

Anaphoric and Referential Chains in Discourse

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The main assumption of this paper is that equi-reference in natural discourse is obtained by means of two distinct calculi: anaphoric links, linguistically based, which draw a direct connection to a previously uttered mention, and referential links, which are obtained indirectly, by means of communicative inference between two wide pedantically process of expressions. A revised notion of the opposition between *anaphoric* and *referential* chains (originally introduced by C. Chastain, 1975) is set up along these lines and a typology of anaphoric links (pronominal, demonstrative, definite) is sketched out in this framework.*

0. Introduction.

The notions of anaphoric chains and referential chains were originally introduced by C. Chastain (1975) in a paper whose central topic is an approach to the theory of reference based on the idea that singular reference is basically a kind of connection between a token and a thing.

In this paper, I will develop a linguistic analysis of referential connections in discourse. The main assumption guiding this analysis is that some linguistic expressions ("anaphors" in a rather wide and non technical sense) involve, as a defining property, an interpretative connection to mentions of their context of use, whereas other expressions do not involve such a connection and can only be linked to other mentions via communicative knowledge.

A revised notion of the distinction between anaphoric chains and referential chains is set up along these lines, and emphasizes the composite nature of equi-reference relationships in natural discourse. Equi-reference chains are to be seen as a mixture of *anaphoric* connections (linguistically based) and *referential* connections (communicative in nature).

1. *Anaphoric and referential chains in Chastain (1975)*.

Chastain provides the following definition of anaphoric chains:

- (1) "Let an anaphoric chain be a sequence of singular expressions occurring in a context, such that if one of them refers to something, then all of the others also refer to it."
Chastain (1975: 205)

* I am very indebted to Marlene Dolitsky, who read the last English version of this paper and suggested many corrections.

This definition is based on an implication:

Let E (a b c d ...) be singular expressions in a context.

a... b... c... d is an anaphoric chain iff:

$\forall x \in E(x R i)$; with $(x R i) = 'x$ refers to the object i' .

Chastain does not explicitly address the question of when and why such an implication holds. He relies on "grammarians" for the underlying concept of "anaphora", and provides only samples of sequences falling under the concept of anaphoric chain, as opposed to sequences falling under other concepts (mainly referential chains). Thus, it will be necessary here to take as a starting point the contrast between the paradigmatic examples of Chastain.

1.1. Anaphoric chains

- (2) "At eleven o'clock that morning, an ARVN officer stood a young prisoner, bound and blindfolded, up against a wall. He asked the prisoner, several questions, and when the prisoner₂ failed to answer, beat him₁ repeatedly. An American observer who saw the beating₁ reported that the officer "really worked him₂ over". After the beating₂ the prisoner was forced to remain standing against the wall for several hours."¹

According to Chastain, this passage contains the following anaphoric chains:

- (3)
- I. "that morning"
 - II. "an ARVN officer-he-the officer"
 - III. "a young prisoner- the prisoner₁-the prisoner₂-him₁-him₂-the prisoner₃"
 - IV. "a wall-the wall"
 - V. "an American observer who saw the beating₁"
 - VI. "the beating₁-the beating₂"

1.2. Referential chains

- (4) "(...) suppose that I am reading the morning newspaper and I come across the following story:
D 7: "Houston, Texas, March 10 (UPI) - Dr. Michael DeBaakey stated at a press conference today that an artificial heart could be developed within five years. The famed Baylor University heart surgeon said that such a development would make heart transplants unnecessary."²
- (5) "I then report the fact to you by saying:
D 8: "A doctor in Texas claims that artificial hearts will be developed within five years."³

Following Chastain,² it is possible to trace a "referential connection" "between a doctor in D 8 and a particular person", and "I am not merely claiming that the class of Texas doctors making the aforementioned claim is

¹ Example D4 of Chastain (1975: 205).

² *Op. cit.*, pp. 212-215.

not empty." The two expressions are said to be referentially linked in a referential chain.

Chastain accepts these two notions as primitive, assuming (rather rightly) that the difference between the two kinds of connexions exemplified by (4) and (5) is very clearcut, but he does not try to offer an explanation for the existence of these contrastive data.

Now it is obvious that the understanding of these notions will only be improved if we can formulate their characteristic empirical properties, especially the distinctive ones, and if we have some theory to account for them.

I will now briefly survey the kind of definitions inferable from Chastain's formulations, and show that none of them could be taken as a firm basis to capture the intuitive distinction under consideration.

1.3. Positions of terms in chains

The general concept of chain allows for a distinction among sequential positions, minimally to distinguish between I-position (initial) and N-positions (non initial). It might be the case that two kinds of chains can be contrasted according to the position that different terms can occupy in them.

Roughly speaking, Chastain assumes the following rules concerning indefinite expressions: let x be an indefinite expression in a chain; if x is in an N-position, the chain is a referential chain; if x is in an I-position, the chain is an anaphoric chain.

Indefinite expressions are thus crucial in distinguishing between the two concepts, since Chastain assumes (6):

- (6) An indefinite expression can only be a first term in anaphoric chains.

He doesn't explicitly assume the converse (7):

- (7) The first term of anaphoric chains can only be an indefinite expression.

However, the discussion of chain VI (VI. "the beating₁-the beating₂"; cf. 2-3 supra) suggests that Chastain is sometimes inclined to assume implicitly this thesis:

- (8) "(VI) begins with a definite description, "the beating", but it is clear that the beating in question is the one first mentioned in the second sentence of the text; we can therefore think of the first link of (VI) as being an indefinite description - perhaps a bearing of the young prisoner by the ARVN officer - which would appear after a deeper analysis of the second sentence."³
Chastain (1975: 205-206)

Two subsets of "indefinite expressions" are distinguished as far as chain formation is concerned: some terms like "a man" can be connected to something else (although this is not necessary), and some terms like "nothing" cannot. They are "referentially segregated".

³ This is confirmed by the accompanying footnote 22: "If an anaphoric chain begins with a definite description which is a singular term in that context, then, the context is in a sense incomplete or elliptical. Most linguistic contexts that actually get uttered are of this sort."

In contrast, the singular terms considered by Chastain do not make a clearcut distinction between anaphoric and referential chains. Proper names are assumed to occur in all the positions that the theory of chains can recognize (see below). Other singular terms (definite and demonstrative NPs) are assumed to occur only in N-positions of anaphoric chains (cf. 8 supra, and footnote 3).

These observations capture only correlations between an intuitive distinction (R-chain Vs A-chain) and the distribution of terms. To set up a theory provided with some explicative concepts and definitions, one must try to draw an explicit link between the correlated observations. For example, what must be said about the distinction between R/A-chains and about the semantics of indefinite terms in order for the correlated distributions just mentioned to be accounted for?

But these constraints on the distribution of terms in chains are taken by Chastain to be a semantic definition of indefinite expressions. The notion of anaphoric chain receiving the status of a more fundamental concept of the semantic theory than the notion of indefinite interpretation,⁴ the latter cannot be used to explain the nature of the former.

1.4. *Links between contexts and links within contexts*

Chastain (*op. cit.*, p. 214) states that anaphoric chains hold *within* contexts, whereas referential chains hold *between* contexts. The paradigmatic examples contrast links within a single discourse (2) with a link between two discourses (4-5).

Could this opposition be taken as the basis of a definition for the opposition between A-chains and R-chains?

First, this idea would imply that we had strict individuation principles for "contexts", and that these principles are independent from the interpretation of terms involved in chains (relying only on external factors). The notion of context used by Chastain has a very large extension ("Anything which expresses something or represents something is a context", p. 195), and rather curiously, context is not a relational notion: something is a context, not a context *for* something. Context seems to be taken as an interpretable entity, larger than elementary interpretation units.⁵ Chastain gives no principle of individuation for those entities; he gives only two paradigms of examples: to exemplify anaphoric chains, single monologic narrative discourses (cf. 2), and to exemplify referential chains, reported discourse (cf. 4-5). Nevertheless, the theoretical import of the distinction depends on the possibility that explicit

⁴ "The difference between indefinite descriptions and definite descriptions is that the former can only be used to initiate anaphoric chains and the latter only to continue them." "the difference is in a sense merely stylistic..." (*op. cit.*, p. 206). For a discussion, cf. Corblin (1985, 1987); Chastain's theory of indefinites is discussed in Heim (1982).

⁵ It is worth noting that for Chastain a context is not a part of the world itself, but something which "represents" things, i.e. a symbolic entity.

independent principles for context individuation can be formulated, which is not an uncontroversial idea as we will see later.

Now let us consider only the paradigmatic cases mentioned above, and suppose they provide clear examples in which a link *within a context* can be contrasted with a link *between* two contexts. If these barrier-like constraints were necessary conditions for the formation of anaphoric versus reference chains, one would expect that R-chains are impossible within a single context whereas A-chains are impossible from one context to another. That would follow from the respective definitions of these kinds of chains. But examples like (9) seem to be direct refutations of such a claim.

(9) (John_i consulted Dr Lauben_j. This boy_i consulted a doctor_j because he felt sick)

The sequence enclosed in brackets is supposed to be formed by two successive utterances of a single monologic discourse. A *doctor* can only be tied to *Dr Lauben* by an R-chain,⁶ but *this boy* is presumably linked to *John* by an A-chain. The mere possibility for A-chain and R-chain to be instantiated in a single sentence shows that these notions cannot be defined as intra contextual versus inter contextual connexions.

Chastain gives the following account of proper names:⁷ proper names can be anaphorically linked with a singular term if the two expressions are in the same context; otherwise, a proper name can form a referential chain with a term of another context, unless the proper name is used to initiate a new chain. There are several obvious inconveniences in assuming this account for proper names:

- 1) "grammarians", as Chastain calls them, would never -as far as I know - speak of anaphora for proper names;⁸
- 2) proper names are provided with four distinct roles or positions: N-position in an anaphoric chain, N-position in a referential chain, I-position in an anaphoric chain, I-position in a referential chain.⁹

The most important point is the second one; the first one would just mean that the theory is based on a revised concept of anaphora, which remains to be made more precise. The analysis of a form as n-ways ambiguous is not per se an objection against a theory. Nevertheless, it is commonly accepted that the theory should not make more distinctions than necessary. In the case of proper names, it seems that the distinction is merely an artefact of the theory itself: there are not four radically different uses of proper names reflecting the same differences as the opposition between the uses of indefinites as exemplified in (2), in (4-5) and the use of a pronoun in anaphoric chains.

⁶ We will come back later to this particular use of indefinite NPs.

⁷ *Op. cit.*, pp. 215-219.

⁸ For a discussion about the content of the notion of anaphora (intension and extension) cf. Corblin (1985).

⁹ The contrast between the first term of A-chains and R-chains doesn't play any role in the theory of Chastain.

We can sum up this survey of Chastain's analysis of chains as follows: the distinction between A-chains and R-chains is used to capture a very clearcut contrast between some paradigmatic examples of sequences in which a given object is mentioned several times. Chastain doesn't attempt to provide a theoretical analysis of this contrast, and doesn't actually discuss the application of this distinction to other examples. He accepts these notions as primitives, and doesn't provide definitions, but only some correlated distinctive properties. Two of them are of particular interest: the position of indefinites in the two kinds of chains (I-positions in A-chains, N-positions in R-chains), and the perception of a "context-shift" for R-chains, while A-chains seem to be bound within a single context.

We will now try to provide an analysis of the opposition between A-chains and R-chains. Chains will not be taken as primitives, but as a product of interpretative rules governing linguistic categories. The opposition will therefore be provided with a different conceptual content, which leads to different applications of these two concepts. For instance, proper names in N-positions will only be considered as members of R-chains (cf. contra Chastain quoted above). Nevertheless, the distinctions made by Chastain about the paradigmatic examples (2) and (4-5) will remain non affected. This paper can thus be seen as an attempt to provide an analysis for the central empirical distinction of Chastain's work.

2. *The linguistic bases of chain formation.*

2.1. *Bound Vs free chains*

The distinction between free and bound anaphora was originally introduced in a generative framework by N. Chomsky (1975). The essence of this distinction is the assumption that there is one phenomenon (anaphora) with two variants. Later developments of the theory emphasized the differences between bound and free relations, casting the greatest doubts on the idea that these relations were manifestations of a single phenomenon, and even manifestations of related phenomena.

In the spirit of the original distinction, bound anaphora would be defined as follows:

- (10) A is a bound anaphor iff:
 1 - A is an anaphor¹⁰ (i.e. needs an antecedent)
 2 - the only possible antecedent of A is chosen unambiguously in virtue of a purely syntactic calculus.

A paradigmatic example of bound anaphora is the French reflexive:

- (11) Pierre, *se*, regarde dans la glace
 [Pierre looks at himself in the mirror]

¹⁰ "Anaphor" is taken here in a non-technical sense: "second term in an anaphoric link". For the technical sense of "anaphor" in the "Government and Binding" framework, cf. Chomsky (1982).

Although they were first taken also as instantiations of bound anaphora, such idioms like "X_i lost his way"¹¹ are not, since it is only in some particular lexical contexts that the third person pronoun is bound to the subject. Occurrences of pronouns most often analysed as bound variables are not bound anaphors, since the quantifier-like expression is not the only possible antecedent:

- (12) Everyone_i thinks *he_i* is right

The kind of referential connection exemplified by bound anaphora is an oriented relation between two terms which can be captured as follows in terms of chain formation:

- 1 - a term triggers a connection to its context (the so-called "anaphor")
- 2 - this connection is to another linguistic term
- 3 - the reference of the anaphor is bound by this term (the so-called "antecedent")
- 4 - the construction of the chain is fully syntactically determined.

As such, the notion of bound anaphora applies to a very narrow subset of chain phenomena. But the distinction between free vs bound anaphora actually embodies the assumption that the link between the reflexive and its antecedent is basically of the same nature as the link between the free third person pronoun and its antecedent: the syntactic nature of the calculus for bound anaphora could be seen as a particular value for a parameter specifying how the calculus of an antecedent is to be carried out. Anyway, a natural hypothesis is to suppose that the properties 1-4 can exist independently, and possibly with different parameters. This would provide a basis to distinguish several kinds of connections, hence several kinds of links in chains. I will assume this idea as a working hypothesis and will present a general typology of chain connections designed along these lines.

2.2. *Connections by free pronouns*

Only free chains will be considered, i.e. chains whose formation is not completely achieved by means of a syntactic calculus.

The notion of bound anaphora embodies, by definition, a global answer to three crucial questions regarding the context relevant for the formation of chains: "what" (nature), "where" (location), "which" (relevant subpart); bound anaphora works on linguistic expressions in a syntactic domain, and the subpart of this relevant syntactic domain (the "antecedent") is syntactically recruited.

As for free chains, none of these questions receives an obvious and uncontroversial answer.

Consider for example free third person pronouns (*he, she, it*). A commonly admitted idea is that they cannot be used without being linked to something,

¹¹ Cf. Chomsky (1975).

difference between an actual mention and something like the inference of such a mention from the situation.

The crucial point in my theory is that a pronoun is not linked "directly" to a referent, but is linked to a domain including the *mention* of a referent. This theory is in accordance with the linguistic intuitions about the interpretation of pronouns and receives obvious confirmations from languages like French where gender is arbitrary and where pronouns include gender features. In those languages, in order to interpret a pronoun of a given gender, one must take for granted that the context provides a mention of the referent by means of an NP of this gender. Gender is a property of Nouns, not a property of referents, so a given gender can only be obtained by a specified mention, actual or inferable from the context.

Following a suggestion due to the French linguist L. Tesnière (1959), I will introduce a slightly revised terminology. A pronoun requires an associated domain containing what I will call its *source*. An actual mention in the preceding discourse providing this source will be called the *antecedent* of the pronoun. This terminology could shed some light on questions very often debated about in the literature.

The unmarked case is the identity between source and antecedent, which can be straightforwardly deduced from my theory of pronominal interpretation, and from Relevance theory (Sperber and Wilson, 1986). From a purely linguistic point of view, an actual mention provides exactly what is required for the interpretation of a pronoun. Moreover, according to relevance maxims, what was uttered before, is supposed to be relevant, with minimal inferencing, for what is uttered. It is worth noting that this theory doesn't imply a strict identity between the antecedent and the source. For example in (16):

(16) A man entered. He smiled.

The antecedent of *he* is *a man*, but the source, involving a fixed referent, is derived from the interpretation of the complete previous sentence.¹⁵ Similarly, this theory offers a framework where some well known pronoun puzzles reviewed in P. Bosch (1983 : chap. 5) are no longer puzzles as such - even if they remain to be properly accounted for - since the theory doesn't presuppose a strict identity between the antecedent and the source.¹⁶ In the same way, the conclusions of F. Cornish (1988: 233) according to whom "agreement" of anaphoric pronouns in gender and number is not a necessary condition for pronominal anaphora, since "the speaker is able to manipulate these features to achieve a variety of references to a particular discourse referent" can be viewed as a natural consequence of the distinction between antecedent and source. From the antecedent to the source, some "bridgings" are allowed under linguistic and pragmatic constraints.

¹⁵ Therefore, indefinite antecedents cannot be taken as an argument for the referential nature of indefinite NPs (cf. Corblin 1987a, and contra, Chastain).

¹⁶ The discussion of these paradoxes (i.e. Bach-Peter sentences, donkey sentences, paycheque sentences, etc.) is far beyond the scope of this paper.

Nevertheless, the possibility remains of using a pronoun without an antecedent, so long as the physical surroundings or the mental state of the speakers can provide an appropriate source, i.e. can have the same effect as an actual mention. The difference between the so-called anaphoric and deictic uses of pronouns is nothing but a difference in how an appropriate source is obtained.

Anaphoric links

If this conception of pronominal interpretation is correct, the construction of pronominal anaphoric chains can be described as follows. A pronoun is linked by anaphora to its antecedent, i.e. to an expression which is taken to provide the intended source for the use of this pronoun.

So, the capacity of a form to occur in a pronominal chain depends on its pronominal anaphoric properties (N-positions) or on its capacity to provide a source for a pronoun (I-positions). From the linguistic properties of the pronoun itself a first selection of possible antecedents can be made. The conjunction of linguistic properties and pragmatic principles can add other possible antecedents by means of bridging. The resolution of a pronoun, i.e. the retrieval of its intended antecedent, is constrained by some pragmatic principles about the retrievability of intended reference.¹⁷

We must now address the question of whether the concept of anaphoric chain could be generalized in order to apply to other constituents of chains. In Chastain's paper, definite and demonstrative NPs are viewed as constituents of A-chains, although many linguistic theories would not describe these NPs as anaphors. It will be assumed that the referential links a given expression can achieve is nothing but a consequence of the linguistic definition of the specific linguistic calculus implied by this expression.

2.3. Demonstrative NPs

Demonstrative NPs (e.g. *This man, that girl*) generally¹⁸ have a linguistic content, the so-called "Descriptive content" in Chastain (1973 : 230). It is well known that these NPs can be connected to a previous linguistic expression, which looks like an *antecedent* (the so-called "anaphoric uses"), or can be used without an antecedent ("deictic uses").

Demonstratives will be considered as *designators* (a term I borrow from S.A. Kripke). It seems plausible to think that this very category involves - it is suggested by the name itself -, as a defining property, a relationship to something else. It is most often assumed that this relationship is to an object, a referent. I will assume on the contrary that this relationship is, for demonstrative NPs, to a mention which in its turn provides a referent. Some theories of demon-

¹⁷ Resolution of anaphors is considered along these lines in Corblin (1987b).

¹⁸ Except for demonstrative NPs like *ça, cela, ceci* in French. Cf. Corblin (1985).

strative reference seem to make a very similar assumption when claiming that the referent of a demonstrative NP must be provided by an "associated demonstrator", i.e. a pointing to what will be taken as the referent of the demonstrative NP.¹⁹

So, I will make the hypothesis that a demonstrative NP requires an associated domain containing a mention which provides its referent. This stipulation is very close to what was stated above about pronouns. Nevertheless, there is an important difference: for pronouns, the need for the associated domain is due to their definition as unsaturated NPs; for demonstrative NPs the stipulation in question is related to their definition as designators, or more precisely, as designators deprived of specified means to achieve the referential calculus involved by the category *designator*. This theory of demonstrative designators is developed more explicitly and more at length in Corblin (1987a). One could ask whether it is correct to use the same term ("mention") for pronouns and demonstratives. For Kaplan (1977), the associate of demonstratives is – quasi tautologically – called "demonstration". Some more precisions, however, are needed in order to justify my own choice. In fact, "mention", as I use it as a generic term, applies to sources, and doesn't involve as such the representation of a linguistic content. Something is a mention if it counts as a pointing to an object in such a way that a linguistic mention of this object becomes possible. In the case of pronouns (at least in the case of French personal third person pronouns), the relevant mention-source must include a linguistic content, whereas in the case of demonstratives, there is not such a requirement (cf. Corblin, 1987a).

The question whether it is correct to consider demonstrative NPs as anaphors may be seen as a purely terminological one, provided that the different classes of expressions falling under this concept receive a precise characterization, and provided that the very concept of "anaphor" receives an explicit content. I will assume that the primitive concept is "anaphora", which applies to a linguistically based connection between an expression and its immediate context of use, due to the necessity of providing this form with a source. Expressions for which anaphora holds can be called anaphors. In this respect, pronouns and demonstratives can be viewed as anaphors.

Demonstrative links

For pronouns (cf. above), it was assumed that the source is the pair nominal classification/referent used by the pronoun itself.

In other words, when using a pronoun, we repeat the exact content of a source borrowed from the context. A related fact is that the linguistic content of the pronoun is the principal clue for the retrieval of the intended source/antecedent.

Basically, the relevant representation is as follows:

¹⁹ See D. Kaplan (1977).

- (17) Source: (a, N_i) ex: (a, HOMME)
 Unsaturated pronoun: il (x, N)
 Saturated pronoun: il (x, N_i)

This is not true for demonstratives: first, demonstrative NPs have a descriptive content of their own, unlike pronouns; second, a demonstrative NP needs as a source only a mention, regardless of the nominal content of this mention; third, this mention must be identified as a source by external means, i.e. by means of a concomitant ostension. In anaphoric uses, the rule is roughly that the intended mention is the nearest one. The second and third points are in fact related: demonstratives imply, as a main condition on their source, external factors (ostension, proximity), and not an agreement-like linguistic relationship between the source and the NP, as pronouns do.

This leads to the following representation of demonstrative links in A-chains.

- (18) *Dr Lauben* is very ill. *This famous heart surgeon* has been living in London for ten years
 (19) Antecedent: "Dr Lauben" (a, Dr LAUBEN)
 Demonstrative source: (a, *just mentioned*)
 Saturated demonstrative: (a, FAMOUS HEART SURGEON)

The variation of the second member of the pair represents what I called the "reclassifying" effect of demonstrative reference (cf. Corblin 1987a). The referent of the demonstrative NP is grasped as "a just mentioned", the demonstrative NP achieves a reclassification of this referent as a x, x being the descriptive content of the demonstrative NP. This particular effect of demonstrative references was first brought out by P.T. Geach (1967: 40-41), who called it "act of naming".

2.4. Definite NPs

Demonstratives and pronouns both need an Associated Domain which contains a mention. In this respect, one can see them as second terms of a binary relation to a given mention.

This is not the case for definite NPs. Basically, it is only required for definite NPs that the context fix a Domain of reference within which the definite NP will be able to achieve the designation of a particular.

Among the categories used by linguists and philosophers to distinguish between definite references, two are of particular relevance for the ongoing discussion:

1 - The so-called definite descriptions of logicians: *The father of John, the murderer of Smith, the president of the U.S.A, the best piano-player in the world*, etc. They are also called *complete definite descriptions* by F. Récanati (1986)

2 - Anaphoric definite expressions, or *incomplete descriptions*: Récanati (*op. cit.*): *The boy, the girl*, etc.

Among those, Hawkins (1978) distinguishes between the strict definite anaphora as exemplified in (20), and "associative anaphora", as exemplified in (21):

- (20) John asked a girl for his way. *The girl* was very surprised
 (21) *This house* is old. *The front door* is broken

It is sometimes assumed that definite descriptions, like Proper Names, are not context-dependent, whereas incomplete descriptions are context dependent and are in this respect like pronouns and demonstratives. In fact the distinction is not so clearcut, as some authors (see for example Récanati 1986) have shown. Nevertheless, as far as linguistic intuitions are concerned, there is a very strong difference between the two following links:

- (22) *John* is Mary's brother. *Mary's brother* is very narrow-minded
 (23) *John* is Mary's brother. *The boy* is very narrow-minded

In (23) we have something which seems very close to pronominal or demonstrative links. But in (22) a kind of shift very close to the characteristic manifestation of R-chains (cf. above) seems to be involved. We could confirm this point by the observation that *the boy* can be used again in the pursuit of the chain, whereas *Mary's brother* cannot.

The contextual dependence of definite NPs

Definite reference is achieved by means of the linguistic descriptive content of the NP within a domain. All theories of definite state that these NPs are to be connected to a domain of interpretation within which their linguistic content applies to a single particular. I will call this domain the required associated domain for definite NPs. The relevant properties of such a domain, as far as the linguistic rules defining definite NPs are concerned, can be specified as the domain in which the linguistic content *x* of the NP can pick up a single particular. The role of context is to fix a domain satisfying this requirement.

The knowledge that *D* is a required domain for a given definite NP *d* is a conjunction of linguistic knowledge and knowledge of the world. Let us suppose for example a domain characterized by means of its content, e.g. a domain containing a boy, a girl and a cat. Linguistic knowledge of the definite NPs like: *the boy, the girl, the cat*. Suppose now a domain specified as a house. Linguistic knowledge of definite expressions and Nouns, together with general knowledge about houses will insure almost certainly, that the considered domain matches the requirement of definite NPs like *the front door, the roof*,²⁰ etc. The difference is only that in the second case, the source of the definite NP is obtained by inferences based on general knowledge, whereas in the first case, the source is provided explicitly by the context.

The so-called "complete definite descriptions", or "uniquely identifying descriptions" embody the mention of domains such that very few is required from the context to fix the domain matching the requirement implied by the

²⁰ The ongoing discussion takes into account only singular NPs referring to particulars. Neither plural NPs nor NPs with a "variable interpretation" (e.g. *In a house, the front door is always nice*) are considered.

NP. For example, *the president of the U.S.A.* needs only the setting of a temporal parameter in order to provide the required domain for a singular reference, since unicity is required for *president* in the domain in question (*U.S.A.*). Definite descriptions can be viewed as more complete than bare definite NPs because they contain a relational predicate and fix the most relevant parameter(s) for this predicate, regarding the isolation of a particular. *President* generally implies unicity, provided that the values of the variables *x* and *t* in *president of x at t* are fixed; so, for *president of the U.S.A.* only a temporal parameter — or "point of reference" as R. Montague (1974: 98) calls it — must be borrowed from the context.

Remarks about the referential/attribution opposition

The now well-known distinction between referential and attributive uses of definite descriptions is due to K.S. Donnellan (1971).

Basically, the distinction brought out by Donnellan is as follows. When using *Smith's murderer*, it might be the case that I have in mind a specific particular. I use then this description as a means (a "tool" in Donnellan's terms) of referring to this particular. But it might be the case that I know only that Smith was murdered. I then use the description in order to refer to the person who killed him.

As far as I know, this duality is generally assumed only for definite descriptions, (not for demonstratives, for example), and only for complete definite descriptions. It's worth attempting to account for these two points in order to arrive at a better comprehension of the phenomenon itself.

In fact, the distinction explicitly brought out for bare definite NPs by J.A. Hawkins (1978) — see above — seems very close to the referential/attribution distinction. In a situation where a mention of *a boy* is taken as a source, the definite NP *the boy* can be seen as a referential use. But in a situation where only *a house* is taken as a source, *the roof* cannot be seen as a referential use. The crucial distinction is between cases in which the source of the definite NP provides it with its referential index and cases in which the source provides it only with the setting of parameter(s) such that the reference of the definite NP is supposed to be fixed. A convenient way of symbolizing that would be to use, in addition to a standard index, a superscripted index:

- (24) A boy_i, the boy_j
 (25) a house_i, the roof_j

In this representation, *the roof* receives an index via a link to the preceding source (i), but this index is not the index of this source. This would be a convenient way for representing those *associative links* which are very widespread in natural discourse.

- (26) They entered a small house_i. In the kitchen_j, near the table_k they saw a man reading under the light_l

Before we consider complete definite descriptions some precisions are needed in order to clarify the linguistic bases of the distinction between the

two kinds of anaphoric links introduced above. The common property is that the link to a source is a consequence of the linguistic rules which define the interpretation of a bare definite NP. From the necessity to provide a domain within which the linguistic content of the NP can isolate a particular, one can deduce two kinds of associated domains: 1- domains actually containing the mention of a single particular satisfying the description. 2- domains within which it can be taken for granted by means of general knowledge that the linguistic content of the NP is able to isolate a particular. One could think that the opposition is not so strict and that in the second case, a mention-source of the particular referred to by the definite NP can be obtained by bridging - cf. pronouns above. I don't think that such a theory would be correct. Suppose for example that, given a mention of a house, one assumes a theory in which such a mention implies the insertion in the domain of interpretation relevant for later expression of specific particulars as *a roof, a front door*, etc. Once supposed that such items are actually in the domain of interpretation, how could one explain that these sources are not accessible for pronouns, or for demonstrative NPs? For pronouns, a natural interpretation could be invoked. Generally, such a kind of inference would introduce at once many particulars, and a pronoun has too few linguistic content to choose one of them. But this explanation would have some difficulties in stating why demonstrative NPs cannot mention those inferred particulars. Under one form or other such a theory would have to stipulate that inferred sources are only accessible for definite NPs, which seems an ad hoc stipulation. A better solution is to assume that the requirement of definite NPs for their associated domain is only the setting of the reference points restricting a domain within which the linguistic content of the definite NP is generally able to isolate a particular. This explains straightforwardly why the reference of the definite NPs can be variable, provided that the point of reference is variable, and why the existence of a referent can be cancelled:

(27) In these books, the first chapter is too long

(28) The conclusion of this book is absent

It is not obvious that a similar distinction between two kinds of anaphoric links applies to complete definite descriptions. The problem is that, if it is not too difficult to find examples of associative anaphoric links between a definite description and a part of its context setting a required parameter, it is not easy to find examples of definite descriptions which would exhibit the kind of connection exemplified in (24) above. In this respect, the paradigmatic example is the contrast between (29) and (30) quoted above as (22-23):

(29) *John* is Mary's brother. *Mary's brother* is very narrow-minded

(30) *John* is Mary's brother. *The boy* is very narrow-minded

As any reader who has referred to Donnellan's (1971) text can see, (29) would be a typical example of Donnellan's referential use of a definite description. The problem is, as already stated, that (29) is a rather strange succession, which could hardly be expected from Donnellan's analysis itself.

One could try to describe this phenomenon by stating that a complete definite description cannot be anaphorically linked to a close mention of the particular referred to by this definite description. In this formulation, "anaphorically" has, of course, the revised meaning introduced above. Regarding this particular terminology, this means that a complete definite description cannot be connected to a previous expression mentioning its referent by the kind of link which connects a pronoun or a demonstrative to its so-called *antecedent*, a statement which seems rather uncontroversial for linguistic intuition. But such a statement needs an explanation.

I will tentatively propose such an explanation on the basis of the theory of definite descriptions sketched in this paper. What is supposed is that the associated domain of a linguistic expression is inferable from the linguistic properties of this expression. Now consider a definite description like *Mary's brother*. The required domain is one within which this description can isolate one and only one particular. The mention of *John* which is in fact Mary's brother, cannot be taken in itself as the setting of the required parameters for the interpretation of the definite description. This mention can be seen as accidental, or irrelevant, as far as the linguistic interpretation of the description is concerned. It seems true that this description would be interpreted in the same way if the previous sentence were not uttered. So we could conclude that there is no linguistically based link between the mention *John* and the interpretation of *Mary's brother*. Basically, this explanation assumes that for complete definite descriptions, the associated domain is so completely inferable from the expression itself that no previous mention can be taken as the source of this NP. It thus relies on the general assumption already stated, according to which, it is the expression itself which specifies what is to be accounted as the associated domain required for its interpretation.

This doesn't preclude, of course, the existence of *co-reference* relations between a complete description and other expressions capable of mentioning the particular referred to by the description (for example between *John* and *Mary's brother* in 29). By co-reference, is meant a relation between two (or more) expressions which do refer to the same particular, without being connected by means of the linguistically based relation of anaphora. If a and b co-refer, although a and b refer to the same particular, a is *not* the *antecedent* of b, i.e. a is not the mention providing the source of b. The relationship between the so-called *family of descriptions* satisfied by a particular would fall, according to this revised terminology, under the concept of co-reference. The same would be true for the relationship between a description and a proper name. This means that such a relationship is not obtained as a result of the referential calculus of the description. In other words, *Mary's brother* triggers a referential calculus involving a domain in which a singular reference can be achieved, but this calculus is independent from the existence of other descriptions and names in the preceding discourse actually referring to this particular. The knowledge that several descriptions refer to one and only one particular is contingent, and must be learned from the uses of these descriptions,

or by explicit assertions, except when it can be inferred from the content of the descriptions itself (e.g. *my brother's mother* and *my mother*).

There is a very insightful discussion in Kripke (1972: 91 and ff.) on the way different descriptions and names are assumed to refer to a particular. Basically, Kripke, following (and somewhat amending) a point made by Strawson, assumes that uses of designators are linked by a "communicative chain":

- (31) "Someone, let's say a baby, is born; his parents call him by a certain name. They talk about him to their friends. Other people meet him. Through various sorts of talks, the name is spread from link to link as if by a chain".
S.A. Kripke (*op. cit.*: 91)

It's worth noting that the links brought out by Kripke are links between actual *mentions* of particulars. I think that this particular notion of chain is the right notion for handling the link between definite descriptions and other mentions, even if those expressions occur in the same piece of discourse.

A central assumption of this paper is thus that the connection between expressions actually interpreted as mentions of the same particular can have two distinct bases:

1- Some connections are drawn on linguistic bases, when communicative and pragmatic factors affect only the selection of the relevant context and the intended antecedent. This is the case for the relationship between an antecedent and a pronoun, a demonstrative NP, and some occurrences of bare definite NPs.

2 - Some connections are drawn on communicative bases. This means that a given expression can by itself – and most often once the context has fixed some required parameters – be interpreted as a mention of a particular. If a link can be drawn to a previously occurring expression, it will be by means of communicative factors that it can be taken for granted that the two expressions under consideration are in fact mentions of the same particular. This is the case for the relationship between a definite expression and a previously uttered mention, but also for the link between proper names and indefinites to previously occurring mentions.

I suggest therefore, that the distinction between these two kinds of connections offers a firm basis to distinguish between two kinds of chains in natural discourse: A-chains, which are linguistically based, and R-chains, which are communicative in nature. I thus follow Chastain in suggesting that equi-reference in natural discourse is to be handled by two distinct concepts, but the definition and the extension of these two concepts are not the same as Chastain's.

2.5. A general picture of referential connections in discourse

If this is correct, a general picture of referential connections emerges which is roughly as follows.

In a given piece of natural discourse some expressions can be said to be referentially connected. They form what we will call *referential chains*. Two kind of links are to be distinguished: one of them can be noted by means of the *identity of subscripted indices* (mentions of the same entity, or same address-or file in Heim's terminology – in the memory of the on-going discourse); the other one is represented by the *identity between subscripted indices and superscripted indices* and covers both *associative links* and the fixation of *reference points* relevant for the referential calculus of a definite description.

The major kinds of connections to be distinguished are *anaphoric links* and *referential links*. This distinction is based on the nature of the calculus which achieves the identity of indices. For anaphoric links, the link to a previous expression is set up in virtue of the linguistic calculus associated with a type of linguistic form. Basically, some linguistic forms involve a referential calculus which takes for granted the accessibility of an Associated Domain relevant to achieving their referential function. The linguistic categories Pronoun, Demonstrative, and Definite²¹ can be distinguished according to the kind of requirement they specify for their Associated Domain.

Pronouns and demonstratives require a Source which has to provide them with a subscripted index (i.e. which has to provide them with a specified reference). Pronouns need a source with all the properties of actual linguistic mention of a particular (i.e. a mention of a particular classified as a N of a given gender), and are to be interpreted with all the parameters of this source. Demonstrative NPs require as a source a mention, whatever the linguistic properties of this mention, and reclassify the referent by means of their own linguistic content.

Definite NPs require an Associated Domain such that their linguistic content is assumed to be capable to achieve a singular reference. For bare definite NPs, this requirement can be achieved in two ways:

- 1) The Associated Domain contains only one N, N being the head of the definite NP. The result is then the identity of subscripted indices (reference to the same particular as the source).
- 2) The associated domain contains a mention which can count as the setting of a parameter for N, N being the head of the definite NP, which is supposed to enable the NP to achieve singular reference. The result is the identity between the subscripted index of the source and the superscripted index of the definite NP (*associative anaphora*). For complete definite descriptions, i.e. descriptions embodying the setting of some required parameters, the Associated Domain is to be taken as the fixation of the not yet fixed parameters, and the relationship to a previous mention of the same referent is not taken into account for the referential calculus of the NP.

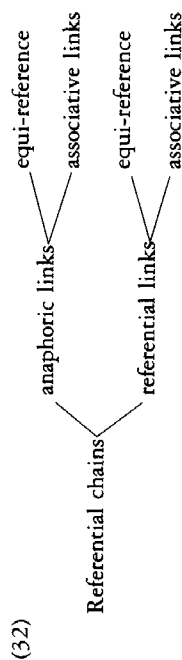
The *antecedent* of an anaphor is an expression actually uttered in the preceding discourse which is supposed to provide the intended source for the anaphor.

²¹ This summary is very sketchy and is based only on the most salient properties of French data.

The fact that the intended source is generally to be provided by the immediate preceding discourse can be deduced from an application of relevance theory to the processing of linguistic terms: if something is required for processing, and not explicitly given in the expression itself, it is supposed that what is intended is recoverable from the real environment which is the most closely related to processing, with minimal inferencing. That is why, in the unmarked case, a source is provided by a linguistic mention of the same discourse, which is closely related to the anaphor (proximity and saliency).

Referential links cover the identity of indices which are not obtained as a result of linguistically based referential calculus of expressions. The present theory assumes that these links are obtained as a result of some knowledge regarding the use of referential terms in real life or in a restricted universe. It's worth noting that S.A. Kripke (1980) uses the notion of *chain of communication* to account for the way people can grasp co-reference relations between uses of a given name, and between uses of different designators (see above 2.4).

In this framework, referential chains in natural discourse could be seen as a mixture of anaphoric and referential links, both embodying the two kinds of identities between indices distinguished above.



3. Some related problems.

Two linguistic categories remain to be considered in order to get a complete picture of the linguistic bases for free chain formation: proper names and indefinite NPs. For the sake of brevity I will not introduce any analysis of these categories, but only address the question of their status in referential chains.

3.1 Indefinites

I will assume with no justification that a consequence of the linguistic properties of indefinite NPs is that they can only be I-terms in A-chains (they are not anaphors). A further consequence of the referential calculus of indefinites is that they are linguistically predisposed to I-positions in equi-referential chains, i.e. they introduce a new index or address in the domain of interpretation of a given discourse. Under one form or another a lot of theories on indefinites do formulate this property. I will take it as the linguistic basis for the location of indefinites in referential chains.

That doesn't preclude the possibility of indefinites occurring in associative referential chains, as for example in (33)

(33) The house is beautiful, but a window_i is broken

The question whether such a chain is anaphoric or referential is not very clear to me. It might be the case that the Noun *window* which is relational in nature, requires the setting of a parameter (*the window of x*) in order to be properly used in an NP, even but this NP is indefinite. It might also be the case that the setting of this parameter as in (33) is only a communicative preference.

Indefinites can also occur in the course of equi-referential chains, although this is a marked case, because of their linguistic predisposition for I-position in these chains. For example in a given discourse, one finds successions like (34):

(34) My brother is very nice. I phoned him yesterday because I was in a trouble. A minute later a man came in. It was my brother.

The "context-shift" feeling already mentioned for these examples is due to the contradiction between the introducer role of indefinites, and this use in which they turn out to be the mention of an already introduced particular.

Another example is what I would like to call "attributive" uses of indefinites, in spite of the polysemy of this term:

(35) You invited Paul. You invited a man_i who is your greatest enemy.

In such cases, it is inferable both from the immediate literal repetition of the rest of the sentence, and from the epithetic nature of the indefinite NP, that this NP is not used in order to introduce a new particular in the memory of the discourse, but in order to qualify the particular previously mentioned in the corresponding position of the first sentence.

3.2. Proper names

Proper names are not exactly like ID for computers, i.e. terms which correspond to only one address in the whole memory. It's a common sense observation to note that proper names are not absolutely unambiguous, and that first names are usable unambiguously only in restricted domains of individuals. In any case, proper names are not linked to immediate previous mentions of their referent as pronouns or demonstratives are. One could state that proper names do have an Associated Domain, which is the subset of particulars within which it can achieve singular reference, that is to say the subset of individuals within which a given particular can be isolated by the proper name, and that this subset must be obtained from the context. But this is a rather general requirement, which concerns all proper names, and it seems rather obvious that a proper name doesn't require as a source the actual mention of a particular which would have to be retrievable from its immediate context of use.

So, one can conclude that proper names do not occur in the course of equi-referential A-chains, but can only occur in equi-referential R-chains.

3.3. First and second person pronouns

The kind of connection which holds between two occurrences of *I* or between two occurrences of *you* seems closer to the connection between two occurrences of a proper noun than to the connection between an antecedent and a pronoun. This would lead to thinking that those personal pronouns can only occur in R-chains, not in A-chains. This could be obtained by means of a subscripted index fixed by enonciative parameters. One occurrence of *I* is fixed by enonciative parameters, and a connection between two occurrences of *I* are referentially connected, provided that the parameters are identical. I won't pursue the question further.

4. The heterogeneous nature of referential chains.

Equi-reference in natural discourse is thus obtained by means of two distinct calculi: anaphoric links, which draw a direct connection to a previously uttered mention, and referential links, which are obtained indirectly, by means of communicative inference between two independently processed expressions. I think that Chastain's insightful paper was based on the same central assumptions, although the two analyses are rather different.

Basically the distinction emphasized in my analysis is the distinction between linguistic links and communicative links. As already noted two theories use the concept of chain for two disjoint problems: Chomsky's theory and Kripke's theory. Kripke speaks of communicative chains, and Chomsky of anaphoric chains. I think that these concepts once extended and revised are the fundamental concepts required for the description of equi-reference chains in natural discourse. This paper tries to sketch out a particular extension of these concepts centered on the linguistic bases of free chain formation.

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