

Centering, Global Focus, and Right-Dislocation

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Abstract

Centering has been proposed to fill the role of modeling the local level of attentional state within Grosz and Sidner's (1986) model of discourse structure. In this chapter, we demonstrate that centering can also aid in explaining a particular syntactic structure, right dislocation. To do so, we propose a modification to the attentional state model that coordinates the global level of attentional state with centering. The chapter includes an analysis of right dislocation constructions in English and Hebrew.

1. INTRODUCTION

The centering framework and theory treat interactions among attentional state, choice of referring expression, and discourse coherence. Centering has been proposed to fill the role of modeling the local level of attentional state within Grosz and Sidner's (1986) model of discourse structure. In this chapter, we demonstrate that centering can also aid in explaining a particular syntactic structure, right-dislocation (henceforth, **RD**). **RD** constructions contain a pronoun and a coreferential definite description; these two expressions are used jointly to establish discourse coherence.

This chapter provides an analysis of **RD** constructions in English and Hebrew and proposes modifications to Grosz and Sidner's (1986) attentional state model to handle them. In so doing, we address a question left open by previous work on the attentional state component, the interaction of centering with global focusing mechanisms. Section 2 provides an overview of the attentional state model. Section 3 describes **RD** and Section 4 discusses its discourse function. Section 5 then describes the modifications to attentional state models at both the global and local levels that are needed to explain **RD**.

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2. BACKGROUND: THE ATTENTIONAL STATE MODEL

The attentional state model in Grosz and Sidner (1986) mediates between two other components of discourse structure, *linguistic structure* and *intentional structure*. The linguistic structure comprises the grouping of utterances into *discourse segments*, the relationships among discourse segments, and those linguistic features (intonational, morphological, and syntactic) that are used to mark this level of structure. The intentional structure is a structure of Gricean-like intentions that delineate the purpose of the discourse. The overall communicative purpose of a discourse is called the *discourse purpose* (DP); each segment within the discourse has an associated intention, the *discourse segment purpose* (DSP). Grosz and Sidner (1986) claim that a discourse is coherent to the extent that satisfaction of the DSPs contributes to satisfaction of the DP.

According to Grosz and Sidner (1986), the linguistic structure ultimately depends on the intentional structure. Relationships between DSPs provide the basic structural relationships for the discourse; embeddings in the linguistic structure are derived from these relationships. However, the complexity of computing intentional structure makes linguistic cues to the linguistic structure and attentional state crucial to efficient computation of segment boundaries.

The attentional state component of Grosz and Sidner (1986) has two constituents, a global one and a local one. The global-level constituent models attentional state properties at the intersegmental level; the local level models intrasegmental changes in attentional state. In Grosz and Sidner (1986) the global-level component of the attentional state is modeled with a stack, the *focus space stack*, and the local-level with *centering*.

The focus space stack associates a space with each segment of the discourse. At any time the space is active (i.e., on the stack), it contains representations of those entities (i.e., objects and events) that have been mentioned explicitly in the discourse segment. It may also contain additional entities that became salient in processing utterances in the segment (e.g., those engendered by bridging inferences (Clark 1977; Clark and Haviland 1977)). Entities in some space on the stack are explicitly in global focus. In addition, entities that are closely related to those that are explicitly in focus are considered to be implicitly in focus.¹ An entity may be in more than one space; in particular, if it is mentioned in more than one segment, it will be.

Stack relationships represent relative salience. The top space corresponds to the current discourse segment. Spaces further down the stack correspond to discourse segments that embed the current one; they have

¹ Explicit and implicit focus are distinguished for computational reasons described elsewhere (Grosz 1977a,b).

been started, but not completed. Items in spaces further down the stack are less accessible than those higher in the stack. Thus, this representation embodies a claim that entities referred to in the current segment are more highly focused than those in embedding segments. Furthermore, once a segment is completed and its space 'popped' from the stack, the entities focused within it become less accessible, unless they are also in spaces remaining on the stack; as a result, reference to them requires a more complete description than when the space is active. Definite descriptions are interpreted relative to the stack; thus, global focusing plays a major role in constraining the interpretation of definite descriptions in discourse. A description is taken to refer to the closest entity that 'matches' the description, i.e., to the entity that matches the description in the highest space in which there is such.²

At the local, or intrasegmental, level, centering theory, following the work on which it was based (Grosz 1977b; Sidner 1979; Joshi and Kuhn 1979; Joshi and Weinstein 1981), connects centering status with the use of pronominal reference. This connection derives from a more fundamental claim of centering theory, that the resource demands of identifying the referent of noun phrases 'are affected by the *form of expression* of the noun phrase' (Grosz, Joshi, and Weinstein 1995: 208). Entities on Cf(U, DS) are considered to be locally in focus and the partial ordering of elements of Cf(U, DS) reflects relative salience. The Cb(U_{n+1}) provides a link to some element of Cf(U_n) and thus lends coherence to the sequence of utterances in the discourse segment.

The claim of centering theory that most specifically makes the link between centering and pronominal reference is Rule (1) (Cf. Chapter 1, p. 4-5). As it is only one constraint on pronominalization, Rule (1) does not fully account either for pronoun production or for the resolution of pronominal reference. In particular, a range of other factors must be taken into account for utterances with multiple pronouns. In the context of this chapter, the rule is relevant because of the connection it makes between attentional state at the local level and pronominalization.

Thus, the model of attentional state proposed by Grosz and Sidner (1986) ties pronominal interpretation to centering and the interpretation of definite descriptions to global focus. Two exceptions to this linking have been described previously (Grosz and Sidner 1986; Grosz, Joshi, and Weinstein 1995): (1) the realization of the Cb(U_n) by a non-pronominal expression; (2) the use of a pronoun in utterance U_n to realize an entity not in the Cf(U_{n-1}). Both kinds of uses seem to be strongly constrained, but a full explanation of these uses and the constraints remains to be given. This chapter makes a step in this direction.

² Additional details of this model, including a discussion of 'matches' are in previous papers (Grosz 1977b, 1981).

3. BACKGROUND: RIGHT-DISLOCATION

Right-dislocation is characterized by a non-vocative final noun phrase (henceforth, NP_i), which is coreferential with a pronominal noun phrase preceding it in the same clause as examples (1) and (2) illustrate:

- (1) He_i is here, Jim_i.
 (2) I don't like them_i at all, the cops_i.

This structure can be represented schematically as,

- (3) X PRO_i Y NP_i

The referential properties of **RD** have not been examined critically in the linguistics literature, probably because of an erroneous conception that **RD** is a performance error phenomenon, a type of 'afterthought' (Geluykens 1987). However, it has recently been argued that **RDs** differ from afterthoughts systematically and constitute part of planned speech (Ziv 1994, 1995; Ziv and Grosz 1994; Fretheim 1994; Linson 1992). We briefly review the arguments relevant to this chapter. In doing so, we also point out distinctions between uses of **RDs** in English and in Hebrew to make more evident its linguistic properties.

Previous work has shown syntactic and semantic-pragmatic distinctions between **RDs** and afterthoughts (Ziv 1994, 1995; Ziv and Grosz 1994). NP_i can only occur in clause final position in **RD**, whereas in afterthoughts it may be added as a parenthetical in other positions in the sentence as well, as long as it follows the pronoun. The nonfinal occurrence of NP_i in afterthoughts is illustrated by (4).

- (4) I met him, your brother, I mean, two weeks ago.

The two constructions also display distinct properties with respect to subadjacency, a syntactic restriction on extraction domains. For distinguishing among the two constructions at hand, the applicability of this constraint amounts to determining whether or not it is possible to extract an entity outside of its own clause.³ **RD**, but not afterthought, abides by subadjacency; it does not allow extraction out of its clause. Evidence for this distinction is found in the difference in well-formedness between (5), where NP_i occurs at the end of its own clause, and (6), where NP_i occurs in a position external to the clause from which it was 'extracted'. In the absence of any context (6) is an instance of **RD** and ill-formed. However, the same sequence of words uttered in context as an afterthought, as in the sequence in (7), is well-formed.

³ In another paper (Ziv and Grosz 1994), we describe this distinction in more detail and also discuss the movement analysis of **RD** implicit in this formulation.

- (5) The story that he told us Bill was very interesting.
 (6) *The story that he told us was interesting, Bill.
 (* when NP_i is non-vocative)
 (7) Remember they/the two of them were telling us all sorts of stories? Well, the story that he told us was very interesting, Bill, I mean.

Differences in referentiality provide another piece of evidence for the contrast between **RD** and afterthoughts. In **RD**, NP_i must be coreferential with some NP which precedes it in the clause. Because afterthoughts may contain corrections of reference, it is possible that no coreference holds between the two definite NPs (the clause internal NP and NP_i). This absence of coreference is illustrated in (8).

- (8) I met John yesterday, Bill, I mean.

RDs and afterthoughts in which NP_i occurs in final position also seem to differ intonationally (Ziv and Grosz 1994; Fretheim 1994). **RDs** appear to constitute a single contour with no pause preceding NP_i. An initial analysis suggests three options for the tune: (a) **RDs** display a fall-plus-rise intonation; (b) the intonation level does not change and NP_i serves as the tail, intonationally continuing on the same level as the previous entity; (c) NP_i is de-stressed (Quirk *et al.* 1985: 1310, 1417-18; Taglicht, personal communication). Afterthoughts, on the other hand, are characterized by a distinct pause preceding the final coreferential NP. They comprise two different intonational units, so that NP_i is clearly stressed. Fretheim (1994) describes the intonational features of **RDs** and afterthoughts in Norwegian. Further study of the intonational properties of these two constructions is needed to evaluate the initial hypotheses.

These distinctions between **RDs** and afterthoughts are valid for Hebrew as well. However, morphological characteristics of NP_i in **RDs** in Hebrew seem to distinguish it from its English counterpart. In English, NP_i occurs in the bare form when the pronominal entity with which it is coreferential occurs in either the nominative (example (1)), or the accusative (example (2)).⁴ In Hebrew, NP_i occurs with the same overt morphological case mark-

⁴ The acceptability of different grammatical forms for NP_i in English **RD** constructions in which the pronoun is not in subject position remains an open question. For accusative, there is no question as to the acceptability of the bare NP form for NP_i (e.g., (2)). When the pronominal expression is dative, speakers' intuitions differ about whether the use of a bare noun phrase in NP_i position is more or less acceptable than the alternative with a preposition introducing NP_i. This problem is illustrated by the following pair for which reactions differ:

- (i) ?I gave her the book, your sister.
 (ii) ?I gave her the book, to your sister.

The difference between the reactions to (i) and example (2), suggests either that the dative and accusative pronouns are distinct in English, despite superficial morphological similarity, or that

ing as the pronoun with which it is coreferential.⁵ For example, the accusative pronoun in (9a) and the dative in (10a) are coreferential with noun phrases in NP₁ position that are explicitly marked by accusative and dative markers, respectively. The corresponding sentences with a bare nonvocative NP₁ are clearly ill-formed in Hebrew, as is evident from (9b) and (10b).

(9)(a) raiti ota etmol, et dorit
[I] saw her yesterday DEF ACC Dorit

(b) *raitu ota etmol dorit

[I] saw her yesterday Dorit

(10)(a) hexzarti la et hasefer, ledorit.

[I] returned to her DEF ACC the book to Dorit.

(b) *hexzarti la et hasefer dorit.

[I] returned to her DEF ACC the book Dorit.

Afterthoughts in Hebrew, in addition to occurring in the same pattern as RD (example (11)), may also, in some restricted cases, use bare NP instead, as in (12).

(11) raiti ota etmol, et ruti ani mitkaven

[I] saw her yesterday DEF ACC Ruthie I mean

(12) raiti ota etmol, ruti, nu

[I] saw her yesterday Ruthie you know (approximate)

The utterance in (12) can only be construed as an afterthought in which the speaker's impatient *nu* (roughly: 'come on, you know who I mean') indicates that he realizes in midstream that the addressee is not sure to whom he refers. Afterthoughts like (12) are clearly morphologically distinct from the corresponding RDs in Hebrew.

A small corpus of spontaneous conversations in English and Hebrew was collected by Ziv and the occurrences of RD constructions examined. In most uses of RD constructions, NP₁ corefers with a pronoun in subject position. The results are preliminary and need to be corroborated by additional empirical data, but even at this stage they are suggestive of certain tendencies. In the English corpus of 112 instances of RDs, over 80 per cent had pronouns in subject position. RD pronouns occurred in object position in 15 per cent of the instances (some of them topicalized). The remaining examples consisted of adjuncts of which, again, there were instances of

NP₁ may be sensitive to grammatical function or configuration and not just to morphological case.

⁵ As Ziv points out elsewhere (1994), this morphological property is one way in which RDs differ from left-dislocations. In left-dislocations in Hebrew, only bare (nominative) NPs can occur as NP₁.

topicalized tokens. With respect to the form of NP₁ the following was found: *this*-NPs occurred in over 40 per cent of the cases, proper nouns 20 per cent, definite descriptions and genitives 25 per cent. Situationally evoked generics appeared in 5 per cent.

The Hebrew data comprised 104 examples collected from spontaneous speech. These data displayed a very similar pattern of distribution: close to 75 per cent of the RD pronouns were in subject position; the remainder were in a variety of nonsubject grammatical roles. More than 50 per cent were *this*-NPs (*haze* (masculine), *hazer* (feminine)). Proper names occurred in 15 per cent and genitives in close to 30 per cent of the cases. Interestingly, no example in the Hebrew corpus had a definite description that was not genitival.

4. THE DISCOURSE FUNCTIONS OF RD

Although RDs have been commonly confused with afterthoughts, their discourse functions differ significantly. The discourse function of afterthoughts is, by definition, corrective. They are a type of repair in which the speaker assesses in mid-utterance that he has made an error in the referring act. The error may concern either the identity or the relative ease of retrievability of the referent. As a result, the speaker corrects the referring expression or supplies additional information to help identify the referent.

The corrective discourse function of afterthoughts can be succinctly characterized in terms of the attentional state model. The speaker realizes that the Cf(U_{n-1}) is such that the hearer will be unable to interpret the pronominal reference in U_n correctly. He corrects his reference using a definite description or a proper name.⁶

In contrast, RDs function to help organize the discourse. In describing RD in French, Lambrecht (1981) supplies a characterization of its discourse functions. NP₁ is claimed to be 'highly presuppositional' and as such to function characteristically in recovering entities which are either 'situationally evoked' (as in (13) from non-standard French) or 'textually evoked' (Prince 1981b).

(13) Il est beau, ce tableau! (Lambrecht 1981, no. 123)

⁶ In discussing RDs, Linson (1992; personal communication) acknowledges the non-afterthought nature of true RDs. For him too, RDs do not constitute repairs. However, he maintains an additional discourse function for true RD, namely specification. Just like restrictive relatives function in restricting the reference of their antecedents, so, he argues, does the RD in some cases function in further specifying the referent. An interesting example in this context (for which we are indebted to G. Ward) is the following: (1) *We have a talk to go to all of us/me and you*. Although we found examples like this in our English and Hebrew corpora, the RD in each example also served one of the discourse functions of RD that we describe in this chapter. Thus, we do not consider a separate specificational role for RD here.

Utterance (13) is appropriate when the picture is in the physical surroundings of the interlocutors, and the speaker wants to make sure that the addressee will pay the necessary attention to it. As we have demonstrated previously (Ziv and Grosz 1994), there are no equally appropriate constructions which abide by the given constraints. In particular, we show that a pronominal expression, or a definite or demonstrative expression in a non-RD construction, is appropriate only in alternative situational or discourse environments.

The utterance in (13) is an example of an explicit situational use of RD. In this use, RDs seem to constitute instructions to addressees to search their surroundings for the appropriate situationally evoked entity. The RD utterance makes further reference to these entities possible from that point on in the discourse. RD is appropriate in two other settings. It may be used for entities that are only implicitly in the situation, and may under certain constraints be used for entities that are textually evoked rather than situationally evoked. We discuss these two cases in the following sections.

4.1. Reference to Entities Implicitly Focused in the Situation

In the case of entities that are implicitly focused in the situation, the referent must be inferable from a situationally evoked entity. An example of this case is provided by the discourse fragment in (14), uttered in the following situation:⁷ one individual, say Susan, is holding Chomsky's latest book and conversing with another person, say Jon; the book has not been part of the conversation; Jon notices the book and says one of the following,

- (14)(a) It's very difficult, this book. I started reading it three times and got stuck.
 (b) He's terribly confusing, this Chomsky. I can't figure him out.
 (c) Chomsky is terribly confusing.

Jon could not have used the nondemonstrative definite description or a pronoun alone in (14a). Both require mutual belief that Susan is already attending to the book. The only felicitous alternative is use of a proper demonstrative. In the case of (14b), the pronominal subject 'he' without the clause-final coreferential NP would have been unintelligible. The use of the proper name 'Chomsky' in subject position as in (14c) might still be confusing; it would reflect an unwarranted assumption by Jon that it was mutually believed by him and Susan that he had seen the book. In addition to the bridge inference (Clark 1977; Clark and Haviland 1977) required to get from the book to its author, the proper interpretation of (14c) depends on a Gricean implicature to get to the object in the situation that is relevant to

⁷ This example is taken from a companion paper (Ziv and Grosz 1994), in which it is explained in more detail. That paper also contains a number of other examples.

the conversation. In contrast, the use of the RD construction constitutes an explicit instruction to the addressee to search the context for the relevant referent, with specific indications as to the search. It thus makes the Gricean inference unnecessary.

The demonstrative determiner 'this' occurring with the proper noun in (14a) does not function as a mere demonstrative; the overwhelming number of instances where *this*-NP occurs in RD in our corpus (over 40 per cent in the English corpus and 50 per cent in the Hebrew corpus) indicates that this form is significant. Despite our inability to characterize it further, it is sufficient, for our present purposes, to point out that this is clearly an instance of a definite *this*-NP, unlike the indefinite uses of *this*-NP in other circumstances (Prince 1981a). Although more research is obviously required into the nature of this so-called demonstrative NP, the Hebrew instances, like their English counterparts, are not used just deictically. They may co-occur with proper nouns and tend to convey emotive content. The difference between (15) and (16) is indicative in this respect.

- (15) hu nora meacben, haxomski haze
 he terribly annoying the Chomsky this
 'He is terribly annoying, this Chomsky.'
 (16) ?? hu gar betel aviv, haxomski haze
 he lives in Tel Aviv this Chomsky

4.2. Reference to Textually Evoked Entities

RD cannot, in general, be used to refer to an entity mentioned in the immediately preceding utterance when NP₁ is used strictly referentially. This constraint is evident from the inappropriateness, under normal assumptions, of examples like the following:⁸

- (17) I took my dog to the vet yesterday.
 # He is getting unaffordable, my dog
 (18) A: I asked you to read this/the article for today.
 B: # It is much too difficult, this/the article.

However, the following three situations are ones in which RD may be used for entities that are textually evoked: (1) entities that are in global focus but not (current) forward-looking centers; (2) the referent is only implicitly in focus; (3) NP₁ is a definite description that attributes in addition to referring. We consider each of these in turn.⁹

⁸ All of the examples in this section are in English. There are Hebrew counterparts for each category. We have not included them because they do not differ in any significant way from the English examples.

⁹ Again, more examples may be found in a previous paper (Ziv and Grosz 1994).

The first case of **RD** for textually evoked entities is the use of **RD** when the referent was last mentioned in a relatively distant¹⁰ utterance and not subsequently mentioned. For example,

(19) A: I asked you to read this article for today.

B: I know. I tried to very hard, but I was quite busy. I had guests from abroad who I had to entertain and I had nobody to help me. Besides, it is much too difficult for me, this article.

In the second case, the referent of the **RD** in U_n is inferable from, but does not occur explicitly in, U_{n-1} . In this case, the NPs (pronoun and coreferential NP) in **RD** refer to an entity that was realized, but not directly realized in U_{n-1} ; the referent is thus only implicitly and not explicitly in focus. For example,

(20) I saw *Modern Times* again yesterday.

He is amazing, (this) Charlie Chaplin.

In the third case, NP₂ is used attributively or predicatively and not simply referentially. In many instances, it expresses emotive content.¹¹ In these cases, the clause-final NP in the **RD** does not merely refer to an entity; instead, it is used to predicate some property or attribute of the referent. For example, in utterance (21), manginess is predicated of the speaker's dog.¹²

(21)(a) I took my dog to the vet yesterday.

(b) He is getting unaffordable, the mangy old beast.

5. THE ATTENTIONAL STATE MODEL AND RD FUNCTIONS

Two extensions to the attentional state model are needed to explicate **RD**. First, global focus must be augmented with situationally salient entities. Second, the alignment of pronouns with centering and definite descriptions with global focus must be modified. This second change entails a closer coupling of the two components of the model when used for the process of understanding referring expressions. We briefly describe each of these extensions and then examine the subcases discussed in Section 4.

The situational use of **RD** enables a speaker to refer to entities that are salient in the discourse situation, rather than in the text, using a definite description that contains minimal linguistic specification of the referent's properties. Thus, the joint use of the pronominal expression and the definite

¹⁰ Distance as used here is measured linearly, rather than with respect to global discourse structure, i.e., it refers to the number of intervening utterances.

¹¹ Cf. Doron's treatment of appositives as predications (Doron 1992).

¹² This example is adapted from one of Sidner's (1979).

description that are characteristic of **RD** enables a reference that would otherwise require either that an entity be in global focus or that the speaker use a more complete linguistic characterization of the referent. To accommodate the situational use of **RD**, the attentional state model must provide for a search of the discourse situation (and not just explicit focus) using the reduced linguistic description of the referent. A complete discussion of the appropriate way in which to conduct this search and augmentation lies beyond the scope of this chapter because it must ultimately rest on cognitive theories of perceptual capabilities and memory. However, use of **RD** alters attentional state in systematic ways: the entity referred to enters (explicit) global focus and becomes the $Cp(U_n)$, i.e., most highly ranked member of $Cf(U_n)$. There is no $Cb(U_n)$, as the **RD** initiates a new discourse segment.

In text-based uses of **RD**, either the combination of a pronoun and a definite description is used to refer to an entity that is globally in focus, but not directly realized in the Cf , or the definite description is used attributively. Because the entity is not locally in focus, centering theory alone cannot explain the pronominal reference. Although the use of a definite description to refer to an entity that is in global focus fits the standard model of global focus, the descriptive content of the definite description in **RD** is typically more minimal than usually required. For instance, in example (19), speaker B is able to use the simple noun phrase 'this article' rather than the more cumbersome 'the article we were just talking about.' The exact extension of the attentional state model to account for text-based **RD** depends on whether the **RD** noun phrases refer to a centered entity or to one that is only globally focused.

The commonality among **RD** uses is that they enable a speaker to signal to the hearer a shift in attention. All uses of **RD** (text-based and situational) result in the entity to which the **RD** noun phrases refer becoming $Cp(U_n)$. With the exception of its use with attributive definite descriptions, **RD** serves to enable the speaker to shift attention to an entity that is not immediately available on the $Cf(U_{n-1})$; in the attributive use, it enables a speaker to shift to a new perspective on the entity. Thus, **RD** functions not only to signal salience, but also to signal to the hearer that different search procedures should be used to identify the referent.

Although many **RD** pronouns appear in subject position, not all do. Thus, it is the **RD** construction and not subject role alone that functions to signal salience. In particular, the corpora cases with **RD** pronouns in nonsubject position, as well as those with the pronoun in subject position fell into one of the function categories described in Section 4, and can be attentionally modeled as we describe in this section.

The different specific functions of **RD** are treated by extending the attentional state model as follows:

Entities present in the discourse situation, but not mentioned. The use of an **RD** cues a search of the discourse situation for the referent; if the search is successful, this entity becomes the most highly ranked element of the **Cf** for the **RD** utterance. For example, in Lambrecht's example (13), the hearer must search the discourse situation for a suitable painting, perhaps using information about the speaker's eye gaze to help; this painting then becomes the most highly ranked element of the **Cf**. Similar processing occurs when the referent is only implicitly focused in the situation. For example, in (14), Jon's utterance of 'He's terribly confusing, this Chomsky' results in Chomsky being the most highly ranked member of the **Cf** for the utterance.

Entities that are explicitly in global focus, but not centered. When **RD** is used to refer to an entity that has been mentioned in the discourse, but not recently, it functions simultaneously (a) to reintroduce the entity into the discourse, and (b) to put it in a prominent position on **Cf**. This entity then is treated as highly likely to be referred to in the subsequent utterance. For example, in the sequence (repeated from (19) above),

- (22)(a) A: I asked you to read this article for today.
 (b) B: I know. I tried to very hard, but I was quite busy.
 (c) I had guests from abroad who I had to entertain and I had nobody to help me.
 (d) Besides, it is much too difficult for me, this article.

the article remains in global focus during and after the utterances in (22b-c), but it is not on the **Cf**(22c). The use of **RD** in (22d) reestablishes it as **Cp**(22d), the most salient entity in the discourse.

Entities that are implicitly, but not explicitly, in focus. The use of **RD** requires a search from entities that are directly realized in the **Cf** (and thus explicitly focused) to those additional entities that each implicitly focuses to identify the referent and establish discourse coherence.¹³ It results in the referent becoming the most highly ranked member of the **Cf**. For example, the movie *Modern Times* is on the **Cf**(23a) and (explicitly) in focus in the topmost focus space. Charlie Chaplin, by virtue of being the primary actor, is in implicit focus. The use of **RD** in (23b) requires that the hearer link Charlie Chaplin to *Modern Times*, and then results in Chaplin's being the most highly ranked member of the **Cf**.

- (23)(a) I saw *Modern Times* again yesterday.
 (b) He is amazing. (this) Charlie Chaplin.

¹³ The kinds of inferences that must be drawn to identify implicitly focused entities include POSET (partially ordered set) (Hirschberg 1991) of a restricted type; the characterization of the relevant relationship (Ziv 1994) utilizes a version of POSET in which set, identity, part-of, and subtype-of relations are pertinent.

Attributive definite descriptions. When **RD** is used to refer to an entity that is on the **Cf**(U_{n-1}), NP_1 is restricted. NP_1 must function attributively or predicatively, and not purely referentially. In this case, the hearer is intended to recognize the implication embodied in the description (Kronfeld 1989). The entity referred to becomes **Cf**(U_n) and also the most highly ranked member of **Cf**(U_n). For example, the speaker's dog is both the **Cb**(21b) and the **Cp**(21b).

RD proscribed. Finally, the attentional state model may be used to explain why the use of **RD** in U_n to refer to an entity that is on the **Cf**(U_{n-1}), as in examples (17) and (18), is unacceptable. Entities directly realized on **Cf**(U_{n-1}) are immediately accessible; they are natural candidates for **Cb**(U_n) (or, more loosely speaking, for future topicality (Reinhart 1981) and reference). But **RD** functions either to introduce a new entity or to reintroduce a previously evoked entity into the discourse and simultaneously to make it highly likely as the next backward-looking center. Thus, the use of **RD** for entities on the **Cf**(U_{n-1}) would erroneously implicate that the referent is not already in the center of attention. If the immediately preceding utterance includes a reference to the entity referred to by the **RD** noun phrases, then **RD** is only felicitous if, as just described, NP_1 is attributive. In all other cases a pronominal reference or simple definite description may be used instead.

6. CONCLUSION AND ASM EXTENSIONS

RD may be seen to function to organize the discourse when standard reference and discourse processing are not sufficient. It may be used to retrieve and refocus a formerly centered entity or it may constitute a genuine shift from the text to some situational entity. The commonality among these cases is that the speaker is shifting attention to an entity that is present in the discourse context to some extent (e.g. in the discourse situation, but not discussed; globally but not locally in focus), but not currently sufficiently salient. The use of the description in NP_1 helps the hearer identify the entity; the use of a pronoun (especially in subject position) makes the entity salient. Other instances of **RD** enable the use of attributive or predicational descriptions (in NP_1), while maintaining the current centering status.

The treatment of **RD** presented in this chapter has required two modifications of Grosz and Sidner's (1986) attentional state model. To accommodate the situationally driven use of **RD**, the attentional state model must provide for a search of the discourse situation (and not just explicit focus) using the reduced linguistic description of the referent. Second, the generation and interpretation of **RD** referring expressions require a combined use of global focus and centering. Because **RD** has been shown to have

interactions at both the local and global levels, the alignment of pronominal reference with the local level of attentional state and definite descriptions with the global level must be relaxed.

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