode would demand an explicit mention, the use of which is beyond the need for clarity. When a new scene begins, the entities of the previous scenes are deactivated. Indeed any contrast felt between topic, action or scene, induces an explicit marking of the referent. However, the pragmatic markings[7] in the text do not always indicate the degree of identifiability of the referent marked.

The urgency of the full NP's in picture 10 varies considerably. Some referents are slightly difficult to identify through context while others are very difficult; in the entire extract, we see differential degrees of referential difficulty that can intuitively be marked through some type of convention ([?] and [???]consecutively, indicating slightly difficult and very difficult to identify through context):

23
The dog pulled the girl. The girl/ she [?] pulled the old woman/her [???]. The old woman/she [?] pulled the old man/ him [???].

The differences in the informativity of context lead to variable degrees of difficulty in identifying referents; the full NP's are variable in terms of the urgency by which they are used to maintain

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[7] Referring expressions are used for achieving two distinct tasks. One function of these linguistic devices is to mark how identifiable the referents are to the reader; if easily identifiable, a formally attenuated device is appropriate; but if the referent is not easily identifiable through context, a full NP is semantically necessary. The second major function of the referring expressions is to serve the writers' pragmatic intentions. This is different from marking the identifiability of the referent. More often than not, the uses of the full NP's when they are not semantically needed serve the intentions of the writer, e.g. marking the organisational structure of the text to the reader, acknowledging a formal situation, reflecting the view point of another referent rather than the writer of the text, and displaying the mental status of one salient character in the mind of another, etc. Indeed, when the assumed correlation between the use of the referring expressions and the identifiability of the referents is violated, the writer's pragmatic desire (intention) may be taken accountable; in such cases, the pragmatic functional aspect should be distinguished from the need for removing potential ambiguity in marking the identifiability of the referent.

clarity. Context is so strongly integrated with referential marking that an account of coreference in discourse requires a model to account for the interplay the two sources of referential information.

In picture 10, the same procedure helps to intensify the expectation of the reader that a challenging thing is to be achieved. And finally the goal of the story that is the pulling of the turnip out of the ground is attained. Pragmatically the reader is directed to believe further actions will eventually lead to what is the goal of the action phase of the story. The communicative dynamism of the text here is limited to repeating the same actions by more referents. The full NP's are used to remove the ambiguity caused by several referents doing the same action and full NP's have to be used under variable degrees of urgency, but in the case of the predication made of the enormous turnip, one cannot claim the full NP is used urgently for maintaining the clarity of the referent. In the same episodic environment, full NP's are used for two completely different reasons.

24 (Picture 10)
15. The dog **pulled** the girl.
16. The girl **pulled** the old woman.
17. The old woman **pulled** the old man.
18. And he **pulled** the turnip.
19. They **pulled** and they **pulled**.
20. But still the enormous turnip would **not move**.

Table 9: The story file up to picture 10

planted grew enormous pull up but not move called to pulled but not move called to pulled would not move so called to come&help

D	pulled	G
G	pulled	OW
OW	pulled	OM
OM	pulled	ET
ref PLURAL	PULLED	ET
ref PLURAL	PULLED	ET

ET _____ but would not move

In this story, one can intuitively capture at least three types of referential assistance from context. One type is the predicate of the clause strongly reveals the identity of the arguments associated with it; or the predications already made in previous context are informative in identifying a given referent. The full function of context in revealing the plausibility of the referents was observed in the introduction phase of the story within which identifiability could be attained through context. In the second type of inference, the referent is identifiable through some kind of information form context, but it is not easy to resolve the anaphoric relations. In this phase of the story, it is possible to draw pragmatic inferences based on the ad hoc information taken from the systematicity of the actions of pulling. The information can be used to discover which referent resumes the action of pulling and calling for help in subsequent episodes. But this information does not lead to easy identification of a particular referent and hence we see full NP's are used. As a third possibility in the resort to context, there may be absence of any type of helpful information; then the use of full NP turns to be maximally urgent for maintaining the identity of referents under ambiguous conditions.

25
(Picture 11) 21. So the dog called to the cat to come and help.
(Picture 12) 22. The cat pulled the dog. 23. The dog pulled the girl. 24. The girl pulled the old woman. 25. The old woman pulled the old man. 26. And he pulled the turnip. 27. They pulled and they pulled and they pulled. 28. But again the enormous turnip did not move.
(Picture 13) 29. So the cat called to the mouse to come and help.
(Picture 14) 30. The mouse pulled the cat. 31. The cat pulled the dog. 32. The dog pulled the girl. 33. The girl pulled the old woman. 34. The old woman pulled the old man. 35. And he pulled the turnip.

When the story reaches sentences 21-35, without the specific formal indications used, it would not be easy to keep track of which referent should be chosen for the subject NP slots, but it is possible to judge about the degree of the urgency of the full NP's used in relation to context. Some full NP's are used to mark a difficult to identify referent, but some full NP's may be used to mark impossible to identify referents; likewise, full NP's may tend to be used for referents which are slightly difficult to identify through context. The most feasible explanation for this type of judgement is that readers are continuously involved in making inferences based on a semantic record of the entire discourse. Formal expressions do the job of making identification of the referents easier and are also used for conveying the writer's pragmatic intentions. For instance, we see that despite the absence of effective ambiguity for the referent of *enormous turnip*, full NP is repeatedly used for marking it. Why is this so? Our explanation is that the writer repeats the full NP's to convey a pragmatic point to the reader: repeatedly mentioning the formal expression *enormous turnip* to remind the reader that this turnip is very big and pulling it out is a real challenge.

Each character does the act of pulling singly and yet all of them do the pulling together. When the subject of pulling is *they*, it is up to the reader to infer that only the pulling characters so far introduced can collectively be included as the referent of *they*; figuring out which one(s) of the referents are plausible to be the referent of the pronoun 'they' involves inferences. It is in this particular world that the plural pronoun, *they*, corefers with all the plausible characters introduced singly; therefore, it plays an important semantic role and cannot be ellipted from mention: the plural pronoun points to all individually introduced referents. The object of the verb *pull* is too accessible to be explicitly mentioned. The meaning drawn from *they pulled* is: the OM, the OW, the G, the D, and the C each pulled the other; and the only one in the group who pulled but was not pulled in this configuration was the dog; in addition, the only character who pulled the turnip and at the same time was pulled by the old woman acting in the collective actions is the old man. These and potentially many more are inferable propositions displaying the connection between the textual context and the semantic knowledge. Within inferable propositions, referents are identifiable through being associated with certain actions; thus, predications are inferred according to context, through which arguments are identified.

> 26 (Picture 15)
> 36. All of a sudden **there was** a strange noise and the enormous turnip **came flying** out of the ground.

Picture 15 displays the result of continuous pulling actions, which is achieved in this final part. The action-referent association tends to be strong again in the final phase, so the identity of the referent is less dependent on the referential device used. The expressions all contribute to an already expected result. The adverbial expression *all of a sudden* is used to display explicitly that the act of coming out of the ground takes seconds. The expression ends the reader's expectation for the *moving out* to happen; which by itself ends the predictions for more of the series of actions involving the occurrences of the *turnip*. The strange noise is the natural consequence of moving out of the ground; if the writer had decided to leave it to the list of implicit propositions, the text itself would inferentially implicate that there is a sudden noise involved in moving out of the ground by the pulling force. These are part of the activity of forming a world evoked by the story and are related to the way resolution of anaphoric relations is achieved.

Most of interpretations regarding why expressions are used in various slots of the sentences constituting a story require a mutually shared knowledge; e.g. inferentially, the reader has been waiting to witness the sudden move out of the ground. Inferences through context are indeed implicit propositions which are gathered from the set of explicitly mentioned propositions.

planted watered grew faster pull up but not move called pulled but not move called pulled but would not move so called pulled but would not move

(D)	called to come&help	CAT
C	pulled	D
D	pulled	G
G	pulled	OW
OW	pulled	OM
OM	pulled	ET
ref PLURAL	PULLED	ET
ref PLURAL	PULLED	ET
ref PLURAL	PULLED	ET
ET	but not move	
C	so called to come&help	MOUSE
M	pulled	C
C	pulled	D
D	pulled	G
G	pulled	OW
OW	pulled	OM
OM	pulled	ET
ref PLURAL	pulled	ET
ref PLURAL	pulled	ET
ref PLURAL	pulled	ET
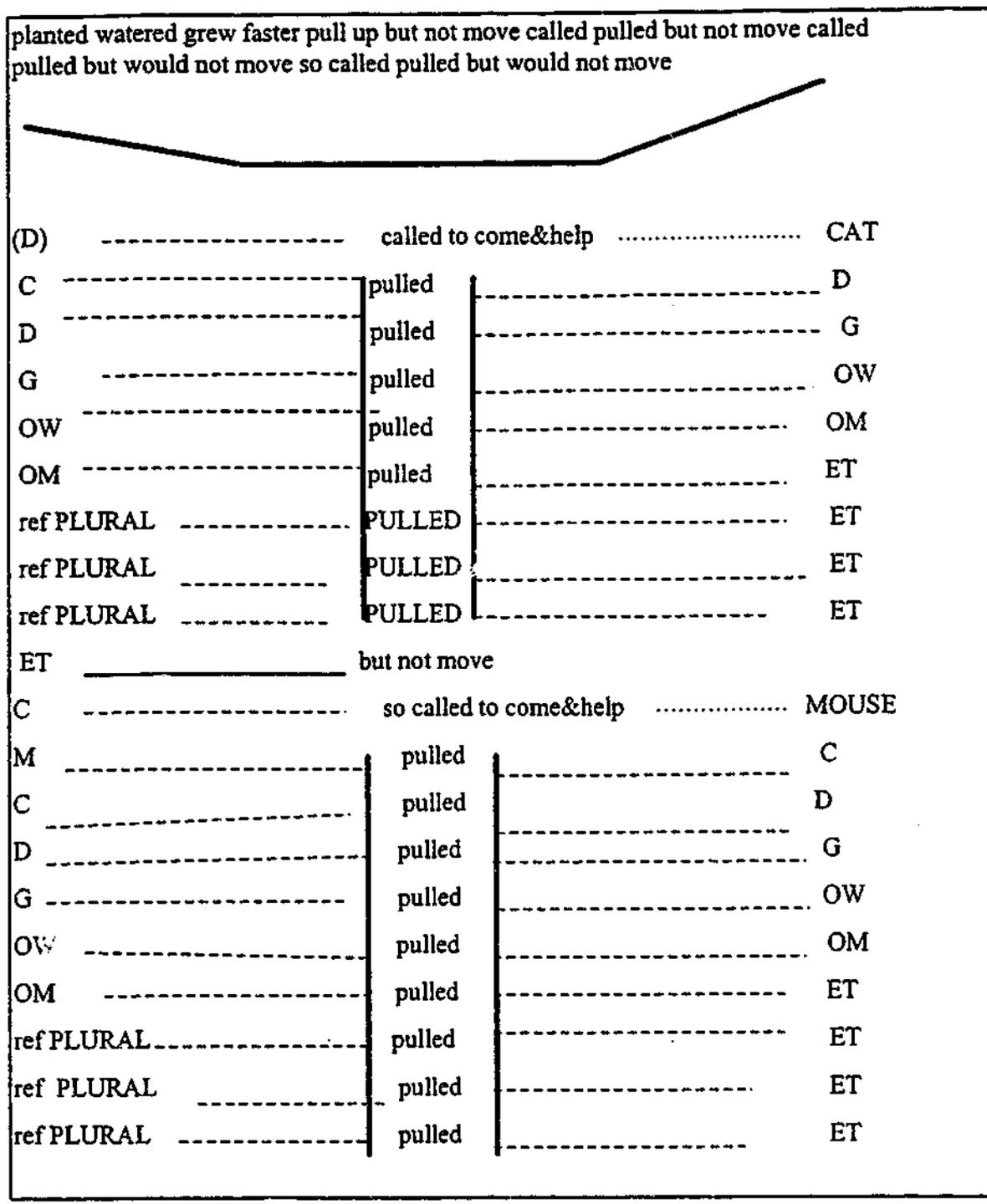
C = cat, M =mouse

From the beginning, the reader has been led to believe that the expected consequence will come about; this expectation has been becoming increasingly strong; it is the topical referent, *turnip*, that has been attracting an increasingly stronger focus while the reader's expectation is becoming stronger. This is how the narrative plot is linked with referent retrievability. All of the mentions of the referent of *turnip* throughout the story are optionally made by the full NP *the enormous turnip*; although the referent is easily identifiable through being associated with the verb connected to it. The full NP's used play a pragmatic function rather than semantically contributing to the maintenance of the referent's identity.

Table 11: The conclusion phase of the story. Action referent association is informative in this phase (picture 15).

```
1 planted 2 watered 3 grew 4 grew faster grew enormous 7 decided pull up 9 but not move 10 called to
11 come&help pulled pulled but not move 15 called to 16 come&help 17 pulled 18pulled 19 pulled
20 pulled pulled would not move 23 called to 24 come&help Picture 10 25pulled pulled pulled pulled
PULLED 30 PULLED 31 but would not move Picture 11, 12, 13, 14 32 called to 33 come&help
34 pulled pulled pulled pulled pulled PULLED 40 PULLED PULLED but not move 43 so called to
44 come&help 45 pulled pulled pulled pulled pulled 50 pulled PULLED PULLED 53 PULLED
```

all of a sudden noise

ET _____ came flying out of the ground

The first phase of the story is characterised by verbs such as *planted, watered, grew, grew faster, and grew enormous;* in this phase, referents are strongly predictable through the association between context and the topical referents, turning the use of full NP's into an optional pragmatic choice rather than contributing to the referential clarity. The second phase which starts with *decide, pull up* and continues to *but did not move, so call to,* and *come and help* is the longest phase in which *pulling* is performed six times totalling in 31 tokens, and *calling for help* five times, each time one character being added to the story line. It was observed in the action phase that continuity of the same type of action by a growing number of participants resulted in the fall in the degree of plausibility and lead to greater semantic significance for the use of full NP's. The systematicity in the order of participants in the series of similar actions provided some help in the resolution, yet the resolution had to depend on the use of full NP's.

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Through comprehending the story, a world which is evoked by the written narrative is discovered by the reader right after the introduction phase; the sooner the world is evoked, the more easily the coreference resolution is achieved. At the end of the story a complete file is recorded and the links between the acts denoted by verbs and also the association between verbs and referents connected with them is readily made. Ambiguity is null for the associative verbs which govern the plausibility of referents. The agent of *planted, watered, decided, called, and pulled* cannot be *the turnip*, and likewise ambiguity is null for the referent of *grew faster, but did not move,* and *came flying out*. The referent constrains the occurrence of certain actions, but evidently it does not make the occurrence of the predication redundant, while the predication indicates the plausibility of the arguments associated with it and makes their mention redundant where the verbal link is informative. This process is the major requirement for staging and creating a coherent discourse.

The verbs which are used to make the predications of the salient referents differ in the degree of their associativeness in the story, the result of which is selective pronominalisation. The expressions *decide, planted, watered, grew and came jumping out, but would not move* are high in their degree of associativeness; while such phrases as *come and help, pulled,* and *called to* tend to be low, specially at the stages in which the number of referents increase. *The turnip* is distinguished from other referents through such verbs as *grew bigger, grew faster, but not move* (used five times), *all of a sudden there was a noise, came flying out of the ground*; in this sense, no considerable competition is assumed for turnip. The reluctance for using pronouns is not related to the need for clarity; the degree of associativeness is maximal in all its mentions. The verbs *called to* and *come and help* exclude the turnip from the list of plausible referents, but these verbs did not distinguish between such referents as *the old man, the old woman, the girl*, etc. There are several plausible referents which could be the agent or the patient of these verbs. So, ambiguity cannot be constrained in the case of verbs which do not determine the plausibility of only one referent.

The verb *pull* is very weak in its associativeness with regards to the object referent connected to it; it cannot distinguish *the turnip* from the rest of the referents as its argument, neither can it distinguish the rest of the referents from one another. Six rounds of actions of *pull* involved 31 tokens, in which either one or up to the seven topical characters (OM, OW, G, D, C, M, THEY) was/were the subject, and one of the six characters (ET, OM, OW, G, D, C) was the object. In 10 tokens in which *pull* was the verb and a plural referent *they* was the subject, no object was explicitly mentioned; evidently, the elimination indicated that the referent was too accessible; the expression *they pulled* stands for *they all pulled successively one another and the turnip*. The plural pronoun *they* is not replaceable with ellipsis in this particular environment and is anaphoric to the entire referents so far introduced except the enormous turnip. The context is so integrated

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with the anaphoric relations that *they* is used to refer to a selection of the referents previously introduced into the story. This is persuasive evidence to believe that figuring out that *they* is anaphoric to all but one referent needs a background of the entire story, i.e. the readers need to keep the details in mind in order to work out whom the plural pronoun *they* is related to, and indeed they do this as part of the natural processes of anaphor resolution.

Table 12. A simple presentation of the discourse instantiation. The verbs and their association with referents.

Verb	Arg.s	actor	undergoer	Verb		actor	undergoer
1 Planted	2	1 Old man	turnip seeds	2 watered	2	6 OM	2 TS
3 grew	1	1 TS	---------	4 grew faster	1	5 ONE T	-----
5 grew enormous	1	1 Big T	-----	6 decided	2	7 OM	
7 pull up	2	2 OM	1 BT	8 not move	1	6 BT	
9 so called to	2	3 OM	old woman	10 help	1	5 OW	????
11 pulled	2	1 OW	1 OM	12 pulled	2	8 OM	2 BT
13 pulled	2	1 THEY	?????	14 pulled	2	9 THEY	????
15 pulled	2	2 THEY	?????	16 not move	1	7 BT	-----
17 so called to	2	2 OW	GIRL	18 help	1	3 G	?????
19 pulled	2	1 G	OW	20 pulled	2	6 OW	4 OM
21 pulled	2	4 OM	3 BT	22 pulled	2	10 THEY	????
23 pulled	2	3 THEY	???	24 pulled	2	11 THEY	???
25 but not move	1	2 BT	-----	26 called to	2	4 G	1 DOG
27 come&help	1	1 DOG	????	28 pulled	2	4 D	G
29 pulled	2	2 G	OW	30 pulled	2	7 OW	5 OM
31 pulled	2	5 OM	4 BT	32 pulled	2	12 THEY	????
33 pulled	2	4 THEY	???	34 pulled	2	13 THEY	????
35 but not move	1	3 BT	-----	36 so called	2	5 D	2 CAT
37 come&help	1	1 C	????	38 pulled	2	3 C	2 D
39 pulled	2	2 D	G	40 pulled	2	5 G	OW
41 pulled	2	3 OW	2 OM	42 pulled	2	9 OM	5 BT
43 pulled	2	5 THEY	????	44 pulled	2	14 THEY	????
45 pulled	2	6 THEY	????	46 not move	1	8 BT	-----
47 so called to	2	2 C	1 MOUSE	48 help	1	2 M	?????
49 pulled	2	1 M	1 C	50 pulled	2	4 C	3 D
51 pulled	2	3 D	G	52 pulled	2	6 G	OW
53 pulled	2	4 OW	3 OM	54 pulled	2	10 OM	6 BT
55 pulled THEY	2	7 THEY	????	56 pulled THEY	2	15 THEY	????
57 pulled THEY	2	8 THEY	???	58 sudden noise	1	NOISE	----
59 came out	1	4 BT	----				
23x2 +7X1 =53				21X2+8X1 =50			
Total connections: 58X2 +15X1 =103							

There are six plausible patients (ET, OM, OW, G, D, and C) and seven plausible agents (OM, OW, G, D, C, M, and THEY) associated with *pull*, five plausible agents (OM, OW, G, D, C) and five patients (OW, G, D, C, M) are associated with *call to*, two plausible referents (TS, ET) for *grew*, and only one plausible referent (ET) for *grew faster* and *but did not move*. The *noise* also indicates a clear association between *pulled* and *moved out of the ground*, on the one hand, and *the turnip* on the other. It could have created a connection with another similar consequence, but in such contexts, the one that creates the noise is most likely to be the turnip's moving out of the ground; the likelihood of any other source for noise would be lower than the one intended.

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Table 13: The NP slots in which the topics and sub-topics of the story appeared. The number of times referents appeared in subject and object slots has also been cited. Verbs marked by being bold indicate unique associativeness, others mark lack of it.

Referent	Slot type	Number	Verbs
TS:	agent:	1	**grew (1)**
	patient:	2	**planted (1), watered, (1)**
T	agent:	8	**grew faster (1), grew enormous (1), but not move (5),** came flying out (1),
	patient:	6	pull up (1), pull(5)
OM	agent:	10	planted(1), watered(1), **decided(1)**, pull up(1), pull (5), **so called to (1),**
	patient:	5	pulled (5),
OW	agent:	7	pulled (5), called to (1), **come&help (1),**
	patient:	5	pulled (4), called to (1),
G	agent:	6	called to (1), pulled (4), **come&help (1)**
	patient:	4	called to (1), pulled (3)
D	agent:	5	pulled (3), called to (1), **come&help (1),**
	patient:	3	called to(1) pulled(2)
C	agent:	4	pulled (2), **come&help (1),** called to (1)
	patient:	2	pulled (1), called to (1)
M	agent:	2	pulled (1), **come&help (1)**
	patient:	1	call to (1)
THEY	agent:	15	pulled (15)
	patient:	---	
	T of actors	58	
Total = 9	T of undergoers	28	

The need for the referents to be marked by nominal forms may be related to one or more of several factors. Either the verbal predicate of the clauses does not indicate the plausibility of the arguments connected to it; or the episode boundaries are marked, e.g. only in 2 of the 15 pictures, the beginning of the episode is marked with a pronoun. While the sequential order of the series of actions of *pull*, *but not move*, and *call to come and help* could be used as an ad hoc source of information for disambiguating the resolution, it did not provide sufficient help for easing the establishment of the plausibility of one among several competing referents; this is one reason the writer preferred to use full forms. It is important to note that the necessity of the full NP's used under the effect of ambiguity is variable; ellipting a full NP might lead to variable degrees of difficulty in identifying the referents through context. The conceptual complexity emerging from the configuration of several referents, switch subject when there are one or more contrastive referents, low salience of non-human referents, the functional marking of episode closures, and lack of action-referent association are among the reasons for the writer's reluctance to use pronouns. The pronouns are avoided to counter complexity where the verbal element is not sufficient to determine the referent of a pronoun.

Table 13 presents 58 tokens of occurrences of 11 verbs listed as *planted, watered, grew, grew faster, decided, pull up, called to, come & help, pull, there was sound,* and *came flying out.* The 58 tokens of actions are themselves linked, and are associated with 103 tokens of the limited list of topical and sub-topical referents: *TS, ET, OM, OW, G, D, C, M, NOISE.* If the 58 tokens of predications were all different verbs, it would be possible for the story to be devoid of effective ambiguity. In order for a text to be free from effective ambiguity, it is necessary for it to contain fewer numbers of topical referents and a greater number of distinguishing actions contributing to a conceptual frame. Continuity of the same actions carried out by several participants adversely affects the pronominalisability of the referents associated with them.

Table 14. The association of the agentive referents with events. The bolded verbs are void of unique association because they are associated with more than one agent.

Old man	Turnip Seeds	Enormous Turnip	Woman	Girl	Dog	Cat	Mouse	They
Plant	Grew	Grew Faster	**Come**	**Come**	**Come**	**Come**	**Come**	**Pull**
Water		Grew Enormous	**Pull**	**Pull**	**Pull**	**Pull**	**Pull**	
Decide		Not Moved	**Call**	**Call**	**Call**	**Call**	**Call**	
Pull		Sudden Noise						
Called		Came Out						

In Table 15, an abstract representation of what is assumed to remain as an instantiation of the entire story is presented. This is the manner the 'wholeness' of the story is utilised for coreference resolution. Verbs that are connected with only one referent can easily issue the plausibility of their arguments; the full NP's are used to mark an already identifiable referent. But verbs that are connected with several referents are weak in extending plausibility to the referents that are connected to them. Where the actor is associated with an act to which no other actor is associated, the effect of ambiguity is null; whereas if the same verb is associated with several referents, the effect of ambiguity is decisive in making a nominal choice. A limited number of topical and subtopical referents are associated with a potentially indefinite number of actions throughout the story.

In accounting for potential ambiguity, it is important to note how much the referent is developed and where in the story it is located. Ambiguity is the sole determiner of referential choice in environments where context is not informative in indicating the most plausible referent associated with a given predicate. Table 14 shows that pivotal information related to anaphor resolution is available in the semantic outline of the story. It is claimed that every written text presents a world which may or may not be compatible with the real world. Within the world evoked, inferences are natural and are made frequently in order to figure out implicit propositions which are related to the structure built. Among the sources which provide referential information, context is significant. It

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is inferentially possible to figure out which referents are associated with which actions; therefore, divisions can clearly be made between the characters of the story as for the plausibility that is issued for them through the predications.

The support of context in constraining potential ambiguity leads to the formation of a hierarchy of referential difficulty which determines the semantically variable significance of the use of full NP within various NP slots. When the referent is easy to identify, a pronoun is almost always expected; and when identifying a referent is very easy, using a full NP is not considered to be appropriate and hence the reader clearly detects an infelicity. But a full NP is chosen for convenience when it is slightly difficult to identify the intended referent through context. It is preferable to use a full NP if, according to the writer's estimation, a given referent is difficult (or very difficult) to identify through context. Under these conditions, if a pronoun is used, the resolution of coreference will be more or less problematical for the addressee; although identifying the referent from the context will not be impossible. A skilful writer reaches a compromise between economy of coding and the ease of coreference resolution.

The thrust of this study is that identifiability is a more comprehensive concept than accessibility which reflects short term and episodic mental storage. It is important to note that a referent that is difficult to identify from context is of low accessibility, while one easy to identify is accessible; however, identifiability is not at all constrained by referential distance. The identifiability of discourse referents depends on how informative their context is, while their accessibility depends on where in the previous context the referent in question was mentioned, provided that referential competition does not interfere. The assumed association between salient referents and the predicates connected with them is a long lasting one, not constrained to the activation of referents within the episode limits. Verbal associativeness operates to enhance global referential givenness through 'semantic wholeness'. In general, context is complementary to the use of referring expressions, providing referential informativity. The analysis of the narrative data supports a hierarchy of difficulty as follows:

Full NP impossible to identify > difficult to identify > ea y to identify > Ellipsis

Table 15. The display of verbal association and the semantic links in Turnip story.

PLANTED
WATERED
PULLED
CALLED
COME HELP

SCHEMA OF THE STORY:
FEMALE TO MALE
MALE   TO FEMALE
HUMAN TO ANIMAL
ANIMAL TO HUMAN
HUMAN TO TURNIP
ANIMATE TO TURNIP
ANIMAL TO ANIMAL
HUMAN TO HUMAN

PULL AGENT

PULL PATIENT

CALLED TO AGENT

CALLED TO PATIENT

OM
OW
G
D
C
M

GREW ———————————— TS

GREW FASTER
NOT MOVE
CAME OUT

T
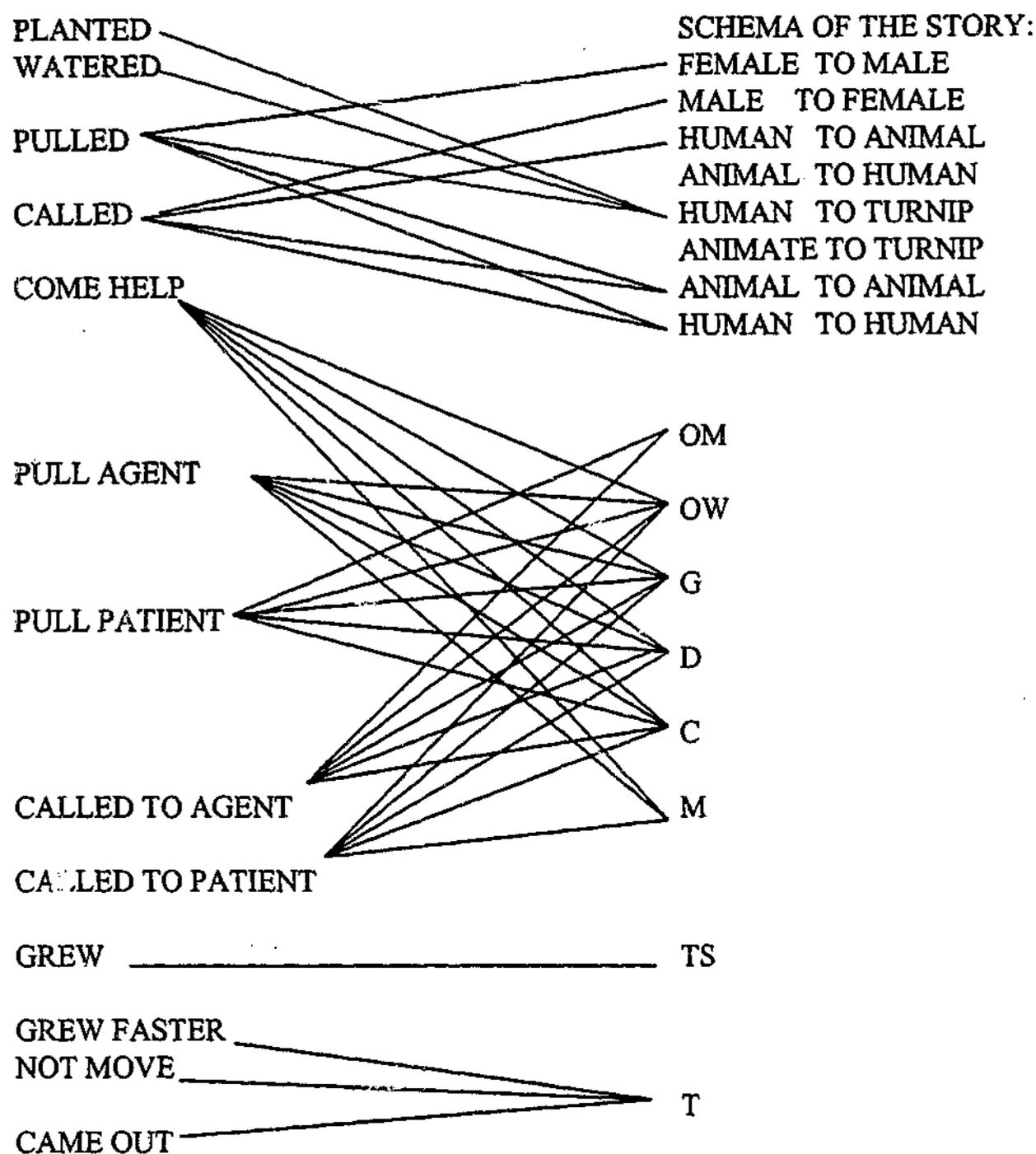
The action-referent association is the function of a complete discourse file which is formed by the text in correspondence with the unconstrained semantic shared knowledge of the communication participants and hence implies the involvement of semantic memory. The process of anaphor resolution in discourse resembles a file updating operation system which represents the dynamism in the discourse referents' growing familiarity for the reader. The anaphoric expression marking the topical participant of the story circumscribes a dynamically growing quantity of information (cf. Van Dijk 1977, Adams 1980, Beaugrande & Dressler 1981). The referential forms mark an already existing relation between previous, current, and subsequent mentions of the topical characters. As Halliday and Hasan (1976) have confirmed, pronominal reference and the relation it represents between itself and its antecedent is one of meaning rather than one of form and the

continuity that is created is a semantic continuity. Beaugrande and Dressler (1981) asserted that there is continuity on the semantic level, consistency and unity in sense among the concepts and knowledge that are activated by the expressions of the text. On the structural level, we can hardly perform full investigations into the events of connectives, transition markers, anaphora, and the marking of definiteness.

We showed in this section that, without first considering the interplay of context, ambiguity cannot be thoroughly measured; a view of potential ambiguity must consider the accessibility which results from the action-referent association. It was shown that referential ambiguity is constrained by context, but only one competing referent located anywhere in the discourse can create effective ambiguity undermining the accessibility brought about by referential salience and the recency of the prior mention; it demands that a full NP be used as the only means of removing ambiguity. Frequent use of full NP's for marking given discourse referents can be due to ambiguity neutralising the influence of referential salience and recency of prior mention on triggering a pronominal choice. A text which contains frequent subject switches contains a much greater frequency of full NP's than texts which do not contain subject switches. The wholeness of the text is an indispensable condition in accounting for referents' identifiability and how ambiguity is realised.

5.3 Summary And Conclusion

In this chapter, we have exemplified and illustrated the phenomenon of ambiguity by simple examples and also through analysing a short piece of written narrative discourse. Anaphor resolution involves context and the use of the referring expressions as well, both of which integrated, in the sense that an account of discourse coreference is not complete without considering the two. We have established that ambiguity is not an unconstrained notion as has been supposed by the functional studies (cf. Clancy 1980, Givón 1983, 1989, Ariel 1990). When ambiguity is present, it easily overrules the effect of salience and referential recency on triggering a pronominal choice; however, ambiguity must be considered along with the constraining effect of context. The identification of referents in ambiguous environments depends primarily on the inferences through context. We focussed on the inferences through two types of relations in the world evoked by the story; the association of actions with referents related to them and the link between verbs constituting a conceptual frame.

Pragmatic inferences including ad hoc and non-ad hoc ways of specifying referents, e.g., the systematicity of the series of actions associated with an orderly organised set of referents, is

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informative; but in this specific story it did not lead to using pronouns. We perceived, through the examination of context, that the degrees of identifiability for ellipted discourse referents through context are variable. The lower the degree of difficulty of retrieving the referent, the higher is the likelihood of a reduced form occurring in the referential slot. It seems reasonably clear that the action-referent association systematically eases co-reference resolution when ambiguity is present.

CHAPTER SIX
CONCLUSION and IMPLICATIONS

In this final chapter, we present a summary of the salient findings of the study and offer new perspectives on the current theories by incorporating the role of context into the task of anaphor resolution. This thesis reveals some observations about discourse anaphor resolution in relation to the function of context in identifying the salient referents and the discourse cognitive constraints that affect the choice of anaphoric expressions. In chapter three, we proposed a hypothesis called referential freedom of choice, from which a more encompassing hypothesis emerged in chapter four: action-referent association. Needless to say, the findings summarised here pertain to the set of data collected and analysed for this particular study. Global claims regarding discourse coreference resolution require a more extensive range of data and a wider range of factors should be examined. This should be kept in mind while interpreting and generalising the findings.

The present study has focussed narrowly on limited modes of discourse in examining how subjects use context to identify ellipted referents and respond to the functional pragmatic constraints on the use of anaphoric expressions. Due to time constraints, this study did not deal with the differences in a large number of subjects within and across the same and different ability groups. Using different modes, collecting a larger corpus of data, and eliciting data from precisely the same ability group and through different methodological procedures would yield more accurate results. Different genres, registers, and social varieties of language may also yield differences in the uses of anaphoric devices. A broader data base would offer several advantages. A larger amount of data provides the possibility of using inferential statistical analyses rather than descriptive statistics. In order to investigate the effect of conflicting factors, data could be collected from the populations of subjects filling the NP slots of long texts among which we can select slots in which only one factor determines the referential choice and compare these with NP slots in which there is more than one factor determining the choice. In this way, we could examine the interplay of the conflicting cognitive factors in determining referential choice.

In the course of this thesis, we suggested that the resolution of anaphora is concerned with not only the structural, syntactic, and the functional levels of representation of discourse, but also with a semantic level of representation. The functional observations show that referring expressions are arranged on a conventionally constrained basis. But topical entities are mostly identifiable through what they undergo or undertake; and this is how context complements coreference. Given the fundamental assumption of this study that context and formal

indications of referents are both involved in anaphor resolution, anaphoric relationships should be considered in general as dynamically growing relationships; and so-called topic continuity is a semantic continuity.

Context is a combination of three sources of information representing the textually shared knowledge, the knowledge of the situation in which the discourse occurs, and the culturally shared knowledge of the world around us: a hierarchically structured body of information that is used in drawing inferences according to the discourse events. The linguistic presentation of the world through explicit propositions introduces an abstract model of the world in question; there are always some implicit propositions inferable through the shared textual and general knowledge.[1] For the world to be completely evoked, both the explicit and the implicit propositions are necessary. The three context types (textual, situational, and semantic) are three interrelated sources of information; and they are hierarchically related to form a common ground between the writer and the reader.

Inferences are possibly made for figuring out who did, does, and is likely to do what. The actions that occur within the world and help construct it are associated with a limited number of salient referents, in the sense that the verbal element is a clue for inferring which referents appear in the NP slots. Similarly, the appearance of a referent in an NP slot implies which predications in previous and later stages of the discourse are likely to be associated with it. Within this integrative semantic model, the identifiability of a given referent depends on three possible sources: a) the verbal elements of the text prior to the sentence in which a given referent is mentioned; b) the semantic information in the sentence carrying the mention of the referent in question; and c) the informativity of the linguistic referential marker used to mark the intended referent.

Chapter one was devoted to some interesting aspects of coreference and factors such as referential distance, focus within episodic structures, salience, and potential ambiguity which

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[1] As regards the pragmatic inferences involved in the processing and resolving coreference, several pragmatic approaches to discourse have tackled the issue which could possibly have been used for our purposes; however, we took the basis for inferences to be context. The theories of presuppositionality (Stalnaker 1978), implicatures (see Allan's interpretation (to appear) who believes in a pragmatic notion of presuppositionality), scripts, mental spaces (Fauconnier 1985), worlds spoken of (Allan 1986), and mutual knowledge (Clark and Marshal 1981) are all related to how anaphoric relations are resolved. No matter which view is taken, inferencing through context plays an important part in anaphor resolution. Scripts relate to a dynamic view of discourse in which the events are inferred to be related and predictable. We made mention of pragmatic presuppositions. A discourse production process is believed to be a process of assertions and presuppositions. The more propositions are asserted, the greater will be the amount of the presupposed information and the more limited will be the context set and the number of the possible worlds. We further made mention of implicatures which are pragmatic inferences based on context. The inferences drawn from the world spoken of assist the process of discourse understanding: readers are expected to be able to access the knowledge enabling them to work out what are the typical entities and happenings of a given world.

have been considered as functional constraints on discourse coreference. These factors influence accessibility and the choice of anaphoric expressions.

The research questions of the three research projects reported in this thesis are briefly recapitulated as follows:

1. On the discourse level, anaphoric expressions are claimed not to be used on a random basis. There are constraints which affect their choice. It is useful to know how strongly subjects respond to the need of marking discourse referents by considering the cognitive constraints: referential distance, ambiguity, salience, and the focus of attention within episodic units.

2. The importance of the role of context in anaphor resolution has been recognised by many studies. Cognitive evidence drawn from many data based studies shows that episode is generally the boundary within which referents maintain their activation status. However, these studies do not properly account for the general importance and hence identifiability of the referents through context. The use of long distance pronouns is documented in actual discourses and is hypothesised to be the result of the long lasting identifiability attained through context.

3. It is advantageous to investigate how the interference of competing referents is realised in discourse. Ambiguity cannot be properly defined as the measurable effect of the presence of competing referents. Potential ambiguity can be effectively constrained by context, and when unconstrained, it often motivates an obligatory selection of a full NP.

Chapter two presented three distinct paradigms for studying anaphor resolution. The givenness approach maintains that a sentence carries two types of information: old and new. Old information is usually the theme and the starting point of a clause and the new information follows it in the rhemic part of the clause. The discourse interpretation of the notion of givenness is applied to concentrate upon the status of entities within discourse episodic boundaries without explicitly dealing with the arrangement of the discourse anaphoric expressions.

In chapter two, we further reviewed those theories which scrutinise referring expressions rather than the status of referents in relation to context. Topic continuity (Givón 1983, 1989, 1990) displays the iconicity of language in relation to function; and shows that the accessibility of discourse referents is marked by the referring expressions on a non-arbitrary basis. Accessibility theory (Ariel 1988, 1990, 1991) presumes that the accessibility of the topical referents dominates the choice of the referring expressions. A correlation is sought between the degree of accessibility of the topical referents and the degree of attenuation of the accessibility markers. Accessibility theory reflects three major pragmatic and experimental approaches to

discourse: psycholinguistic studies dealing with the processing aspect of the referring expressions; the studies on context in relation to the givenness status of referents; and the presuppositionality as indicated by the types of the referring expressions. We concluded that distance theories have the disadvantage of providing us with only a probabilistic account for discourse reference. Moreover, the factors governing the accessibility of referents fall short of accounting for the significant role of context.

The last section of chapter two reviews the focus approach within linguistics, cognitive science, and artificial intelligence. Especial attention was given to Fox's organisational approach to the study of anaphora in conversational and written expository English (1984, 1987). Within this framework, the thrust is that while in focus, a given referring expression does not undergo suppression under the effect of long distance from its antecedent, and the limits for the allocation of focus are the paragraph boundaries. This approach to anaphor resolution cannot deal adequately with potential ambiguity and optionality in the use of referring expressions. The vagueness in the definitions of propositions and paragraphs as units of analysis and the subjective nature of the discourse structural judgments are difficulties affecting the validity of the discourse structural accounts. A structural account does not distinguish between when full NP's are optionally used to convey the pragmatic functional intent of the individual writer and when their use is obligatory as a result of the adverse effect of ambiguity. We observed that in a hierarchical account, the associated presumption requires that the rhetorical structures are hierarchies based on pragmatic judgements about what information is central and what is peripheral. The rhetorical tree does not necessarily have to be dependent on the linear order of propositions. However, it was shown that change of the order of the propositions could impact on the choice of anaphoric expressions. Indeed, anaphoric relations are linear relations as much as they mark the hierarchical organisation.

Through these contributions, we were led to present an account in which pragmatic inferences based on context are used to resolve anaphoric relations. Within this framework, certain characters accumulate salience through actions attributed to them and so are identifiable through pragmatic inferences. We conducted three projects in order to examine: a) the recognisability of the cognitive constraints in determining the choice of anaphoric arrangement; b) the function of context in the task of identifying referents; and c) the effect of ambiguity in relation to context.

Chapter three examined the recognisability of the functional constraints on the use of the referring expressions. It was demonstrated that through a purely productive task (e.g. a story writing performance) we cannot elicit data which are useful for the particular aim our study

pursues.[2] In an experimental task in which subjects were asked to fill the empty NP slots by choosing appropriate referring expressions, the referential selections were compared and explanations were presented for why some referential selections varied across different individuals. Various structural and non-structural[3] factors are at work to determine the choice of the anaphoric expressions. Each NP slot is unique in how strongly it motivates the subjects' prototypical selection of a common referential device. The fact that the discourse constraints governing the choice of anaphoric expressions belong to the subconscious awareness of the subjects resulted in some idiosyncratic referential styles. It is claimed that the patterning of each text is sufficiently distinct to possess its own characteristics. The reasons include: a) some producers are conservative in their patterning of reference; b) the interplay of several factors occasionally makes it difficult to make appropriate referential selections; and c) there appears to be a degree of stylistic freedom in referential choice. Crude quantitative data were offered to indicate roughly the extent of the similarities and differences among subjects in making referential choices.

Chapter four reported a more comprehensive complementary project with its assumptions founded upon the previous chapter which claimed that anaphors are part of a process of redundancy reduction, consonant with what Grice (1975) called the cooperative principle. It compared the performance of native English speaking subjects in a twofold task involving: a) the comprehension of a piece of expository text with empty NP slots; and b) production of appropriate forms of referring expressions. The assumption was that a theory should describe situations in which speakers should clearly avoid pronouns but they don't, or they should clearly use pronouns but don't. The observation revealed that anaphoric expressions achieve two different tasks: a) maintenance of the identity of referents complementary to context; and b) marking optionally the pragmatic (general and personal)[4] functional intent of the text

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[2] The problems include: subjects may write narratives of variable length; they may choose to elaborate the interactive parts more; they may apply their skill to use ellipsis more frequently through creating the appropriate environment; they may use the same language skill in order to create appropriate contextual environment to use a higher frequency of pronouns; and they may decide to introduce a greater number of insignificant referents into their stories and hence create conceptual complexity.

[3] Non-structural factors are the factors that are less generalisable and need ad hoc explanations. Fox (1987) pointed out that local exigencies may necessitate exceptional non-structural choice of anaphoric expressions which require ad hoc explanation. Clancy also mentioned that switching between different worlds may cause unusual referential choice. Taking the view point of the characters of the story in making reference to other characters requires the use of an unusual referential choice. As was reported in chapters two, three, and four, the use of the referring expressions may be for conveying the pragmatic referential intent of the writer, e.g. to indicate that the environment is formal, a last name is more appropriate than a first name; or a full NP may be useful in inviting a pragmatic inference (in chapter five, we observed that the full NP, *the enormous turnip*, was used repeatedly although the referent was easily identifiable).

[4] General pragmatic functional principles are tendencies at work which predictably direct referential patterns of groups of subjects in prototypical terms. However, there are some functional tendencies that are personal, making the individually written texts idiosyncratic. In other words, the so called cognitive constraints direct the general pragmatic tendencies observable in prototypical performances of groups of subjects. But the personal pragmatic tendencies require ad hoc explanations and convey the pragmatic intent of the individual writer.

producer. It was concluded that by focusing on the status of referents via viewing the associative capacity of verbal elements, a reliable account can be given which does not depend on the pragmatic indications of the use of the formal expressions. Additional tests provided evidence for the conclusion that the continuity hierarchy functions as a constraint on the selection of anaphoric devices. However, the continuity claims are only statistically based.

Chapter five verified the role of context in reducing the effect of ambiguity and showed that, from a contextual stance, ambiguity is understood with a different sense from what has been presented hitherto. The effect of referential ambiguity in determining the choice of full NP's is more decisive than the effect of salience and recency. By taking into account the informativity of context, we can distinguish between whether or not the presence of other competing referents creates ambiguity. Two things facilitate anaphor resolution: the links between verbs which constitute the story world (and perhaps script), and the association of the verbal expressions with salient characters. When a full NP occurs, it may be either because the information it contains is necessary to identify the referent in the absence of assistance from the action-referent association; or, alternatively, because it is used to invite some pragmatic inference which is secondary to the maintenance of the identifiability of the referent in question. We concluded that a full NP is preferred to a pronoun when the referent in question would otherwise be difficult or impossible to identify through context. In this sense, anaphor resolution is a process of removing referential difficulty either by using a full NP or through inferences based upon the informativity of context.

Further research may be conducted on seeking a correlation between the degrees of referential difficulty and the choice of nominal expressions. Additionally, It would be useful to know about the precise relation between accessibility and identifiability. Identifiability is a lasting effect of context and is not limited to episode boundaries reflecting the function of short term and temporary memory storage. We know that there are degrees of accessibility, but they do not correspond with degrees of identifiability. The degrees of accessibility are factors of temporary memory storage; while degrees of identifiability are related to long term memory storage and demand a different treatment. Further investigation is required to study the nature of the relationship between the two.

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