Pronouns Without NP Antecedents: How Do We Know

When a Pronoun is Referential?

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Pronouns without explicit noun phrase antecedents pose a problem for any theory of reference resolution. We report here on an empirical study of such pronouns in the Santa Barbara Corpus of Spoken American English, a corpus of spontaneous conversation. Analysis of 2,046 third person personal pronouns in fourteen transcripts indicates that 330 (16.1%) lack NP antecedents. These pronouns fall into a variety of subtypes. 88 refer to entities that are inferable from an activated frame or script, or are otherwise easily accommodated. In 110 cases, *it* could refer to a fact, proposition, event, activity, situation, or reason that has been evoked by a previous non-nominal antecedent. Finally, 92 cases of *it* were classified as pleonastic. We focus on some problematic subclasses of pronouns that could be analyzed as either referring to entities of various degrees of abstractness that were introduced by or implied in previous discourse, or as non-referential, including pleonastic. Such cases include certain non-specific uses of *they*, possible truncated cleft pronouns, and possible truncated extraposition pronouns.

1. Introduction

The referent of a prototypical pronoun has been recently introduced into the discourse by a noun phrase, i.e. the pronoun has an explicit noun phrase 'antecedent', as in (1):

(1)a. My neighbor's Bull Mastiff bit a girl on a bike.
   b. **It**'s the same dog that bit Mary Ben last summer. (Gundel et al., 1993)

These are the simplest cases for a theory or algorithm for pronoun resolution to account for. It is well known, however, that such an antecedent is neither necessary nor sufficient for appropriate pronoun use. As shown in (2), the personal pronoun *it* in English is not always acceptable even when there is a recent NP antecedent because the referent of that antecedent is not sufficiently salient.

(2) a. Sears delivered new siding to my neighbors with the Bull Mastiff.
    b. #**It**'s the same dog that bit Mary Ben last summer. (Gundel, et al., 1993)

Moreover, an NP antecedent, or an explicit antecedent of any sort, is not always necessary, a fact which poses problems for any theory of reference resolution (see Cornish 1999, Gundel, Hedberg and Zacharski 2000, Byron 2000, inter alia).

In the present paper, we report on an empirical study of personal pronouns without NP antecedents in the Santa Barbara Corpus of Spoken American English. Particular attention will be paid to cases where it isn't clear whether the pronoun is referential or not, specifically whether it refers to a fact, situation, proposition, etc. or whether it is the subject of a truncated cleft (Hedberg 2000), a truncated extraposition construction, or is otherwise possibly non-referential.

2. Methodology

We analyzed roughly the first 10 pages, ranging from 9.5 to 25 minutes, in each of 14 transcripts from the Santa Barbara Corpus of Spoken American English Part-1 (DuBois, et al., 2000). The transcripts represent conversations between two to six speakers in a variety of settings. For example one conversation took place when the three participants were preparing a dinner, another took place at a birthday party, and a third was a classroom discussion.

We coded each of the 2,046 third-person personal pronouns (excluding false starts) in the corpus for whether or not it had an explicit coreferring NP antecedent.[1] Pronouns without such antecedents were further classified as pleonastic (i.e. expletive and non-referential) or referential. Referential pronouns were further classified into type of referent (e.g. proposition, fact, activity), if they had a non-nominal antecedent; or as an inferrable, if they had no antecedent at all and therefore had to be inferred by means of a bridging inference. Pleonastic pronouns were further classified into type (e.g. cleft, extraposition, atmospheric).

The results of the primary classification are shown in Table 1.

	N	%
NP antecedent	1676	83.34
Inferrable	88	4.38
Non-nominal antecedent	110	5.38
Pleonastic	92	4.50
Other[2]	40	2.00
Total	2046	100.00

Table 1: 3rd Person Personal Pronouns in Santa Barbara Corpus

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[1] For the sake of comparison, we also counted the demonstrative pronouns in the transcripts, finding 601, and classified them as to whether or not they had an NP antecedent.
[2] The 'Other' category included pronouns referring to entities in the extralinguistic environment, idioms such as 'God damn it', and pronouns that we couldn't interpret.

It can be seen that 16.1% of the pronouns lacked NP antecedents. We now turn to a discussion of each of the major categories of these.

3.   Inferrables

3.1   Referential Inferrables.

In (3), the referent of the pronoun is an example of what Prince (1981) calls an 'inferrable', (cf. 'associate anaphor' (Hawkins 1978, 1991), 'indirect anaphor' (Erku & Gundel 1987 and Gundel, et al. 2000)). The referent of the pronoun hasn't been explicitly mentioned in the discourse, but the addressee can infer from mention of the kids across the street that *she* refers to their mother.

(3)   [Talking about how the kids across the street threw paint in their yard.] Those kids are just – And **she**'s pregnant with another one. (2.294)

Most of the inferrables have what Cornish (1999) calls an 'antecedent trigger'. For example, in (3) the antecedent trigger for *she* is *the kids*. There are a variety of relations between the antecedent trigger and the inferrable pronoun. Sometimes these are stereotypical connections as in (3) or in (4), where the antecedent trigger is the name of the musical group Oba Oba (or possibly the whole statement 'We went to see Oba Oba') and the referent of the pronoun *it*, the concert performed by the group, must be inferred from the statement that the speaker went to see the group.

(4)   We went to see Oba Oba. You know. Ruben loved **it**. (6.157)

Other examples include discussion of filing a police report to *they* referring to the police, or from discussion of a class to *he* referring to the teacher. In some of these cases, the referent is inferred from an activated frame or script, such as a classroom script that includes the information that a classroom has a teacher.

Other possible relations include specific entity to generic kind, generic kind to set of specific entities, individual to couple, or individual to group (cf. the "poset" relations of Hirschberg 1991). In (5), for example, the antecedent trigger is *Trish* and the inferrable makes reference to the couple, Trish and her husband.

(5)   A: Was it Trish who told me she was pregnant?
       B: She looked really good. Where are **they** going to church? (13.221)

Gundel et al. (2000) propose that most pronominal inferrables constitute minor violations of the restriction that the referent of a pronoun must be in focus, if unstressed, or at least activated, if stressed (Gundel, Hedberg and Zacharski 1993), and the addressee must accommodate the violation in order for correct interpretation to take place. They further point out the pronominal inferrables are relatively infrequent and, for the most part, restricted to casual, spontaneous discourse. This supports the hypothesis that they are often performance errors and that accommodation is involved in their processing. These claims are also supported by our current data, where less than 5% of the total number of personal pronouns are inferrables. In (5), for example, there is no reason to assume that mention of Trish would automatically bring into focus a representation of Trish and her husband, and it is difficult to imagine a formal mechanism that would activate Trish's husband every time she is mentioned. But the referent of the pronoun is easily accommodated.

As in the earlier study, we do however find a few examples of pronominal inferrables whose referent can be assumed to be in the focus, or at least activated, at the point just before the pronoun is uttered. For example in (6):

(6)   A: Where is that salad spinner? Here it is.
        B: And possibly the most spurious device ever created.
        A: Oh I think **they**'re great. (3.155)

We can assume that reference to a particular salad spinner will activate a representation of the generic kind of salad spinners and, in this context, would be brought into focus since speaker B makes a generic statement about salad spinners. This would also be predicted by the claim that all (successful) references are at least type identifiable since processing at the NP/DP level necessarily involves processing at all lower N levels.

Whether they are in focus or not, these examples are referential, and their reference must be resolved in order for full interpretation to take place. In accommodation cases, the inferential process required for resolution relies on general pragmatic principles, as there is no obvious formal mechanism that activates the appropriate referent based on linguistic information alone. We now turn to a discussion of the possibility that some inferrable pronouns might not be referential at all.

3.2   Vague Inferrables.

There are some inferrable pronouns that are only loosely referential but may be restricted in reference by a currently activated entity or frame. For example, in (7) and (8), *they* seems to refer to people in general. In (9) it is even more vague.

(7)   And **they** say that if there's six years between children, there's not that much rivalry. (7.1247)

(8)   And **they** probably didn't have to wash their salads back then, because they didn't know what was on them. (3.165)

(9)   He said I didn't get done working until after nine. …Cause that five-car pile up **they** had between Hardin and Crow? (7.414)

Reference resolution in such cases is not only difficult, but typically unnecessary. Sentences like (7) can be replaced by agentless passives with no loss of information content, as in (10).

(10)   It is said that if there's six years between children, there's not that much rivalry.

There seems to be a continuum then between clearly referential inferrables and nonreferential inferrables as reference proceeds, for example, from a specific woman across the street as in (3); to the people in the office, whoever they might be; to people in general as in (7), (8), and (9).

4.   Pronouns With Non-Nominal Antecedents.

Events and activities, as well as facts, propositions, situations and other 'higher-order'/abstract entities are often introduced into discourse by non-nominal constituents like clauses, sequences of clauses and verb phrases. Previous work has found that it is more common for such entities to be referenced by a demonstrative pronoun than by a personal pronoun. For example, Webber (1991) found that only 15 out of 96 (or 15.6%) pronominal references to clausally introduced material in written English were made using the personal pronoun *it* as opposed to a demonstrative pronominal *that* or *this*. Hegarty, Gundel, & Borthen (2001), in a study of both spoken and written texts, reached an almost identical result, finding that only 15 out of 95 references to entities introduced by expressions larger than a noun phrase were made with *it* as opposed to *this* or *that*.

The theory of referential expression choice of Gundel, et al. (1993) can explain these figures if entities introduced by a clause or sequence of clauses are activated, but are much less likely to be brought into focus than entities introduced by noun phrases in syntactically prominent positions. Gundel, Hegarty & Borthen (In Press) further suggest that one factor determining whether a clausally introduced entity is brought into focus, and is therefore available to immediately subsequent reference with *it* is its degree of 'world immanence' (roughly degree of abstractness), as discussed in Asher (1993). Specifically, the more world immanent the referent, the more likely it is to be brought into focus when first introduced by a non-nominal constituent. In processing terms, the reason for this correlation may be that eventualities (i.e. states, activities, and events) which have a

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relatively high degree of world immanence, with spatiotemporal location and causal efficacy, are directly introduced when a clause or verb phrase is processed. They are therefore more likely to be brought into focus than facts or propositions, which have low world immanence and require an additional level of processing before they are introduced into the discourse model. The examples in (11)-(14), all from Hegarty, et al. (2001) illustrate these claims.

(11)   John insulted the ambassador. **It/that** happened at noon.

(12)   John insulted the ambassador. ??**It/that/this** was intolerable to the embassy.

(13)   A: I read somewhere that the poodle is one of the most intelligent dogs around.
        B: well uhm. . I definitely wouldn't dispute **that**. (Switchboard Corpus, Dialog 2019)
        B':?? well uhm. . I definitely wouldn't dispute **it**.

(14) a.   "We believe her, the court does not, and **that** resolves the matter," Mr. Montanarelli said today of Ms. Lewinsky's testimony that… (NY Times, 5/24/00)
        b.   "We believe her, the court does not, and **it** resolves the matter," Mr. Montanarelli said today of Ms. Lewinsky's testimony that…

In (11), where the pronoun refers to the event of John insulting the ambassador, the personal and demonstrative pronouns are equally acceptable. By contrast, the personal pronoun is less acceptable in (12) where it refers to the situation of John's insulting the ambassador. A personal pronoun is also less acceptable than a demonstrative in (13), where it refers to a proposition, and in (14), where it refers to a fact.[3] The contrast is especially striking in (14), where there is a competing `in focus' entity, the court. The personal pronoun in (14b) would be taken as referring to the court rather than to the complex fact introduced in the preceding two clauses.

Our data support the claim that referents of pronouns with non-nominal antecedents are not usually brought into focus, and are thus relatively inaccessible to subsequent reference with the personal pronoun *it*. Only 110, roughly 5%, of the total number of personal pronouns and 1/3 of the total number of personal pronouns without NP antecedents referred to entities associated with a non-nominal expression. Moreover, only

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[3] The distinction between facts, situations, events, etc. is not always clear cut, but can usually be determined from the semantics of the predicate. For example, *it* in *It happened at noon* refers to an event (cf. *The event happened at noon,* but *??The situation happened at noon*), but it refers to a situation in *It was intolerable* (cf. *The situation was intolerable*, but ??*The event was intolerable*).

16 of these (15% of those with non-NP antecedents and 0.8% of the total number of personal pronouns) were coded as referring to facts and propositions, and few if any of those were clear cases.

By contrast, an analysis of demonstrative pronouns in our data reveals that 433 out of 601 of these (or 72%) lacked NP antecedents. Although we haven't yet done a classification of these demonstrative pronouns as to referent type, perusal of the data reveals quite a few references to facts and propositions, for example (15) and (16):

(15)   Pete: I stuck up for you today at that store.
          Harold: **That**'s true.   (2.169.79)

(16)   This is a raging bureaucracy, . . and there's nothing I can do. . . I have found **that** out. (4.445.98)

In (15), *that* refers to the proposition that Pete stuck up for Harold today at the store. In (16), *that* refers to the fact there is nothing the speaker can do.

With regard to personal pronouns, it is at least consistent with the proposal in Gundel, et al. (In Press) that very few personal pronouns with non-nominal antecedents in our data refer to facts and propositions, since the latter have low world immanence and are therefore less likely to be brought into focus upon introduction into the discourse with a clause or VP. Some of the clearer examples of references to facts or propositions with the pronoun *it* are given in (17)-(19).

In (17), *it* in *it's a double whammy* may be interpreted as referring to the fact, associated with the previous three clauses, that Chicanos don't vote in great numbers (compared to other Americans) and that Americans don't vote in great numbers (compared to people in other countries).

(17)   ... Chicanos do not vote in great numbers. And we don't participate in many organizations in great numbers... .I don't care if you're African-American, …I don't care if you're Asian- American, . . . and I don't care if you're Latino, or whatever. . . . Most Americans, . . . do not vote, . . . in great numbers. . . . So, . . **it**'s a double whammy. (12.1026)

In (18) the speaker is suggesting that they check out the proposition that the measuring cup is unbreakable. In (19) the speaker is saying that the proposition that they approve the loan request is moved and seconded.

(18)   Wendy: . . . Yes. Microwavable, chef. Eight ounce measuring cup. Is virtually unbreakable.
          Kevin: Virtually, let's find out.

Kendra: Let's check **it** out.   (13.551)

(19) Joe: I am moving that we approve this loan request

                   (about three minutes of discussion)

      Fred: I second then Joe . . .

      Joe: So **it**'s moved and seconded . . to uh . .   (14.415)

Note, however, that (17)-(19) are not counterexamples to the claim that a clause or verb phrase doesn't bring an associated fact or proposition into focus, since, in all three cases, the fact or proposition has been mentioned, overtly or covertly, in an intervening sentence. This could be what brings the fact or proposition into focus and licenses reference with a personal pronoun. In (19), moreover, the entity is introduced as a complement to a verb that takes a proposition as an argument. So it is likely to have been introduced as a proposition the first time.

The majority of pronominal references with non-nominal antecedents in our data were classified as activities (25%) or situations (57%), though it wasn't easy to tell activities, events, states and situations apart in many cases. The relatively high number of personal pronouns referring to activities is consistent with the proposal that activities and states are more likely to be brought into focus because of their high world immanence. In (20), for example, the pronoun *it* refers to the activity of doing the translations, which was introduced in the infinitival clause.

(20)   I'm going to do some translations for her and stuff? And um, you know, I have to make at least 50 dollars or so, to make **it** worth my time. (7.323)

In (21), the pronoun clearly refers to throwing a green pepper down the addressee's blouse.

(21)   I threw a green pepper down your blouse. … (SNIFF) .. I thought **it** was funny. (3.384).

We also found quite a few cases where *it* seemed to refer to a situation. It is less clear why there should be so many situations referenced with pronominal *it*, as situations are intermediate in world immanence; but the distinction between situations, activities and states was not very clear and some of these may have been misclassified.

For example, in (22), the pronoun was coded as referring to a situation. However, it could also be interpreted as referring to the activity of watching the car thief showing how not to get your car broken into. The

latter interpretation would be more consistent with the use of a personal pronoun here, given the relatively high world immanence of activities.

(22)   He's gonna show us, you know, how not to protect your car, not to get it, you know, ripped off man. Cause, you know, I -- . , yeah, I was into **it**. (6.31)

Finally, some of the examples of *it* coded as referring to situations were quite vague, for example (23).

(23)   Mary: ...It is really hard living with another couple.
         Alice   ... I mean, .. we -- If we set our -- .. if we sit down and set some rules, which we never did, .. **it** could work. (7.103.78)

5.   Pleonastics

The main three types of pleonastic pronouns were cleft pronouns, extraposition pronouns and atmospheric pronouns, as exemplified in (24)-(26):

(24)   Was **it** Trich who told me she was pregnant? (13.216)

(25)   I just think **it**'s so damn weird we're here. (5.529)

(26)   **It** rained during the dry season. (3.526)

These are clear examples of pleonastics, where the pronoun could be identified as non-referential on purely grammatical (syntactic) grounds, based on the predicate-argument structure of the sentence. But there were some cases where it is not clear whether the pronoun is truly non-referential. There were two types of such pronouns in the corpus: truncated cleft pronouns and truncated extraposition pronouns.

5.1   Truncated Cleft Pronouns

Subjects of truncated cleft sentences, as in (27), where there is ellipsis of the cleft clause *who stole Hector's radio*, were also classified as pleonastic.

(27)   A: It's obvious now that this guy w- -- This was the one who stole .. Hector's [radio]. I mean, .. nobody came out and told you, guess what, I confess.

B: Oh, we knew. .. We knew. .. We figured **it** had to be Michael. (2.70)

However, Hedberg (2000) presents a theory of cleft sentences that claims that cleft pronouns combine with the cleft clause to form a discontinuous definite description, i.e. a referring expression. The appropriate form of the pronoun is determined by the cognitive status of the intended referent of the description, as the Givenness Hierarchy of Gundel, et al. (1993).

In (27), for example, the interpretation of the elided description (the one who stole Hector`s radio) is in focus because it has just been introduced in a syntactically prominent focus position in (24A). Hedberg maintains that the cleft pronoun is not a meaningless, pleonastic element but rather is referential in the sense that a determiner is in the case of full clefts, and in the sense that at least some pronouns are in the case of truncated clefts. To understand in what sense the subject pronoun of a truncated cleft is referential, compare (27) with Hedberg's example in (28).

(28)   My heart beat fast, for I had thought that as the discoverer of the body I would be the first to be called; but to my surprise, **it** was Marcel.

Here, the truncated cleft could be replaced by a full cleft, *It was Marcel who was called.* Hedberg's claim is that the subject pronoun in the truncated cleft co-refers with *the first to be called*.

There are several examples of truncated clefts in the Santa Barbara corpus whose subjects we classified as pleonastics but which could equally well be classified as referring to a reason or a cause evoked in prior discourse. For example, (29) and (30):

(29)   A: So that's why you're interested in death?
            B: Maybe **it**'s because my parents were old? When I was young?   (5.499)

(30)   A: What do you think makes em look African?
            B: Their mustaches?
            A: Is **it** the way their little beard goes? (2.517)

Here again, the truncated cleft could be replaced by a full cleft: *Maybe it's because my parents were old that I am so interested in death*; *Is it the way their little beard goes that makes em look African?* Furthermore, the sentences could be paraphrased as pseudoclefts: *Maybe why I'm so interested in death is because my parents were old*; *Is what makes em look African the way their little beard goes?* However, the cleft pronoun in both (27) and (28) can also be taken as referring to a reason or cause evoked in the previous question. So (26) may be

paraphrased as *Maybe the reason I'm so interested in death is because my parents were so old*; *The cause of them looking African is the way their little beard goes.*

In (31), the pronoun could be analyzed as the pleonastic subject of a truncated cleft, but it could also refer to a cause, the existence of which can be inferred from the fact that the speedometer fell. The full cleft paraphrase here would be *I knew exactly what it was that caused it.* The noncleft paraphrase would be *I knew exactly what the cause was.*

(31)   I saw my .. my speedometer just go Brr=. .. like that just dow=n,. You know, and I knew exactly what **it** was.

The subject pronouns in (27)-(31) can thus be analyzed as 'referential'. Moreover, unlike subjects of full clefts, their non-referential nature can't be predicted on the basis of grammatical properties alone.

It is consistent with the data, however, to claim that truncated cleft pronouns are true pleonastic pronouns, and that what the hearer must do is to reconstruct the material elided from the cleft clause. What's important here is that for purposes of interpretation it doesn't matter which analysis is chosen. Either the referent of the pronoun must be resolved, or the logical form of the utterance must be enriched (in the relevance theoretic sense of Sperber & Wilson 1986) to provide the information in the elided cleft clause. And in both cases, the relevant material must be in the addressee's focus of attention.

5.2   Truncated Extraposition Pronouns

We classified some pronouns as pleonastic because they could be analyzed as truncated extraposition pronouns, as in (32) and (33).

(32)   And the second week they were just like (YELL), and so I had to scream at them, all week long. And **it** was really awful, cause I felt horrible about it. (4.83)

(33)   You can't really tell when they blush. **It**'s very unusual. (4.298)

Both these sentences can be paraphrased as extraposition constructions: *And it was really awful that I had to scream at them, all week long; It's very unusual for them to blush.* They thus have a full paraphrase that is identical to the type that full extraposition clauses have, as in (34) and (35):

(34)   But, for me **it**'s really difficult to pick up a book about death. (5.217)

(35)   And finally **it** dawns on Lisabeth that she doesn't see Mom that much. (6.275)

Pronominal subjects of Extraposition constructions are generally analyzed as pleonastic, and we classified them as such. But the subject pronouns in the truncated cases could equally well be analyzed as referring to entities evoked in previous discourse, such as a situation in the case of (36) or a generic event or process in the case of (37). And the pronoun can be replaced by a full definite phrase referring explicitly to such a referent:

(36)   And **the situation** was really awful, cause I felt horrible about it.

(37) **The event of them blushing** is very unusual.

However, as with the truncated cleft examples, the non-referential, pleonastic nature of the pronoun cannot be determined solely on the basis of grammatical properties. And even if the pronoun is analyzed as pleonastic, the ellipsis has to be reconstructed in order for full interpretation to take place.

Table 2 breaks down pleonastic pronouns into the subtypes discussed here.

	N	%
Atmospheric	8	8.70
Full cleft	10	10.87
Full extraposition	26	28.26
Truncated cleft	27	29.35
Truncated extraposition	14	15.22
Other pleonastic	7	7.61
Total	92	100.00

Table 2: Pleonastic Pronouns

6.   Conclusion.

To sum up, 330 of the third person personal pronouns in our corpus, or 16.1%, lacked NP antecedents. This figure can be compared to the percentages of pronouns without NP antecedents reported on in Byron (2002). As Byron notes, Eckert and Strube (2000) found that 55% of pronouns in a set of Switchboard dialogs lacked NP antecedents. Byron and Allen (1998) found that 50% of pronouns in the TRAINS corpus lacked NP antecedents; and Botley (1996) found that 20% of pronouns in a corpus of newswire documents, literary

narrative, and parliamentary proceedings lacked NP antecedents. In at least some of these cases, demonstrative pronouns were included in the study, so the total number of pronouns lacking NP antecedents can be expected to be higher than the figure we found since, as discussed above, demonstrative rather than personal pronouns are often used to refer to propositions, situations, and speech acts. Byron and Allen (1998) compared demonstrative pronouns with the personal pronoun *it* and found that 79% of the former lacked NP antecedents while only 25% of the latter did so. These percentages compare quite closely with our 73.3% and 16.1% respectively.

The central finding of this paper is that it isn't always easy to determine whether a given personal pronoun is referential or nonreferential. We found several apparently inferrable pronouns that were vague in reference, and some references to higher-order entities were quite vague. Furthermore, quite a few pronouns were difficult to classify as either pleonastic or referential. The speech genre analyzed in this paper was that of unplanned conversation, which was in most transcripts, quite casual. It seems likely that instances of semi-referentiality would be maximized in this genre. In future research we will compare our results with a similar study of more formal, planned speech, even edited, written speech such as newspaper articles. We also plan to examine demonstrative pronouns more carefully, to see if semi-referentiality is also a feature of demonstrative pronouns. Finally, more work is needed on the classification of type of referent (e.g. proposition, fact, situation, etc.) for both personal and demonstrative pronouns.

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