

17. Constraints on Ellipsis and Event Reference

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1 Introduction

Natural languages provide speakers with a wide variety of linguistic devices with which to refer to things. Speakers do not select among these referential options randomly, however, since the linguistic system imposes constraints, both formal and functional, on the use of these expressions (see also Carlson, this volume). For instance, the felicity of a particular choice might depend on whether the speaker believes that the hearer has prior knowledge of the referent, whether it had been mentioned previously in the discourse, or whether it is situated in the immediate surroundings of the discourse participants.

As with reference to entities, we also find a range of options with respect to reference to eventualities¹ in discourse. Four options that we address in this chapter are GAPPING, VERB PHRASE ELLIPSIS, SO ANAPHORA, and PRONOMINAL EVENT REFERENCE, illustrated in (1a–d) respectively.

- (1) George claimed he won the electoral vote, and ...
- a. Al, the popular vote.
 - b. Al did too.
 - c. Al did so too.
 - d. Al did it too.

These constructions are similar in one crucial respect: The interpretation of the eventuality expressed in the second clause requires the recovery of a predication expressed in the first. In recognition of this similarity, Dalrymple et al. (1991) suggest that their mechanism for recovering relations from antecedent clauses in verb phrase ellipsis applies equally to the other three constructions (among others). For expository convenience, we will follow their terminology and refer to the antecedent clause in all of these constructions as the *SOURCE* clause, and the clause containing the elliptical or referential form (the second clause in 1a–d) as the *TARGET* clause.

There are many respects in which these four constructions differ, however. For instance, they have quite distinct syntactic properties. In the case of gapping (1a), all but two (and in some cases, more than two) stranded constituents are elided from the target clause, none of which is an auxiliary.² In verb phrase ellipsis (1b), on the other hand, the target clause contains a stranded auxiliary verb that stands proxy for a missing verb phrase. There is less agreement about the syntactic structure of *do so* (1c); while some authors (Lakoff and Ross 1966, Fu et al. 2001, inter alia) have treated it as an idiosyncratic form of ellipsis, Kehler and Ward (1999) argue that it consists instead of an intransitive use of the main verb *do* (vs. auxiliary *do*) coupled with a referential use of *so* canonically found in preverbal position (cf. *so doing*). Pronominal event reference (1d) is like *do so* in that there is no ellipsis, but different in that it contains the transitive main verb *do*. The referential properties of

pronominal event reference derive from those of the pronoun itself.

This range of syntactic properties is matched by an equally varied set of referential properties, which serve as the focus of this chapter. To provide a framework for our analysis, we begin by describing and situating several previous accounts of the constraints on the use of referring expressions in discourse. We then show that the referential behaviors of the four constructions illustrated in (1a–d) reveal several ways in which these analyses need to be revised and extended if we are to have a fully adequate account of reference in discourse. This result in turn suggests several interesting avenues for future research.

2 Constraints on Reference in Discourse

The use of referring expressions is constrained by several sources of information. One of these sources consists of the speaker's beliefs about the KNOWLEDGE OF THE HEARER, a factor which is likely to dictate whether the speaker selects a definite or indefinite form of reference (Hawkins 1978, Clark and Marshall 1981, Prince 1992). A second source pertains to the speaker's beliefs about the state of the hearer's DISCOURSE MODEL (Karttunen 1976, Webber 1978), that is, the hearer's model of the discourse that represents the entities and eventualities that have been introduced and the relationships that hold among them. A third source is the SITUATIONAL CONTEXT of the discourse, which includes entities and eventualities currently within the interlocutors' perceptual sphere. Thus, any complete theory of reference will have to account for two aspects of discourse understanding: the process of modeling these sources of information (which, particularly the discourse model, are continually changing as the discourse progresses), and the constraints governing the use of referring expressions with respect to these knowledge sources.

There are several properties that can be distinguished when analyzing such constraints; in this chapter we will focus on three.³ First, a distinction can be drawn based on LEVEL OF REPRESENTATION, that is, whether a particular referential expression requires the availability of an antecedent of a particular syntactic form, or merely a semantic referent. Second, with respect to semantic referents, those that are OLD with respect to (the speaker's beliefs about) the hearer's beliefs about the world and/or the hearer's discourse model can be distinguished from those that are NEW. Finally, with respect to those semantic referents that are old, the relative levels of SALIENCE OR ACTIVATION (Chafe 1976, Prince 1981a, Lambrecht 1994, *inter alia*) associated with each at a given point in the discourse can be differentiated. In what follows, we discuss three analyses that, in turn, address each of these three properties.

2.1 An initial distinction: deep and surface anaphora

The notion that referring expressions impose constraints on the level of representation of their referents was addressed in a classic paper by Hankamer and Sag (1976, henceforth H&S), who argued for a categorical distinction between DEEP and SURFACE anaphora. Surface anaphors are SYNTACTICALLY CONTROLLED, in that they require a linguistic antecedent of a particular syntactic form. Examples of surface anaphora include gapping, verb phrase ellipsis, and *do so* (1a–c, respectively). Deep anaphors, on the other hand, do not require an antecedent of a particular syntactic form, but only a referent that is of the appropriate semantic type. Indeed, deep anaphoric reference may be PRAGMATICALLY CONTROLLED, whereby the referent is evoked situationally without any linguistic introduction.

Pronominal event referential forms like *do it* (1d) and *do that* are among the forms in this category.⁴

These two types of anaphora are illustrated in (2a–c).⁵

- (2) A peace agreement in the Middle East needs to be negotiated.
 - a. An agreement between India and Pakistan does too. [verb phrase ellipsis (surface)]
 - b. #Colin Powell volunteered to. [verb phrase ellipsis (surface)]
 - c. Colin Powell volunteered to do it. [event anaphora (deep)]

H&S's account predicts that (2a) is acceptable because the antecedent – the syntactic representation of *needs to be negotiated* – is a surface verb phrase in the propositional representation of the source clause. By the same token, (2b) is unacceptable because the putative antecedent *negotiate a peace agreement* is not a surface verb phrase in the source propositional representation. On the other hand,

(2c) is acceptable because *do it* is a deep anaphor, and is therefore interpreted with respect to a discourse model, in which there presumably exists a purely semantic representation for *negotiate a peace agreement*.

In H&S's dichotomy, the requirement that there be a syntactic antecedent for surface anaphora implies that the antecedent must be linguistic; that is, surface anaphora is not compatible with situationally evoked referents. The unacceptability of verb phrase ellipsis with situationally evoked referents is illustrated in (3a), in contrast to the acceptability of *do it* anaphora in the same context shown in (3b).

- (3) [Hankamer attempts to stuff a 9-inch ball through a 6-inch hoop. Sag says:]
 a. #It's not clear that you'll be able to. [surface]
 (=Hankamer and Sag 1976, ex. 3)
 b. It's not clear that you'll be able to do it. [deep]
 (=Hankamer and Sag 1976, ex. 4)
 c. #I don't think you can do so. [surface]
 (=Hankamer and Sag 1976, ex. 86)

Likewise, *do so* (3c) is also infelicitous with situationally evoked referents, a topic to which we return in section 3.3.

To summarize, surface anaphora requires an antecedent of an appropriate syntactic form, which in turn implies that its referent must be linguistically evoked. In contrast, deep anaphora only requires a semantic referent of the appropriate type, and allows for such referents to be situationally evoked.

2.2 A second distinction: old vs. new

Having distinguished between syntactically mediated and semantically mediated reference, additional distinctions can be drawn within the latter category.⁶ One of these pertains to whether or not an entity is known to the hearer at the time the referring expression is uttered, that is, whether the referent is OLD or NEW. Prince (1992) describes two ways in which a referent may be old or new, particularly with respect to its HEARER-STATUS and DISCOURSE-STATUS. From the speaker's perspective, the hearer status of an entity depends on whether the speaker believes it is known or unknown to the hearer at the time of reference; entities that are believed to be known to the hearer are HEARER-OLD, otherwise they are HEARER-NEW. For instance, by using the indefinite *a book* in (4a), the speaker conveys that the hearer is not already familiar with the book being referred to (i.e., it is hearer-new), and hence the hearer is induced to create a new representation for it in his discourse model.⁷ On the other hand, the use of a proper name, as in (4b), conveys that the speaker believes *The Handbook of Pragmatics* is hearer-old, i.e. already familiar to the hearer.

- (4) a. I bought a book at the bookstore today.
 b. I bought *The Handbook of Pragmatics* at the bookstore today.

Unlike hearer-status, the discourse-status of an entity depends only on whether the entity has already been introduced into the discourse at the time of reference (and is thus presumably already in the hearer's discourse model); an entity that has been so introduced is DISCOURSE-OLD, otherwise it is DISCOURSE-NEW. Thus, produced discourse initially, both *a book* in (4a) and *The Handbook of Pragmatics* in (4b) represent discourse-new referents. In contrast, the referent of *the book* in (5) is discourse-old, since it was previously introduced.

- (5) I bought a book at the bookstore today. The book had been marked down to 99 cents.

Considering hearer- and discourse-status together, entities can thus have one of three INFORMATION STATUSES: hearer-old/discourse-old (e.g. the referent of *the book* in (5)), hearer-new/discourse-new (e.g. the referent of *a book* in (4a) and (5)), and hearer-old/discourse-new (e.g. the referent of *The Handbook of Pragmatics* in (4b)). An entity cannot be both hearer-new and discourse-old, as any entity already introduced into the discourse will presumably be known to the hearer from that point on.

Prince claims that the use of a definite NP in English signals that its referent is hearer-old, whereas use of an indefinite signals that the referent is hearernew. These markings, however, do not directly encode discourse-status; for instance, definites are used for referents that are either discourse-old (e.g. the referent of *the book* in (5)) or discourse-new (e.g. the referent of *The Handbook of Pragmatics* in (4b)). Prince in fact claims that, in English at least, "there is virtually no marking of an NP with respect to the Discourse-status of the entity it represents" (1992:304). However, she then cites pronouns as a possible exception:

Pronouns indicate that the entities they represent are salient, i.e. appropriately in the hearer's consciousness ... at that point in the construction of the discourse model. Therefore, they are presumably already in the discourse model. Therefore, they are Discourse-old. However, at any point in (discourse) time, only a subset, usually proper, of the entities already evoked are salient and hence representable by a pronoun.

(Prince 1992: 304)

The issue of pronouns and the relative salience of referents leads us to the third distinction that we address.

2.3 A third distinction: salience

Thus far we have distinguished between forms of reference whose interpretation is sensitive to the form of a particular syntactic antecedent and those whose interpretation is dependent on the presence of a semantic referent. Among those referents in the latter category, we have also distinguished between those which are old and those which are new, with respect to the speaker's beliefs about both the hearer's knowledge and his discourse model. Among the referents that are old, a further distinction can be drawn with respect to their degree of salience in the discourse context.

Salience has been a prominent factor in accounts of the COGNITIVE STATUS⁸ of referents (Chafe 1976, Prince 1981a, Ariel 1990, Gundel et al. 1993, Lambrecht 1994, inter alia). Consider, for example, the analysis of Gundel et al. (1993), who propose a GIVENNESS HIERARCHY containing six possible cognitive statuses that a referent may have. Below each cognitive status are the (English) referential expressions that encode it.

in			uniquely		type
focus	> activated	> familiar	> identifiable	> referential	> identifiable
<i>it</i>	<i>that</i>	<i>that N</i>	<i>the N</i>	<i>indef this N</i>	<i>a N</i>
	<i>this</i>				
	<i>this N</i>				

The statuses REFERENTIAL and TYPE IDENTIFIABLE will not concern us here, since entities referred to with indefinites are (usually) hearer-new. The remaining four categories distinguish the relative levels of salience that license different forms of definite reference: IN-FOCUS referents, which license pronouns; ACTIVATED referents, which license demonstratives; FAMILIAR referents, which can be hearer-old but discourse-new, e.g. *That national debt sure is getting large* spoken discourse-initially; and UNIQUELY IDENTIFIABLE referents, which license definite lexical noun phrases, and may be (contra Prince) hearer-new. The particular details of Gundel et al.'s analysis and the ways in which they differ with the other analyses cited above need not concern us here. The important point is that any such theory must have some way of distinguishing referents on the basis of their (contextually determined) salience, since the felicitous use of definite referring expressions appears to be sensitive to it.

3 Reference to Eventualities

To summarize thus far, we have classified referents with respect to three properties: (i) the level at which they are represented in the discourse model, that is, syntax or semantics; (ii) in the case of

semantic referents, the information status associated with them, that is, old or new; and (iii) in the case of (hearer-)old referents, their relative level of salience.

We now consider the four forms of reference to eventualities discussed in section 1. We will show that, in light of the referential behavior of these expressions, previous accounts such as those discussed in the previous section must be revised and extended.

3.1 Gapping

The first form we consider is the gapping construction, exemplified in (1a) and repeated below in (6).

(6) George won the electoral vote, and Al, the popular vote.

Evidence from both syntax and discourse supports H&S's categorization of gapping as a form of surface anaphora. The syntactic basis for its interpretation has been widely argued for, based on its sensitivity to various syntactic constraints that we will not cover here (Ross 1970b, Jackendoff 1971, Hankamer 1971, Stillings 1975, Sag 1976, Neijt 1979, Chao 1988, Steedman 1990, 2000, *inter alia*). Likewise, the data show that gapping fails to pattern with deep anaphora in terms of its referential behavior; for instance, it is more constrained than pronominal reference with respect to referents evoked from clauses other than the most immediate one.

- (7) a. Al was declared to have won Florida, and George, Texas.
 b. #Al was declared to have won Florida, but then the networks rescinded their projection, and George, Texas.
 c. Al was declared to have won Florida, but then the networks rescinded their projection, and he had no option but to wait for the votes to be counted.

Whereas (7a) is perfectly acceptable, the insertion of an additional clause between the source and target clauses renders (7b) unacceptable. In contrast, the pronoun *he* in (7c) is felicitously used to refer to an entity (Al) evoked two clauses prior. Similarly, as with other surface-anaphoric forms, gapping cannot refer to situationally evoked referents:

- (8) [Hankamer produces an orange, proceeds to peel it, and just as Sag produces an apple, says:]
 #And Ivan, an apple. (=Hankamer and Sag 1976, ex. 50)

The surface anaphoric account captures these facts.

This analysis leaves one fact about gapping unaccounted for, however, which was originally noticed by Levin and Prince (1986, henceforth, L&P) and discussed in greater detail in Kehler (2000a, 2002). Briefly, L&P note that pairs of conjoined sentences as in (9a) are ambiguous between a SYMMETRIC reading, in which the two events are understood as independent, and an ASYMMETRIC reading, in which the first event is interpreted as the cause of the second event.

- (9) a. Sue became upset and Nan became downright angry.
 (=Levin and Prince 1986, ex. 3a)
 b. Sue became upset and Nan ϕ downright angry.

That is, under a symmetric interpretation, (9a) describes a situation in which Sue and Nan both expressed independent emotions that may have (but not necessarily) resulted from the same provocation, whereas under an asymmetric interpretation it describes a situation in which Nan became angry because of Sue's becoming upset. L&P point out that the gapped counterpart of (9a), given in (9b), has only a symmetric reading; the reading in which Nan's anger is caused by Sue's becoming upset is unavailable.

The characterization of gapping as surface anaphora does not explain why gapping is inconsistent with asymmetric readings. As such, L&P offer an account that also incorporates a pragmatic component. They base their analysis on the ORDERED ENTAILMENT framework of Wilson and Sperber

(1979), in which processing a sentence results in an ordered set of foreground and background entailments. The background entailments are those OPEN PROPOSITIONS resulting from applying constituent-to-variable replacement rules on focused constituents; the FIRST BACKGROUND ENTAILMENT (FBE) is the open proposition resulting from replacing a minimal tonically stressed (or clefted) constituent with a variable. For instance, (10a), with the indicated stress on *Bill*, has as its FBE (10b), along with the other background entailments (10c) and (10d).

- (10) a. BILL's father writes books.
- b. Someone's father writes books.
- c. Someone writes books.
- d. Someone does something.

L&P then posit a DISCOURSE FUNCTION OF GAPPING rule, which states that all conjuncts in a gapped sentence must share a single open proposition as their FBE. This open proposition consists of the representation of the material deleted in the conjuncts in which gapping has applied, with variables replacing (the representation of) the constituents remaining in those conjuncts. This principle accounts for the symmetric reading of example (9b) because the corresponding elements in both the source and target clauses are contrastively accented. As such, the two clauses share the FBE given in (11).

- (11) Someone became something. [open proposition: X BECAME Y]

According to L&P, however, two FBEs are required for causal implicature. For example, the FBEs for the two clauses in (9a) could be those provided in (12a–b), respectively:

- (12) a. Something happened.
- b. Nan did something.

L&P claim that since gapping requires that all conjuncts share a single FBE, their analysis accounts for the lack of a causal reading in examples like (9b). Kehler (2000a) presents an alternative account that is based on the inferential processes that operate during discourse comprehension. This analysis incorporates the common assumption in the syntax literature that the interpretation of gapping is made possible by the reconstruction of the source syntactic material at the target site (but cf. Steedman 1990, 2000). Unlike syntactic accounts, however, this reconstruction process is not triggered by a (surface) anaphoric interpretation process, but instead only by the need to recover the (elided) arguments of certain kinds of COHERENCE RELATIONS. In particular, reconstruction will occur for those relations that Kehler categorizes in the RESEMBLANCE category, an instance of which is the PARALLEL relation operative in the symmetric reading of (9a–b). In contrast, no reconstruction occurs for CAUSE-EFFECT relations, an instance of which is the RESULT relation operative in the asymmetric reading of (9a). With no mechanism for recovering the antecedent syntactic material, gapping is predicted to be infelicitous under asymmetric interpretations.

While Kehler's account differs from L&P's in various respects, they both address the facts by appealing to principles that apply at the syntax/pragmatics interface, rather than syntax alone. Since we are aware of no independent evidence that the two readings of (9a) are associated with different syntactic structures, it would appear that such an appeal is necessary.

3.2 Verb phrase ellipsis

We now turn to verb phrase ellipsis, exemplified in (13):

- (13) George claimed he won the election, and Al did too.

Note that the pronoun in the source clause leads to two possible interpretations for the target clause: either Al claimed that George won the election (the STRICT reading), or Al claimed that Al won the election (the SLOPPY reading).

Recall that H&S (1976) categorized verb phrase ellipsis as a form of surface anaphora, which is licensed only when an antecedent of an appropriate syntactic form is available. Indeed, there is evidence to support this categorization; consider (14a–c)⁹:

- (14) a. #The aardvark was given a nut by Wendy, and Bruce did too.
[gave the aardvark a nut] (=Webber 1978, ch. 4, ex. 40)
- b. #Al_i blamed himself_i, and George did too. [blamed Al]
- c. #James defended George_i and he_i did too. [defended George]

The unacceptability of (14a) is predicted by the surface–anaphoric account because the source clause is in the passive voice. As such, the syntactic structure representing the active voice verb phrase *give the aardvark a nut* that is required in the target representation is not present in the source clause. Likewise, binding conditions (Chomsky 1981) predict that sentences (14b–c) lack the indicated readings on the assumption that the source verb phrase is reconstructed at the target site.¹⁰ That is, CONDITION A, which requires that a reflexive have a c-commanding antecedent, predicts the lack of a strict interpretation for (14b). Similarly, CONDITION C, which disallows coreference between a full noun phrase and a c-commanding pronoun, rules out the interpretation in which George defended himself in (14c).

However, several researchers (Dalrymple et al. 1991, Dalrymple 1991, Hardt 1992, Kehler 1993a, inter alia) have provided numerous examples in which verb phrase ellipsis is felicitous despite the fact that no appropriate syntactic antecedent is available. Consider the examples in (15a–c):

Passages (1a–b) provide evidence for such a coherence constraint.

- (15) a. In November, the citizens of Florida asked that the election results be overturned, but the election commission refused to. [overturn the election results] (adapted from Dalrymple 1991, ex. 15a)
- b. Ali defended himself_i because Bill wouldn't. [defend Al] (adapted from Dalrymple 1991, ex. 75a)
- c. George expected Al_i to win the election even when he_i didn't. [expect Al to win the election] (adapted from Dalrymple 1991, ex. 75c)

Verb phrase ellipsis is felicitous in (15a), unlike (14a), despite the fact that the source clause is passivized, and thus the syntactic structure for the putative elided active voice verb phrase required by syntactic analyses – *overturn the election* – is not available. Likewise, sentence (15b) is acceptable even though a syntactic account would predict a Condition A violation, as in (14b). Finally, (15c) is felicitous despite a violation of Condition C (cf. 14c).

The fact that neither syntax nor semantics alone can account for the full range of verb phrase ellipsis data suggests that additional pragmatic and/or discourse factors may be at play. Kehler (2000a, 2002) offers an analysis in which these data are explained by the interaction between the properties of verb phrase ellipsis itself and those of the inference processes that underlie the establishment of coherence in discourse (see also Kehler, this volume). The crucial distinction between (14a–c) and (15a–c) is that the former three participate in Resemblance coherence relations (in particular, Parallel), whereas the latter three participate in Cause–Effect relations (VIOLATED EXPECTATION, EXPLANATION, and DENIAL OF PREVENTER, respectively). Kehler argues that two different recovery processes interact to produce this pattern: the anaphoric interpretation of verb phrase ellipsis, and the syntactic reconstruction mechanism posited in the analysis of gapping summarized in section 3.1.

Unlike gapping, verb phrase ellipsis displays the property of being anaphoric, which is demonstrated by its behavioral similarity to pronominal reference. First, as is well known, verb phrase ellipsis and pronouns may be cataphoric in similar circumstances, as shown in (16a–d) (G. Lakoff 1968, Jackendoff 1972):

- (16) a. #George will ϕ_i , if Al [makes a statement claiming the election]_j.
 b. #He_i will make a fool of himself, if Al_j makes a statement claiming the election.
 c. If George will ϕ_i , Al [will make a statement claiming the election]_j.
 d. If he_j makes a statement claiming the election, Al_i will make a fool of himself.

In (16a–b), but not (16c–d), the ellipsis and pronominal anaphors c-command their respective antecedents, and therefore coreference is disallowed. Second, verb phrase ellipsis and pronominal anaphora may both access referents evoked from clauses other than the most immediate one; Hardt (1993) reports that 15 out of 315 instances (5 percent) of verb phrase ellipsis he found in the Brown corpus (Francis 1964) have a referent evoked from at least two sentences prior.

The anaphoricity of verb phrase ellipsis predicts the insensitivity to syntactic form found in examples (15a–c). The remaining question, therefore, is why such a sensitivity is found in examples (14a–c). In section 3.1, we argued that elliptical expressions may be subject to a syntactic reconstruction mechanism. Crucially, this mechanism is not invoked by the need to recover the meaning of the missing material, but instead by the need to recover missing arguments to the coherence relation that is operative. Because this need only arises when the relation is of the Resemblance type, a sensitivity to syntactic form is found only in (14a–c). Thus, while verb phrase ellipsis may take on the superficial appearance of a surface anaphor in the presence of this type of relation, this sensitivity to syntactic form is not a result of its anaphoric properties – which to this point pattern more closely with deep anaphora – but instead is a result of the fact that verb phrase ellipsis also involves omitted syntactic material.

Given its apparent patterning with deep anaphora, we are led to ask whether verb phrase ellipsis allows situationally evoked referents. Schachter (1977a) provides a number of felicitous examples of such ellipsis, including (17a–b):

- (17) a. [John tries to kiss Mary. She says:]
 John, you mustn't. (=Schachter 1977a, ex. 3)
 b. [John pours another martini for Mary. She says:]
 I really shouldn't. (=Schachter 1977a, ex. 4)

Based on such examples, Schachter argues for a proform theory of verb phrase ellipsis, as have others since (Chao 1988, Hardt 1992, Lobeck 1999). However, Hankamer (1978) argues that such cases are, in his terms, either formulaic or conventionalized, occurring only as ILLOCUTIONALLY CHARGED EXPRESSIONS and not generally as declarative statements or informational questions. For instance, the elliptical expressions in (18a–b) are infelicitous, even though the contexts are the same as for Schachter's examples:

- (18) [John tries to kiss Mary. She says:]
 #John, you're the first man who ever has. (=Hankamer 1978, 7a')
 b. [John pours another martini for Mary. She says:]
 #John, are you aware that no one else has? (=Hankamer 1978, 7b')

Based on these data, Hankamer argues that the possibility of situationally evoked referents does not extend to verb phrase ellipsis in general.

Although we maintain that the interpretation of verb phrase ellipsis is a semantic process, we agree with Hankamer that the possibility of situationally evoked referents is extremely restricted. We therefore argue, contra Hankamer and Sag (1976), that the questions of whether a given expression requires an antecedent of a particular syntactic form and whether it can be used for situationally evoked referents need to be kept separate in a general theory of anaphora. We will see in the following section that verb phrase ellipsis is not the only form of anaphora that provides support for this claim.

In sum, verb phrase ellipsis is not strictly categorizable with respect to H&S's distinction between deep and surface anaphora. We have argued that it is similar to deep anaphora in that its anaphoric behavior renders it insensitive to the syntactic form of the referent. The fact that an apparent

sensitivity to syntactic form is manifest when a Resemblance relation is operative is due to factors independent of a theory of anaphora. On the other hand, verb phrase ellipsis patterns with surface anaphora in not generally tolerating situationally evoked referents. Thus, an adequate theory of anaphora must incorporate distinctions beyond those associated with deep and surface anaphora.

3.3 So *anaphora*

In this section we consider so anaphora. The particular form of anaphoric so that concerns us here can appear in preverbal position as in (19a), or postverbally as part of the *do so* construction, as in (19b):

- (19) a. "... and with complete premeditation resolved that His Imperial Majesty Haile Selassie should be strangled because he was head of the feudal system." He was so *strangled* on Aug. 26, 1975, in his bed most cruelly. (*Chicago Tribune*, 12/15/94)
 b. Section 1 provides the examples to be derived by Gapping, and a formulation of Gapping capable of *doing so*. [=deriving the examples] (from text of Neijt 1981)

H&S treat the anaphor so, and consequently the form *do so*, as a surface anaphor. This classification is motivated by the fact that *do so* disallows situationally evoked referents, as illustrated by the unacceptability of example (3c), repeated as (20):

- (20) [Hankamer attempts to stuff a 9-inch ball through a 6-inch hoop. Sag says:] #I don't think you can do so. [=3c]

This restriction appears to be especially strong with so. Recall from section 3.2 that there has been some controversy regarding the possibility of situationally evoked referents with verb phrase ellipsis, given Schachter's purported counterexamples. Although we have seen (per Hankamer's (1978) arguments) that such cases are highly restricted, it is worth noting that so is unacceptable even in these limited cases in which verb phrase ellipsis is licensed. This is demonstrated by the infelicity of examples (21a–b), which differ from (17a–b) only in that they employ *do so* anaphora rather than verb phrase ellipsis.

- (21) a. [John tries to kiss Mary. She says:]
 #John, you mustn't do so. (cf. 17a)
 b. [John pours another martini for Mary. She says:]
 #I really shouldn't do so. (cf. 17b)

The same restriction applies to preverbal uses of so, as seen in (22):

- (22) [A and B together have just witnessed Haile Selassie being murdered by strangulation]
 A: # He was so strangled most cruelly.

Thus, so – whether preverbal, or postverbal as part of the *do so* construction – patterns with surface anaphora in disallowing reference to situationally evoked referents.

However, so does not satisfy the other criterion for surface anaphora; that is, it imposes no requirement for a syntactically parallel antecedent. First, as exemplified by (19b), repeated below as (23a), *do so* can be felicitous in cases in which the voice between the source and target clauses is mismatched; in this case, there is no active voice syntactic representation for the verb phrase *deriving the examples* available in the source clause. Additional examples are provided in (23b–c).

Passages (1a–b) provide evidence for such a coherence constraint.

- (23) a. Section 1 provides the examples to be derived by Gapping, and a formulation of Gapping capable of *doing so*. [=deriving the examples] [=19b]
 b. As an imperial statute the British North America Act could be amended only by the British

Parliament, which *did so* on several occasions. [amended an imperial statute] (*Groliers Encyclopedia*)

- c. It is possible that this result can be derived from some independent principle, but I know of no theory that *does so*. [derives this result from some independent principle] (from text of Mohanan 1983, p. 664, cited by Dalrymple 1991)

Likewise, examples (24a–b) show that *do so* can be felicitous when its referent is evoked from a nominalization:

Passages (1a–b) provide evidence for such a coherence constraint.

- (24) a. The defection of the seven moderates, who knew they were incurring the wrath of many colleagues in *doing so*, signaled that it may be harder to sell the GOP message on the crime bill than it was on the stimulus package. [defecting] (*Washington Post*)
 b. For example, in the dialogue of Figure 2, the purpose of the subdialogue marked (3) is to support the agents' successful completion of the act of removing the pump of the air compressor; the corresponding SharedPlan, marked (P3) in Figure 3, specifies the beliefs and intentions that the agents must hold to *do so*. [successfully complete the act of removing the pump of the air compressor] (from text of Lochbaum 1994)

Finally, other form mismatches between the source and target clauses are attested as well, as illustrated in (25a–b):

Passages (1a–b) provide evidence for such a coherence constraint.

- (25) a. There was a lot more negativity to dwell on, if anyone wished to *do so*.
 [=dwell on more negativity] (*Wall Street Journal*)
 b. With or without the celebration, Belcourt is well worth seeing, and you can *do so* year round.
 [=see Belcourt] (*Wall Street Journal*)

The related preverbal *so* construction also does not require a syntactically-parallel antecedent. In fact, it can be used even in cases in which the intended referent must be inferred, as in (26):

- (26) Regarding a possible Elvis Presley stamp, Postmaster General Frank notes that anyone *so* honored must be “demonstrably dead” for 10 years. (*Wall Street Journal*)

Here, the use of the phrase *so honored* signals to the reader that there is an “honoring” event recoverable from the discourse. In the absence of such an event being explicitly introduced, the hearer is induced to infer one from what has been said. In this case, the referent, which can be paraphrased roughly as “issuing a stamp with a particular person's picture on it,” can be inferred under the presupposition that such an action would constitute an honoring. While the interpretation of this passage may seem effortless, upon closer analysis one finds a non-trivial chain of inference that must be carried out to arrive at the intended interpretation.

Thus, *so* anaphora patterns with surface anaphora with respect to disallowing situationally evoked referents, but patterns with deep anaphora with respect to its insensitivity to the syntactic form of the antecedent expression. It is therefore not categorizable within the H&S dichotomy and, like certain examples of verb phrase ellipsis discussed in the previous section, shows that a simple two-way distinction between deep and surface anaphora cannot be maintained.

Kehler and Ward (1999) present an analysis of anaphoric *so* that captures precisely these properties.

Briefly, *so* serves as an information status marker for the verb phrase it modifies; in particular, it signals a dependency between the event denoted by this verb phrase and other salient, discourse-old information. This treatment provides a unified account of *so doing* and its variant *do so* in which they are analyzed compositionally as forms of hyponymic reference to a previously evoked “doing,” the most general of event types (see also Miller 1990).¹¹ The claim that these expressions are interpreted with respect to semantic representations in a discourse model explains why they do not require an antecedent of a certain syntactic form.

With a minor modification to the notion of discourse-old (Prince 1992), the analysis also captures the fact that anaphoric *so* cannot access situationally evoked referents. Recall from section 2.2 that Prince considers all salient entities to be discourse-old. Because pronouns are indicators of salience, it follows that pronouns mark their referents as discourse-old, which includes referents that achieve salience solely from situational evocation such as in (27a–b).

- (27) a. [Norman sees a copy of *The Handbook of Pragmatics* on a table]
 Fred says to Norman: It's a wonderful book.
 b. [Hankamer attempts to stuff a 9-inch ball through a 6-inch hoop.] Sag says:
 It's not clear that you'll be able to do it. [=3b]

We differ from Prince in that we consider only those entities that have been explicitly (that is, linguistically) introduced into the discourse to be discourse-old. That is, at the moment at which the pronoun is encountered in (27a), *The Handbook of Pragmatics* is highly salient, yet it is discourse-new because there has yet to be a linguistic mention of it. (Of course, this entity becomes discourse-old after the use of this referring expression.) This change in what counts as discourse-old allows for a straightforward articulation of the difference between the referential properties of pronouns and *so* anaphora: We can now simply say that pronouns require that their referents be salient (or IN FOCUS in the sense of Gundel et al. 1993) without further qualification as to the manner of evocation. Thus, not only is it the case that pronouns do not directly mark discourse status (*pace* Prince), they imply nothing with respect to it. On the other hand, *so* anaphora not only encodes the constraint that its referent be salient, but also that it be discourse-old in our sense. Prince's two-dimensional account of information status, as modified, is better equipped to incorporate these constraints, as there is no obvious way to distinguish those referents that achieve salience via (linguistic) introduction into the discourse in unidimensional frameworks such as that of Gundel et al. (1993).

In sum, as with the other phenomena we have considered thus far, the anaphoric use of *so* demonstrates the need to extend or revise current theories of constraints on anaphora. On the one hand, it cannot be categorized within H&S's distinction between deep and surface anaphora, whereas on the other it illustrates the need to extend unidimensional theories of cognitive status to account for the different manners in which entities can achieve salience. It also suggests that Prince's bidimensional framework be revised such that salience does not necessarily imply the status of discourse-old.

3.4 Pronominal event reference

Finally, we consider cases of pronominal event reference, such as *do it*, *do this*, and *do that*, exemplified in (28a–c), respectively.¹²

Passages (1a–b) provide evidence for such a coherence constraint.

- (28) a. As they said about Ginger Rogers: “She did everything Fred Astaire did, and she *did it* backwards and in high heels.”
 b. Writing is a passion, and a film about the genesis of a writer should delve into the mind and heart of its subject. That “Becoming Colette” tries to *do this* is irrelevant, because it doesn't succeed.
 c. So off he goes, writing in his diary the whole 3 day trip and complaining about the food and the runs I suppose, like all English people do when they go abroad, but he writes very well considering he's riding on a bumpy train, I mean he never even smears his ink *once* (I'm

bitter. I can't *do that* with *my* fountain pens ...).

As we mentioned in section 1, these forms are distinct from both verb phrase ellipsis and *do so* anaphora in a number of respects. Unlike verb phrase ellipsis, but like *do so* anaphora, the verb *do* in these constructions is a main verb and not an auxiliary. However, unlike the *do* of *do so*, this verb is transitive. Finally, unlike verb phrase ellipsis (but again like *do so*), these forms are full verb phrases from which nothing has been elided. The anaphoric properties of these expressions derive from the pronoun that occupies the object position, which is constrained to specify an event by the transitive main verb *do*. As one would expect, these pronouns can be used in any grammatical position to refer to events.

Thus, these expressions are uncontroversially forms of deep anaphora, and as such they do not require an antecedent of a particular syntactic form. Indeed, in some cases it is even difficult to precisely identify the linguistic material that gives rise to the referent; this is the case in (28c), for instance, in which we take the referent of *that* to be paraphrased roughly by "write without smearing my ink once while riding on a (bumpy) train." Likewise, as we have already established, such forms readily allow for situationally evoked referents, as in (29):

(29) [Hankamer attempts to stuff a 9-inch ball through a 6-inch hoop. Sag says:]

It's not clear that you'll be able to do $\left\{ \begin{array}{l} \text{it} \\ \text{this} \\ \text{that} \end{array} \right\}$.

However, much more remains to be said about the referential behavior of these expressions. For instance, Webber (1991) illustrates the wide variety of different types of referents to which *that* can be used to refer, as shown in the following examples (adapted from Webber 1991, ex. 5).

(30) Hey, management has reconsidered its position. They've promoted Fred to second vice president.

- a. *That's* my brother-in-law.
- b. *That's* a lie.
- c. *That's* false.
- d. *That's* a funny way to describe the situation.
- e. When did *that* happen?

The referents in each case are: (a) an entity; (b) a speech act; (c) a proposition; (d) an expressed description; and (e) an event. Thus, while the referent of *that* may be constrained in terms of its accessibility within the discourse context, the TYPE of referent involved appears to be relatively unconstrained. This behavior poses interesting questions regarding the time at which representations of such referents are constructed in the discourse model and the means by which they are created.

Webber also points out that *that* is often used to access a referent that is constructed from information communicated in more than one clause. She discusses a variety of such examples, including (31):

(31) It's always been presumed that when the glaciers receded, the area got very hot. The Folsom men couldn't adapt, and they died out. *That's* what's supposed to have happened. *It's* the textbook dogma. But *it's* wrong. They were human and smart. They adapted their weapons and culture, and they survived. (=Webber 1986, ex. 10)

In this example, *that* is used to refer to the sequence of events described in the first two sentences:

the glaciers receding, the area getting hot, the Folsom men's failure to adapt, and their dying out (but – crucially – not the presuming). To model this behavior, Webber (1986) appeals to a process of CIRCUMSCRIPTIVE REFERENCE that identifies this collection of discourse entities and creates a new entity that represents them as a unit. This newly-created entity is then available for subsequent reference, hence the felicitous use of the pronoun *it* in the two sentences that follow.

The existence of a process that creates representations of such referents on the fly raises additional questions regarding the constraints on the use of referring expressions since, strictly speaking, the referent is not available at the time the referring expression is used. As it is, Gundel et al.'s claim (for instance) that referents of *this* and *that* are ACTIVATED is somewhat under-constraining, and the space of possibilities that arise when one considers examples like (31) compound the problem. In a subsequent paper, however, Webber (1991) proposes a specific constraint. She argues that it is not the case that any arbitrary sequence of clauses can give rise to the referent of a demonstrative pronoun, but only those sequences that constitute DISCOURSE SEGMENTS. Furthermore, only certain discourse segments qualify – those whose contribution to the discourse model is currently IN FOCUS.¹³

Webber offers an algorithm that represents the structure of a discourse as a tree, on which a set of insertion operations apply for building discourse structure. (See also Webber et al. (1999) for a system that utilizes a discourse-level version of Lexicalized Tree Adjoining Grammar.) Only those segments on the RIGHT FRONTIER of a tree are in focus at a given time. She provides the following example (her ex. 8):

- (32) a. For his part in their term project, John built a two-armed robot.
- b. He had learned about robotics in CSE391.
- c. For her part, Mary taught it how to play the saxophone.
- d. *That* took her six months.
- d' *That* earned them both A's.

Sentences (32a–b) together form a discourse segment, which then combines with (32c) to form a larger one. In sentence (32d), *that* is used to refer to the event evoked by the immediately preceding clause (32c), which is by definition always on the right frontier. In contrast, *that* in (32d') is used to refer to the set of events evoked by the next larger segment on the right frontier, sentences (32a–c). Whereas both of these references are felicitous, it is hard to imagine an example in which *that* can felicitously be used to refer to a complex referent formed only from material in the non-segment (32b–c), or from the (inaccessible) discourse segment formed by (32a–b), as predicted by Webber's account. As such, the right frontier condition can be seen as a constraint on the use of Webber's notion of circumscriptive reference.

Of course, it is possible for a single discourse segment to give rise to more than one potential referent. Webber (1991) illustrates this point with the following examples:

- (33) a. Segal, however, had his own problems with women: he had been trying to keep his marriage of seven years from falling apart; when *that* became impossible ... (=Webber 1991, ex. 7a)
- b. Segal, however, had his own problems with women: he had been trying to keep his marriage of seven years from falling apart; when *that* became inevitable ... (=Webber 1991, ex. 7b)

In (33a), *that* is used to refer to Segal's keeping his marriage from falling apart, whereas in sentence (33b) *that* is used to refer only to Segal's marriage falling apart. This minimal pair is particularly interesting in that the passages differ only with respect to the adjective following the demonstrative. These examples demonstrate the crucial role that semantic information can play in determining the referent of *that*, including information that is encountered after the referring expression itself. Of course, the fact that both referents may be activated in Gundel et al.'s sense does not help differentiate among these possible interpretations.

Up to this point we have focused primarily on the nominal demonstrative *that*. We now consider the demonstrative *this*, which shares many traits with *that*. In many contexts the two forms can be interchanged with only subtle differences in meaning; consider (34):

(34) Using microscopes and lasers and ultrasound, he removes tumors that are intertwined with children's brain stems and spinal cords. There is only the most minute visual difference between the tumors and normal tissue. Operations can last 12 hours or more. The tiniest slip can kill, paralyze or leave a child mentally retarded. *This* is the easy part of his job. (*New York Times*, 8/11/90; cited by Webber 1991, ex. 2)

Replacing *this* with *that* in the final sentence does not significantly alter the meaning of the passage. One could in fact consider Gundel et al.'s placement of these two forms in the same category as an acknowledgment of this commonality. However, there are also important differences between them. For instance, *this* can be used cataphorically, whereas *that* cannot. Consider the following example:¹⁴

(35) But wait! After this, more stuff happens! Now get *this* – you'll never believe *it*: as it happens (and purely by chance) our two very white firemen bumble into the middle of the execution and get both Ice-T, Ice Cube, and all their very black cronies more than a little miffed at them – especially after they take Ice-T's brother hostage. Thus is the stage set for great drama and tragedy, just as the Bard might have *done it* several hundred years ago.

In the third sentence, *this* is used cataphorically to refer to a complex situation that is about to be described, followed by another mention using *it*. In this case, the demonstrative *that* could not be felicitously used in place of *this*. As an aside, note also that *done it* in the final sentence is used to felicitously refer to an event – which can be paraphrased as *set the stage for great drama and tragedy* – that was evoked by a syntactically mismatched antecedent, in accordance with it being a form of deep anaphora.

This difference between nominal *this* and *that* may be a result of the oft-noted property that *this* encodes proximity of the referent to the speaker in terms of some cognitive dimension (spatial, temporal, perspective, and so forth), whereas *that* indicates distance (Fillmore 1997, inter alia). If hearer-status is viewed as one of these dimensions, then the cataphoricity of *this* could be seen to result from the fact that, at the time of utterance, the referent is “proximal” only to the speaker (i.e., known to the speaker but hearer-new), whereas *that* is appropriate only when the referent is hearer-old. It is less clear, however, what the relationship is between the proximal/distal distinction and the apparent interchangeability of *this* and *that* in passages such as (34).

In sum, the referential behavior of various pronominal forms of reference to eventualities challenges current theories of information status, particularly regarding the constraints on their use and the manner in which their referents are identified – and perhaps even dynamically constructed – in the discourse model.

4 Conclusion

Existing theories of cognitive status and reference in discourse will need to be revised and extended in order to account for the behavior of a variety of types of ellipsis and reference to eventualities. Indeed, the data presented here suggest that a comprehensive model capable of accounting for the distribution of these forms will, at a minimum, require an appeal to principles relating to syntax, semantics, pragmatics, reference, inference, salience, cognitive status, and discourse coherence. The distinctions made in existing theories are simply too coarse to account for the richness of the data that characterize these forms.

One must therefore fight the temptation to be overly reductionist when developing models of discourse processing and reference. In many respects, the full complexity of the integration among the aforementioned areas of language processing needs to be understood before we can arrive at a satisfactory account of reference. On the other hand, the very fact that natural languages offer us so many different ways to refer to things provides important clues to this end.

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1 Following Bach (1986), we use the term *EVENTUALITIES* to refer to events, processes, and states.

2 Gapping is therefore distinguished from *PSEUDO-GAPPING*, in which an auxiliary is left behind, as in (i):

(i) George claimed he won the electoral vote before Al did the popular vote.

3 For discussion of additional constraints and the issues related thereto, see Carlson, this volume, and the papers in Part II (especially those by Abbott, this volume, Gundel and Fretheim, Huang, Kehler, Roberts, and Ward and Birner.)

4 In Sag and Hankamer (1984), this dichotomy was revised to distinguish between two types of anaphoric processes: *ELLIPSIS* (their earlier surface anaphora) and model-interpretive anaphora, or *MIA* (their earlier deep anaphora). The former process derives antecedents from *PROPOSITIONAL REPRESENTATIONS* that maintain some degree of syntactic constituent structure. On the other hand, *MIA* operates with respect to purely semantic representations in a discourse model. In some respects the ellipsis/*MIA* distinction more adequately characterizes the difference between these two types of contextual dependence; the process of recovering a missing syntactic representation is arguably not a form of anaphora at all. However, following standard practice in the literature, we will nonetheless continue to use H&S's original and more familiar "surface" and "deep" terminology.

5 Authors vary as to whether they consider unacceptable examples of surface anaphora to be syntactically ungrammatical (identified as such with a "*") or pragmatically infelicitous (identified with a "#"). The difference is a crucial one in that it reflects whether anaphora and ellipsis are taken to be governed by principles of syntax or semantics/pragmatics. In light of the crucial role that context plays in judging the acceptability of such examples, however, we shall uniformly mark all unacceptable examples of anaphora and ellipsis with the mark of pragmatic infelicity.

6 Again, we refer the reader to the other papers in Part II of this volume.

7 Of course, it could turn out that the hearer was already familiar with a referent that was introduced indefinitely:

(i) I saw a guy on the subway today. He turned out to be your roommate Joe! In such a case, the hearer will associate the newly created representation for the guy introduced in the first sentence with that of Joe upon interpreting the second sentence.

8 Gundel et al. (1993) use the term *COGNITIVE STATUS*, whereas Prince (1992) uses the term *INFORMATION STATUS*. We will use these terms interchangeably.

9 See also Kehler, this volume, for a discussion of data like these.

10 We should note that not all informants agree that (14b-c) are unacceptable under the intended interpretation, and in fact judgments for examples involving verb phrase ellipsis and binding theory violations are notorious for being subject to a great deal of idiolectal variation. See Kitagawa (1991), *inter alia*, for discussion.

11 Note that while *so doing* and *do so* are variants, they are distinct from forms such as *so do(es)* and *so did*, which contain auxiliary *do*. As such, other auxiliaries can be used in these latter constructions (i) but not in the former ones (ii):

(i) George will/may/can claim victory, and so will/may/can Al.

(ii) #George will/may/can claim victory, and will/may/can so Al. Moreover, only the auxiliary constructions are compatible with stative antecedents as shown in (iii) and (iv):

(iii) George intends to claim victory, and so does Al.

(iv) #George intends to claim victory, and Al does so too.

12 Examples (28a-c) were collected from an on-line corpus of movie reviews.

13 Webber's use of the term *IN FOCUS* should not be confused with that of Gundel et al. (1993).

14 Example (35) was also collected from an on-line corpus of movie reviews.

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