

Unheralded Pronouns and Management by Common Ground

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Pronouns are *unheralded* when they appear without an explicit antecedent in the immediate context. Speakers use such pronouns when they believe, by virtue of common ground with an addressee, that a referent is implicitly in the focus of attention. In a series of three experiments, we use unheralded pronouns to demonstrate the waxing and waning of the accessibility of discourse referents as a function of common ground. Subjects read stories in which two characters initially discussed a third (target) character. We show that, as the original two characters were separated and reunited, subjects became slower and faster to recognize a word that referred to the target character. © 1994 Academic Press, Inc.

Toward the end of William Faulkner's *The Sound and the Fury*, a greatly excited librarian presents a dogeared photograph clipped from a magazine to the elderly Dilsey:

'It's Caddy!' the librarian said. 'It is! Dilsey! Dilsey!'

'What did he say?' the old Negress [Dilsey] said. And the librarian knew whom she meant by 'he', nor did the librarian marvel, not only that the old Negress would know that she (the librarian) would know whom she meant by the 'he', but that the old Negress would know at once that she had already shown the picture to Jason. (p. 418)

What is noteworthy here is Dilsey's use of the pronoun "he." Contrary to ordinary expectations, no individual has been men-

tioned locally in the text that could serve as an appropriate referent for this "he." Rather, just as Faulkner suggests, the referent for "he" resides somehow within the corpus of knowledge that the librarian and Dilsey can safely assume each other to hold in common.

Dilsey's "he" is an elegant example of the category of *unheralded* pronouns (Gerrig, 1986). The process by which unheralded pronouns pick out their referents cannot be mediated by textual antecedents in the immediate discourse; rather, these pronouns can only be comprehended if, in the course of constructing and understanding a discourse, speakers and addressees make knowledge that they hold in common relatively more accessible than other knowledge. In this way, unheralded pronouns have much in common with other types of referring phrases. Consider the librarian's assertion, "It's Caddy!" If "Caddy" is to refer successfully, the librarian must have good reason to believe that Dilsey can infer a unique individual named by "Caddy" who is mutually known to both Dilsey and

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herself (Clark & Marshall, 1981). In everyday experience, language users may know *individually*, for example, one or two dozen men named "Michael." In any given context of use, "Michael" will refer successfully to the extent that some one of those Michaels becomes uniquely salient with respect to mutual knowledge.

In a classic analysis of definite reference, Clark and Marshall (1981) argued that individuals must maintain memory structures that are comparable to diaries: These mental diaries encode events along with information about those other individuals who shared experiences (either directly or indirectly) of these events. Clark and Marshall argued that the information in these diaries generally rests on three sorts of grounds: community membership, physical copresence, and linguistic copresence. As the examples presented in Table 1 show, we can

find naturally occurring unheralded pronouns that rely on each of these categories of evidence.

These diaries must therefore be indexed in such a fashion that when two language users are in contact some set of entities becomes relatively more accessible than others for subsequent reference by some range of referring expressions. For example, imagine that Ann has successive conversations with Bob and Carol. If reference is to function smoothly, it should be the case that certain representations become more or less accessible as Ann turns from Bob to Carol. Our experiments will demonstrate exactly such a waxing and waning of the accessibility of referents as a function of story characters parting and reuniting.

Although Clark and Marshall's analysis of the accumulation of common ground focused on the experiences of speakers and

TABLE 1
SOME EXAMPLES OF NATURALLY OCCURRING UNHERALDED PRONOUNS

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1. *Community membership.* Language users often make strong assumptions about what is likely to be mutually known based on shared membership in a variety of communities.
Two people are watching Madonna's "Material Girl" video:
Speaker 1: The set is a rip-off from "Gentlemen Prefer Blondes."
Speaker 2: Is that the one where she's standing over the grate and her dress blows up?
"She" and "her" refer to Marilyn Monroe. The reference is successful because both speakers are aware that they are members of the community of people familiar with Monroe's work. (Note that the answer to Speaker 2's question is "no.")
 2. *Physical copresence.* Two (or more) language users can usually assume that objects that are physically present and easily visible form part of their common ground.
Said of a dying fire: It needs more wood.
Said of a Daumier drawing at a museum: It really captures the moment.
In these cases, each "it" refers because the speaker and addressee are in the physical presence of the fire and the drawing.
 3. *Linguistic copresence.* Language users most often can safely assume that information contained in earlier parts of a conversation (or in past conversations) is in common ground.
The following utterance was spoken to initiate a conversation. It occurred 2 days after a previous conversation in which the speaker and addressee had discussed a car that had been stolen.
Speaker: I got it back.
Here, "it" refers to the speaker's car only by virtue of the previous conversation. The use of a pronoun is felicitous because of the salience of the event.
 4. *Mixed grounds.* Language users sometimes rely on more than one source of evidence for common ground.
A speaker who was giving a lecture addressed the following utterance to someone who arrived late and was standing in the doorway.
Speaker: "Hi. Come in. There may be one back there."
"One" refers to a chair. The reference succeeds based in part on the physical evidence of chairs in the room and in part on the expectation, based on community membership, that individuals would prefer to sit during lectures.
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addressees, it can be naturally extended to the circumstances of reading. Readers are not properly the addressees of the utterances in texts. Rather they can be conceptualized as side-participants (see Gerrig, 1993): Side-participants are those members of multiparty conversations who are not themselves properly the addressees of utterances but whom a speaker intends, even so, to be informed by those utterances (Clark & Carlson, 1982). For example, in this excerpt from Maya Angelou's memoir *I Know Why the Caged Bird Sings*, the narrator, who is known as Sister, interprets an unheralded pronoun in her role as a side-participant (the speaker is her Uncle Willy):

"Momma, why don't you and Sister walk down to meet him?"

To my knowledge, Bailey's name hadn't been mentioned for hours, but we all knew whom he meant. (p. 111)

Although Uncle Willie's utterance is addressed to Momma, Sister understands—and was intended to understand—who was meant by "him." Uncle Willie has designed his utterance having in mind not only the common ground he shares with his addressee but also that which he shares with this side-participant. Sister, as a side-participant, is expected to access common ground in the same way that Momma does, as the addressee. In a similar fashion, authors most often design their utterances with respect to their expectations of the common ground they will share with their readers, and readers accumulate common ground as if they were side-participants in a conversation.¹ The role of reader, there-

fore, is a comfortable extension of the role of side-participant. In either role, unheralded pronouns will succeed or fail depending on whether common ground has been managed in an appropriate fashion.

Unheralded pronouns, thus, are like ordinary referring phrases with respect to the demands they put on common ground. However, they also highlight special properties of pronouns. In general, speakers use pronouns to refer to entities that are in the focus of attention (Brennan, 1989; Chafe, 1974; Ehrlich, 1980; Fletcher, 1984; Greene, McKoon, & Ratcliff, 1992). Successful resolution of a pronoun requires that some entity be sufficiently accessible in the comprehender's discourse representation to provide a unique match to the pronoun as a recall cue; if there is no such unique entity, pronoun resolution may fail (Greene et al., 1992). The accessibility of discourse entities may be affected not only by explicit references to them, but also by other features of the discourse. For example, it is possible that the reunion of two characters who share common ground may be sufficient to make some element of that common ground accessible enough so that a subsequent pronominal reference will fully restore it to the reader's focus of attention.

Information about the comings and goings of various characters is an important aspect of everyday texts, and our experiments are intended to investigate one way comprehenders use this information to guide their understanding. As an illustration, consider Chafe's (1974) analysis of the story of Jack and the Beanstalk, in which he describes the movement of the concept of Jack's mother into and out of the listener's consciousness.² Jack's mother plays a

¹ We do not suggest that readers are *always* cast by authors in this role of side-participant. Just as speakers can purposefully design their utterances so that some members of a conversation will be left uncomprehending (Clark & Carlson, 1982, term these individuals *overhearers*; see also Clark & Schaefer, 1987; Fleming & Darley, 1991), authors may design utterances in such a way that their readers will not be able to understand the full force of what is being said (see Fleming, Darley, Hilton, & Kojetin, 1990). Our claim is only that under most circumstances authors treat read-

ers as side-participants and readers behave as such (see Gerrig, 1993).

² Chafe used the term *consciousness* to capture the same notion that Greene et al. (1992) referred to as *focus of attention*. We use his term here in relating his analysis.

prominent role early in the story, and, thus, she can be referred to by a pronoun, subject to syntactic constraints. However, after Jack ascends the beanstalk, Jack's mother is no longer in the listener's consciousness, and a pronominal reference to her is no longer possible. The question Chafe raised is whether Jack's return home in the story is sufficient by itself to bring his mother back into the listener's consciousness. If it is, then the storyteller may be able to reintroduce her into the discourse using only a pronoun.

The present experiments examine the use of unheralded pronouns and the accessibility of characters in stories similar in structure to Jack and the Beanstalk. Each story began with the introduction of two characters who had mutual knowledge of the activities or attributes of a third. The third character was always identified with a particular social role (e.g., girlfriend, boss, or son). Consider the opening to one story in which Jane and Gloria discuss Jane's *cousin* Marilyn:

Jane was dreading her dinner with her cousin, Marilyn.

She complained loudly to her roommate Gloria.

"Every time I go to dinner at my cousin's house I get sick."

Gloria asked, "Why did you agree to go?"

Jane said, "Because I'm too wimpy to say no."

One version of the story followed Jane to her cousin's house after Jane and Gloria part:

Jane went off to have dinner.

When she arrived, Marilyn was just finishing the cooking.

"You're in luck," she said, "we're having fried squid."

Jane knew she was in for a wonderful evening.

The two of them sat down to dinner.

After dinner, they talked for a while and then Jane left.

A second version remained behind with Gloria after the two of them part:

Jane went off to have dinner.

Gloria decided to cook something nice for herself for dinner.

"As long as I'm home alone," she thought, "I'll eat well."

Gloria searched her refrigerator for ingredients.

She found enough eggs to make a quiche.

After dinner, she put the dishes in the dishwasher.

If we compare these two continuations of the story, we would expect the concept *cousin* to stay relatively accessible in the version that explicitly follows Jane to her cousin's house (the *Concept Present* version). In contrast, we would expect *cousin* to be relatively less accessible in the *Concept Absent* version. Research on the resolution of pronouns and other anaphors has found that the time to resolve an anaphor increases as the number of unrelated clauses (and, thus, the number of new topics) intervening between the anaphor and its antecedent increases (Carpenter & Just, 1977; Clark & Sengul, 1979). Drawing on this research, in our experiments, we asked our subjects to indicate whether the word *cousin* had appeared in the story. Subjects should find this judgment to be easier at this point in the *Concept Present* version than in the *Concept Absent* version.

Both versions of the story concluded with Jane's return home:

Gloria was still up when Jane arrived home about midnight.

Gloria asked Jane, "Did she poison you again?"

Jane chuckled and said, "We'll see in the morning."

In the middle sentence, Gloria's *she* is unheralded with respect to local discourse. We predict that Jane's return to Gloria and the ensuing conversation will make the concept *cousin* relatively accessible once more irrespective of the intervening text. That is, to the extent that Gloria and Jane's earlier conversation supports the cousin as mutually known, the cousin will be restored to the reader's focus of attention even under

textual circumstances (Concept Absent) that rendered the appropriate entity momentarily relatively less accessible. In our experiments, we test this prediction by interrupting our subjects' reading of the story's conclusion and asking them to judge whether *cousin* had appeared in the story. If the concept *cousin* has been restored to (or maintained in) the reader's focus of attention in both versions of the story, then subjects should have no more difficulty making this judgment in the Concept Absent version than in the Concept Present version of the story.

Some components of our prediction that common ground can affect the accessibility of concepts in a discourse model have received partial support in earlier research. For example, repetition of prior context after a digression can facilitate reading of a target sentence describing another aspect of that context (Lesgold, Roth, & Curtis, 1979). There is also suggestive evidence that the accessibility of characters in a story may wane as their potential relevance decreases, independent of specific reference to them or other characters. Such an effect appeared in an experiment investigating the effects of scene shifts within a story on main characters versus "scene-dependent" characters (Anderson, Garrod, & Sanford, 1983). An example of a scene-dependent character might be the waiter in a restaurant where the main character eats, or the barber in a barber shop. Response times to questions that asked about a scene-dependent character suffered a greater decrement than did those that asked about the main character when the questions were asked after a transition sentence suggesting that the current scene had ended (e.g., "Five hours later, . . ."), as opposed to after a sentence suggesting that the current scene had not ended (e.g., "Forty minutes later, . . ."). From these data, it seems that the accessibility of a main character is maintained from one scene to the next, while that of a scene-dependent character is not. Thus, waning of the accessibility of a

character has been found experimentally; the kind of waxing necessary to support the use of an unheralded pronoun has not. In the following experiments, we demonstrate waxing, waning, and the use of unheralded pronouns.

EXPERIMENT 1

Method

Materials. The experimental materials consisted of 40 stories that ranged in length from 13 to 16 sentences. (Two examples of the stories appear in Table 2.) The first section of each story (four to six sentences) introduced two characters, referring to each of them with a proper name. These two characters then either discussed or interacted with the target character, who was designated by a social role (e.g., professor, bartender, senator). In some of the stories, this character was designated by a proper name in addition to the social role (e.g., "Senator Bigelow"). In the *Concept Present* version of the materials, the next sentence described the original two characters separating. The following five to six sentences in this version described the interaction of one of the original two characters with the target character. In the *Concept Absent* version, the first sentence of this second section also described the separation of the original two characters. However, the next five to six sentences of this version described the actions of the character left alone. No mention was made in these sentences of the other two characters. In both versions of the materials, this middle section was followed by a *reunion sentence*, in which the two initial characters were brought back together, without the target character. In the following sentence (the *pronoun sentence*), one of the characters spoke to the other and used a pronoun to refer to the target character. A final sentence concluded the story. Each story had a sentence associated with it for use in a true/false comprehension test. For example, the sentence for the story pre-

TABLE 2
TWO EXAMPLES OF THE MATERIALS USED IN THE EXPERIMENTS

Example 1

Carol went with her friend Donald to the police station.
Donald had been the victim of a mugger earlier in the day.
Donald was supposed to try to identify the mugger in a line-up.
He was still pretty upset, so Carol was there for support.
An officer came and took Donald away to make the identification.

Concept Present continuation

They walked into a dark room with a big window at the front.
Donald saw four men being led in, under spotlights.
They lined up next to each other with their backs to the wall.
They all looked like the sorts who could easily commit a crime.
They all turned to one side and then to the other.
Donald carefully scanned the row for a familiar face.

Concept Absent continuation

Carol spent some time wandering around the station.
One wall was covered with public service posters.
One poster exhorted children to "Stop, look, and listen."
On another wall were posters of the FBI's Most Wanted Criminals.
There were also a bunch of advertisements for toupees.
Carol wondered if policemen had special problems with baldness.

Conclusion (Experiments 1 and 2)

Reunion sentence: In fifteen minutes, Donald was brought back to Carol.
Pronoun sentence: She asked, "Was he in the line-up?"
Final sentence: Donald replied, "No he must still be on the streets."

Conclusion (Experiment 3)

Reunion sentence: In fifteen minutes, Donald was brought back to Carol.
Pronoun sentence: She asked, "Was he a big ugly fellow?"
Final sentence: Donald replied, "No, he was quite normal looking."

Test sentence: Donald had been the victim of a mugger.
Test word: mugger

Example 2

Sitting in their small tent, Carrie and Teresa debated where to hike.
Carrie wanted to ask the forest ranger for suggestions.
"But she'll only suggest wimpy hikes," Teresa objected.
"Well, I'll just tell her we want a good climb," responded Carrie.
Carrie left the tent to walk the half mile to the ranger station.

Concept Present continuation

When she got there, she asked the ranger for a good climb.
"What do you mean by a good climb?" asked the ranger.
"Well, I was thinking maybe a thousand feet," replied Carrie.
"Oh, now I know what you mean," came the reply.
"Then I can suggest three different hikes for you," she continued.
The ranger handed Carrie a bunch of materials about the park.

Concept Absent continuation

Teresa cleaned up the tent as best she could.
It was hard to believe how messy a little tent could get.
She shook out the sleeping bags and rolled them up.
Then she remembered the warnings about bears in the area.
She picked up all the crumbs from breakfast and threw them out.
Then she rolled up the food in a bundle and hung it from a tree.

TABLE 2—*Continued*

Conclusion (Experiments 1 and 2)	
Reunion sentence:	Carrie returned to the tent with a map in her hand.
Pronoun sentence:	"Did she suggest any good hikes for us?" Teresa asked.
Final sentence:	"Sure. She suggested three: steep, steeper, and steepest," replied Carrie.
Conclusion (Experiment 3)	
Reunion sentence:	Carrie returned to the tent with a map in her hand.
Pronoun sentence:	"Did she have any good suggestions?" Teresa asked.
Final sentence:	"Sure. She suggested three different routes," replied Carrie.
Test sentence:	Carrie went to ask the forest ranger about fishing sites.
Test word:	ranger

sented earlier was, "Jane was dreading dinner with her cousin." For each story, the name of the social role of the target character (e.g., *cousin*) served as the test word in the procedure described below.

In addition to the experimental items, 26 filler items were constructed. These stories varied in length from 8 to 13 sentences and described two or more characters interacting. They were similar in style to the experimental items, but they did not follow the same sequence in the pattern of the characters' interactions. Each filler item had a sentence associated with it for use in a true/false comprehension test. Each filler item also had three test words associated with it. These words were common nouns, and approximately one half of the negative test words (one third overall) referred to social roles similar to those used in the experimental items.

Procedure. All of the texts and test sentences were presented on a CRT screen, and responses were collected on the CRT keyboard. Each experimental session began with 30 lexical decision test items. These items were included to give subjects practice with the response keys on the keyboard. After this practice, there were six filler texts, and then the remainder of the texts—40 experimental and 20 filler. The texts were presented one sentence at a time on the CRT screen, with the subject pressing the space bar when he or she had read one sentence and was ready to move on to the next one. The screen was cleared before the presentation of each new sentence.

The display of each experimental item was interrupted once for presentation of a test word, the name of the social role fulfilled by the target character. This interruption occurred either immediately before the reunion sentence or immediately after the pronoun sentence. The display of each filler item was interrupted three times for presentation of each of the test words associated with that item. When a test word was presented, it appeared alone on the screen in all upper case letters. The test word remained on the screen until a response key was pressed (? for "yes" the word had appeared in the text, and *z* for "no" the word had not appeared in the text). Subjects were instructed to read and respond as quickly as they could without making mistakes. Incorrect responses to a test word were followed by an error message, the word *ERROR*, presented for 1500 ms. The test words for the filler items were presented equally often in each third (beginning, middle, and end) of the filler items. Those tested in the first two thirds of the stories were half positive and half negative, and those tested in the final third were all negative.

The texts were presented in blocks of six (four experimental and two filler, except for the first block, which was all fillers), with Concept Present and Concept Absent stories mixed randomly within each block. After each block of six, the true/false questions associated with the stories from that block were presented in random order. Incorrect responses to a true/false sentence

were followed by an error message, the word *ERROR*, presented for 1500 ms.

Design and subjects. There were two variables for the experimental texts: story version (Concept Present or Concept Absent) and location of the test probe (before the reunion sentence or after the pronoun sentence). The four conditions formed by crossing the two variables were combined in a Latin square design with four sets of texts (10 per set) and four groups of subjects (four in each group). All 16 subjects were students at Princeton University who were paid \$5 for their participation.

Results and Discussion

Means for correct responses were calculated for each subject and each item in each condition, and means of these means are shown in Table 3. All response times longer than 2000 ms (about 1% of the data) were eliminated from the means and analyses. Analyses of variance with subjects (F_1) and items (F_2) as random variables and story version (Concept Present or Concept Absent) and test point (before the reunion sentence or after the pronoun sentence) as within-subjects factors found that subjects were faster to respond that the target character was in the story in the Concept Present version than in the Concept Absent version ($F_1(1,12) = 13.86, p < .005$; $F_2(1,36) = 7.28, p < .05$). They were also faster to respond after the pronoun sentence than before the reunion ($F_1(1,12) =$

$11.96, p < .005$; $F_2(1,36) = 11.32, p < .005$). More importantly, the change in response time across test points was much larger in the Concept Absent version of the story than in the Concept Present version (interaction $F_1(1,12) = 7.01, p < .05$; $F_2(1,36) = 19.30, p < .001$). The pattern of the error rates was identical to that of the reaction times, but no effects reached significance in the error data ($F_s < 3.9$).

Consistent with our expectation, the difference in the accessibility of the target character that is observed between the two story versions before the reunion of the other characters is essentially eliminated after one of those characters has used a pronoun to refer to the target character. Our interpretation of this pattern is that, by the time subjects have read the pronoun sentence, the target character has unambiguously returned to their focus of attention, despite the relatively long distance in the text since the last explicit mention of that character.

One question we can ask is whether any extra processing that may have been required in the Concept Absent versions of the stories caused our subjects to take longer to read the reunion and pronoun sentences, which were the same in both versions of the stories. Table 3 also presents the reading time data for those sentences that occurred prior to the appearance of a test word. Analyses of variance by subjects and by items found no significant main ef-

TABLE 3
MEAN RTs FOR CORRECT RESPONSES, ERROR RATES, AND READING TIMES FOR EXPERIMENT 1

	Recognition task				Reading times	
	Before reunion		After pronoun		Reunion sentence	Pronoun sentence
	RT	% Errors	RT	% Errors		
Concept Present	896	3	911	4	1576	1505
Concept Absent	995	9	892	4	1534	1570

Note. In the subjects' analyses, the standard error of the response time means is 20 ms; the standard error of the error rates is 1.6%; the standard error of the reading time means is 35 ms. Reaction times to positive and negative test words were 948 and 913 ms, with 15 and 4% errors, respectively. Reaction times to positive and negative test sentences were 1862 and 1961 ms, with 9 and 21% errors, respectively.

fects of story version or sentence, or interactions between these two factors, in the reading time data. There was, however, a marginally significant interaction in the items analysis only, suggesting that subjects in the Concept Present version spent more of their reading time on the reunion sentence, and subjects in the Concept Absent version spent more of their reading time on the pronoun sentence ($F_1(1,12) = 2.74, p > .10$; $F_2(1,36) = 3.38, p < .10$). We will postpone discussion of reading time differences between the two story versions until Experiment 2.

The results of Experiment 1 suggest that whatever advantage in accessibility the target character enjoys in the Concept Present stories before the reunion sentence disappears after one of the other characters has uttered a sentence containing a pronoun that refers to him or her. Experiment 2 replicates and extends Experiment 1 by adding a third test point to the design, at the end of the reunion sentence, allowing us to determine whether the reunion alone is sufficient to make the target character more accessible.

EXPERIMENT 2

In his discussion of Jack and the Beanstalk, Chafe (1974) suggested that Jack's return home in the narrative might, by itself, be sufficient to bring his mother back into the reader's consciousness. Experiment 2 asks a similar question: Do the target characters only become accessible after the utterance of the sentence containing the pronoun, or might they become accessible one sentence earlier, with the reunion of the two characters whose common ground includes knowledge of the target character?

Method

Materials. The materials were identical to those used in Experiment 1, except that two new stories were added, bringing the total number of experimental texts to 42. Twenty-two filler texts were used.

Procedure. The procedure was the same as in Experiment 1, with one modification. If subjects' responses to the test words exceeded 1200 ms, the message *TOO SLOW!* was displayed for 500 ms. This modification was made to try to reduce the variance in the data.

The texts were presented in blocks of eight (six experimental and two filler, except for the first block, which was all fillers). After each block of eight, the true/false questions associated with the stories from that block were presented in random order.

Design and subjects. There were two variables for the experimental texts: story version (Concept Present or Concept Absent) and location of the test probe (before the reunion sentence, after the reunion sentence, or after the pronoun sentence). The six conditions formed by crossing the two variables were combined in a Latin square design with six sets of texts (seven per set) and six groups of subjects (seven in each group). All 42 subjects were students at Princeton University who were paid \$5 for their participation.

Results and Discussion

Means for correct responses were calculated for each subject and each item in each condition, and means of these means are shown in Table 4. All response times longer than 2000 ms (less than 1% of the data) were eliminated from the means and analyses. Analyses of variance of the reaction times both by subjects and by items and with story version (Concept Present or Concept Absent) and test point (before the reunion sentence, after the reunion sentence, or after the pronoun sentence) as within-subjects factors revealed significant differences in the relative accessibility of the target character in the Concept Present versions compared to the Concept Absent versions of the stories across the three test points. Overall, subjects' responses were faster in the Concept Present than in the

TABLE 4
MEAN RTs FOR CORRECT RESPONSES, ERROR RATES, AND READING TIMES FOR EXPERIMENT 2

	Recognition task						Reading times	
	Before reunion		Before pronoun		After pronoun		Reunion sentence	Pronoun sentence
	RT	% Errors	RT	% Errors	RT	% Errors		
Concept Present	830	4	822	4	838	4	1689	1704
Concept Absent	889	6	859	11	838	5	1635	1771

Note. In the subjects' analyses, the standard error of the response time means is 10 ms; the standard error of the error rates is 1.3%; the standard error of the reading time means is 36 ms. Reaction times to positive and negative test words were 924 and 867 ms, with 21 and 7% errors, respectively. Reaction times to positive and negative test sentences were 1892 and 1987 ms, with 12 and 22% errors, respectively.

Concept Absent versions ($F_1(1,36) = 17.60$, $p < .001$; $F_2(1,36) = 11.61$, $p < .005$). A main effect of test point was significant in the analysis by subjects ($F_1(2,72) = 3.34$, $p < .05$) but only marginal by items ($F_2(2,72) = 2.45$, $p < .10$). Consistent with our prediction, the change in the reaction times across the three test points was different in the two versions of the stories ($F_1(2,72) = 4.69$, $p < .05$; $F_2(2,72) = 5.65$, $p < .005$).

Because our first concern was that the target character should be less accessible in the Concept Absent versions than in the Concept Present versions of the stories prior to the occurrence of the pronoun sentence (i.e., at the first two test points) but equally accessible after it (i.e., at the last test point), we performed a set of planned contrasts to look at the interaction of story version and test point. These contrasts compared the mean advantage in accessibility the target characters enjoy in the Concept Present versions over the Concept Absent versions at the first two test points to their advantage at the third. The contrasts by subjects and by items revealed that the advantage of the target characters in the Concept Present versions that existed at the two test points before the pronoun sentence was diminished after the pronoun sentence ($F_1(1,36) = 9.16$, $p < .005$; $F_2(1,36) = 11.85$, $p < .001$). Thus, our prediction that the sentence containing the pronoun should make the target characters just as accessible in the Concept Absent

versions as in the Concept Present versions is supported.

To examine the hypothesis that the reunion sentence itself might be sufficient to reduce the target characters' advantage in the Concept Present versions relative to the Concept Absent versions, we performed a second set of orthogonal planned contrasts. These contrasts compared the advantage of the target characters in the Concept Present versions over the Concept Absent versions before the reunion sentence to their advantage immediately after that sentence. Although the pattern of the data is consistent with this hypothesis, no significant difference was found in the target character's advantage in the Concept Present versions from before the reunion sentence to immediately after it ($F_s < 2$).

Analyses of variance of the error rates in each condition found that subjects made more errors in the Concept Absent versions than in the Concept Present versions ($F_1(1,36) = 8.82$, $p < .005$; $F_2(1,36) = 6.12$, $p < .05$). The interaction of story version with test point was marginally significant by subjects ($F_1(2,72) = 2.73$, $p < .10$), but not by items ($F_2(2,72) = 2.19$, $p > .10$), and neither of the planned contrasts approached significance by subjects or by items.

The essential result of Experiment 2 replicates that of Experiment 1: The difference in the accessibility of the target character that existed before the two characters have

been reunited has disappeared entirely after the utterance of a sentence that contains a pronoun referring to the target character. With regard to our second hypothesis, Experiment 2 provides little evidence that the reunion itself increases the accessibility of the target character; although the difference in accessibility immediately after the reunion was less than that before the reunion, it was not reliably so.

The pattern of the reading time data, also presented in Table 4, is similar to that found in Experiment 1. Once again, the analyses of variance of reading times by subjects and by items with story version (Concept Absent or Concept Present) and sentence (reunion sentence or pronoun sentence) as factors found no main effect of story version and no interaction of story version with sentence; instead there is only a marginal effect of sentence, and only in the subjects analysis, with subjects taking longer to read the pronoun sentence than the reunion sentence, regardless of which version of the story they were reading ($F_1(1,36) = 3.18, p < .10$; $F_2(1,36) = 1.86, p > .10$). The evidence from Experiment 2 alone does not indicate that subjects' reading times are slowed in the Concept Absent versions of the stories. However, analyses of the reading time data from Experiments 1 and 2 together suggest a slightly different state of affairs. These combined analyses found a marginal interaction between story version and sentence ($F_1(1,48) = 3.55, p < .07$; $F_2(1,39) = 2.90, p < .10$). Although overall reading time on the reunion and pronoun sentences does not differ between the two story versions, it looks as though subjects may be spending more of their time reading the pronoun sentences in the Concept Absent versions and more time reading the reunion sentences in the Concept Present versions. Because our hypotheses do not directly concern the ease or speed with which subjects read the various sentences, the reading time data do not alter our conclusions; furthermore, the weak effect found in the reading time data in Ex-

periments 1 and 2 is not replicated in Experiment 3.

Experiments 1 and 2 provide evidence that, even after a digression in which a character is not referred to at all, that character can still be brought back into the reader's focus of attention by means of a pronoun if the character is part of the common ground shared by other characters. What allows the pronoun sentence to serve this function in this situation? We have already mentioned the possibility that the sentence describing the reunion of the two original characters in our story might boost the accessibility of the target character. Another possibility is that the context provided by the pronoun sentence itself might help increase the accessibility of the target character. For example, for the first text shown in Table 2, the pronoun sentence used in Experiments 1 and 2 was, "She asked, 'Was he in the line-up?'" The reference to the line-up may have provided important contextual information that increased the accessibility of concepts associated with the target character. Experiment 3 was conducted to examine the role that these two possibilities play in the waxing of the target character's accessibility.

EXPERIMENT 3

In Experiments 1 and 2, the pronoun sentence, against the background of the common ground shared by the two main story characters, succeeded in making the target character just as accessible in the Concept Absent versions of the stories as in the Concept Present versions. In addition to the pronoun itself, the pronoun sentences often contained information that was related to the context in which the target character was initially mentioned. For example, the pronoun sentence in the example given earlier was, "Gloria asked Jane, 'Did she poison you again?'" The reference to poisoning provides some context that may assist the reader in accessing information about getting sick, bad food, and the cousin Marilyn. In Experiment 3, we asked whether the

additional context provided by the pronoun sentence was needed to increase the accessibility of the target character, or if a pronoun sentence with less context could produce the same effect. Some evidence that context is important in increasing the accessibility of previously read information comes from experiments by Myers, O'Brien, Albrecht, and Mason (in press), in which a character's act of ordering lunch made accessible to the reader previously given information that the character was a vegetarian. To examine the role played by supporting context in our materials, we changed the pronoun sentences of the original materials to include as little of the initial context as possible. For example, the pronoun sentence in the example just mentioned was changed from, "Gloria asked Jane, 'Did she poison you again?' " to "Gloria asked Jane, 'Did she play you old disco records?' " (See Table 2 for more examples.) Because the pattern of the means in Experiment 2 was consistent with our hypothesis that the reunion sentence might increase the accessibility of the target character in the Concept Absent versions, even before the reader encounters the pronoun sentence, we included a test point in Experiment 3 to examine that possibility again.

Method

Materials and procedure. The materials were identical to those used in Experiment 2, except that the pronoun sentence of each story was modified to refer to as little of the

context of the initial conversation as possible. The final sentence of the story was also modified, if necessary, to make sense following the revised pronoun sentence. The procedure was the same as in Experiment 2.

Design and subjects. As in Experiment 2, there were two variables for the experimental texts: story version (Concept Present or Concept Absent) and location of the test probe (before the reunion sentence, after the reunion sentence, or after the pronoun sentence). The six conditions formed by crossing the two variables were combined in a Latin square design with six sets of texts (seven per set) and six groups of subjects (six in each group). All 36 subjects were students at Princeton University who were paid \$5 for their participation.

Results and Discussion

Means for correct responses were calculated for each subject and each item in each condition, and means of these means are shown in Table 5. All response times longer than 2000 ms (less than 1/2% of the data) were eliminated from the means and analyses. Analyses of variance revealed that subjects' responses were faster in the Concept Present versions than in the Concept Absent versions ($F_1(1,30) = 50.27, p < .001$; $F_2(1,36) = 12.76, p < .001$). There was no main effect of test point; however, there was a significant interaction of story version with test point ($F_1(2,60) = 7.51, p < .001$; $F_2(2,72) = 6.91, p < .005$), indicating that the advantage in accessibility of the

TABLE 5
MEAN RTs FOR CORRECT RESPONSES, ERROR RATES, AND READING TIMES FOR EXPERIMENT 3

	Recognition task						Reading times	
	Before reunion		Before pronoun		After pronoun		Reunion sentence	Pronoun sentence
	RT	% Errors	RT	% Errors	RT	% Errors		
Concept Present	795	6	811	6	812	5	1682	1766
Concept Absent	885	8	849	9	824	7	1638	1735

Note. In the subjects' analyses, the standard error of the response time means is 9 ms; the standard error of the error rates is 1.5%; the standard error of the reading time means is 35 ms. Reaction times to positive and negative test words were 932 and 856 ms, with 20 and 8% errors, respectively. Reaction times to positive and negative test sentences were 1867 and 1961 ms, with 17 and 27% errors, respectively.

target character in the Concept Present versions over the Concept Absent versions varies across the three test points.

The same two sets of orthogonal contrasts were performed as in Experiment 2. The first set of contrasts compared the mean advantage the target characters enjoy in the Concept Present versions over the Concept Absent versions at the first two test points to their advantage at the third. These contrasts revealed that the advantage that the target characters had at the two test points before the pronoun sentence in the Concept Present versions decreased after the pronoun sentence ($F_1(1,30) = 7.18, p < .05$; $F_2(1,36) = 9.64, p < .005$). This effect replicates the results of Experiments 1 and 2: The utterance of the sentence containing the pronoun appears to make the target characters just as accessible in the Concept Absent versions as in the Concept Present versions.

Furthermore, the second set of contrasts, which compared the advantage of the target characters in the Concept Present versions over the Concept Absent versions before the reunion sentence to their advantage immediately after that sentence, revealed that there is a significant reduction in the target characters' advantage from the first test point to the second ($F_1(1,30) = 8.03, p < .01$; $F_2(1,36) = 4.83, p < .05$). The reunion sentence by itself is sufficient in the Concept Absent versions to increase the accessibility of the target characters, who are mutually known by the characters who are reunited.

Analyses of variance with subjects as the random variable suggested that subjects made more errors on the Concept Absent stories than the Concept Present stories ($F_1(1,30) = 5.13, p < .05$), but this pattern was not confirmed in the analysis by items ($F_2(1,36) = 1.80, p > .10$). No further effects were revealed in the error data either by the overall analyses of variance or by planned contrasts.

Reading times for the reunion and pronoun sentences are also shown in Table 5.

Subjects did not read any more slowly in the Concept Absent condition than in the Concept Present condition. Subjects took longer to read the pronoun sentence than the reunion sentence in both conditions ($F_1(1,30) = 8.30, p < .01$; $F_2(1,36) = 2.78, p = .10$), but there was no difference in their total reading times for the two sentences between the two conditions ($F_1(1,30) = 2.10, n.s.$; $F_2(1,36) < 1, n.s.$), and there was no interaction ($F_s < 1$).

The results of Experiment 3 suggest that, even in the absence of additional contextual information, an unheralded pronoun can be used to restore to the focus of attention a character who has faded from prominence in a text. Even a contextually impoverished reference such as our revised pronoun sentences may be sufficient when common ground strongly supports one character as mutually known. Furthermore, Experiment 3 suggests that the relevant common ground becomes available prior to the actual pronominal reference, as evidenced by the increase in accessibility of the target characters immediately after the reunion sentence.

Experiment 3, like Experiments 1 and 2, demonstrates waxing and waning of the accessibility of the target characters as the discourse environment changes. In both the Concept Present and Concept Absent versions of our materials, two characters who share a reference to the target character in their common ground first part and then are reunited. The difference in the accessibility of the target character that is observed between the Concept Present and Concept Absent versions of the stories before the reunion of the other two characters is significantly reduced immediately after their reunion. (In Experiment 2, this effect was not significant.) And (as in Experiment 2) this difference is essentially eliminated after one of those characters has used a pronoun to refer to the target character. We explain this pattern of results in terms similar to Clark and Marshall's (1981) reference diaries. Upon the reunion of the two

characters, the reader makes accessible the common ground that the characters share, in preparation for understanding their future interaction. The ability of the pronoun sentence to restore the target character to the reader's focus of attention then specifically depends on the accessibility of that common ground.

GENERAL DISCUSSION

The goal of these experiments was to show that the accessibility of characters in a story wanes and waxes as other characters who share knowledge of those characters part and reunite. Because unheralded pronouns are used in environments that contain no explicit antecedents, they provide an opportunity to examine the accessibility of characters whose presence or absence in the reader's focus of attention relies exclusively on common ground. In all three experiments, we demonstrated that discourse referents became more or less accessible as a function of the separation or reunion of characters. In both versions of our stories, a pair of characters talked about a third individual (e.g., a cousin). In the Concept Present versions of the stories, the appropriate target referents were repeatedly mentioned in the story and, thus, remained continuously accessible in readers' representations. In the Concept Absent versions of the stories, the target individuals became less accessible when the storyline ignored them. However, as soon as the original pair of characters referred to these individuals with an unheralded pronoun, the target individuals regained all their lost accessibility. In fact, in Experiment 3, the target characters gained in accessibility as soon as the other characters were reunited.

We interpret these experiments as providing initial empirical support for Clark and Marshall's (1981) concept of reference diaries. According to Clark and Marshall, patterns of language use suggest that speakers and addressees maintain memory structures that are devoted to encoding shared

experiences, or common ground. One consequence of this position is that, as different pairs of speakers and addressees meet and part, different subsets of information should become more or less accessible to readers, who, we suggest, can be conceptualized as side-participants in their conversations. Our experiments have provided empirical support for this prediction.

Note that our experiments do not license claims that the processes that manage common ground are automatic: Our methodology did not disallow strategic processing on the part of our subjects. In fact, we might imagine that some aspects of the use of common ground would be strategic. It is likely, for example, that when encountering an old friend we might explicitly try to call to mind the sorts of things we discussed the last time we met. It appears equally likely, however, that some of the fine tuning mediated through reference diaries will prove automatic. For example, we suggested in the introduction that different "Michael"s would become more or less accessible depending on the identity of one's conversational partner. Our intuition, which should be verified experimentally, is that common ground at that level is managed without strategic intervention.

Recent evidence reported by Keysar (1994) might be taken to support a view of readers' management of common ground that contrasts with our own. In several experiments, readers sometimes concluded that an addressee would take a speaker's utterance to be sarcastic, even though the experimental text specified no common ground upon which the speaker and addressee could establish the sarcasm. Keysar interpreted the results of these experiments as showing that readers mistakenly disregarded whether speaker and addressee actually shared common ground sufficient for the addressee to understand the utterance correctly. However, we would argue that the lack of sufficient explicit common ground in the experimental texts does not

justify this interpretation. An alternative interpretation is that, in the absence of strong reasons to believe otherwise, readers (as side-participants) assume that speakers design their utterances taking into account the common ground they share with addressees and side-participants. Readers are therefore entitled to assume that the addressee of an ambiguous utterance shares some common ground with the speaker sufficient to grasp the intended meaning of the utterance, even if that common ground is not specified in the immediate discourse. Circumstances that depart from this expectation would be relatively rare in everyday experience.

Our experiments also contribute to the general view that pronouns serve as cues that some particular individual should be in the comprehender's focus of attention. Greene et al. (1992) showed that the process of pronoun resolution does not automatically identify a referent when no one individual is sufficiently salient. In Greene et al.'s experiments, two characters were equally present in the focus of attention when a pronoun was used, and subjects did not appear to identify one of them as the unique referent unless encouraged to engage in strategic processing. This was true even though the texts themselves were unambiguous: The two characters were of different genders, and the pronoun was explicitly "he" or "she." (For another example in which a gender cue fails to assist pronoun comprehension, see Garnham, Oakhill, & Cruttenden, 1992.) In this light, pronoun resolution relies far less on formal properties of the text than had previously been supposed (see Greene et al. for a review). The current experiments strongly reinforce this point of view. None of our unheralded pronouns had local textual antecedents. Even so, the sentences containing them successfully restored their referents to the reader's focus of attention. Overall, we argue for a view of the management of common ground—and, by extension, of pro-

noun resolution—that is sensitive not only to local features of a text but also to the structure of comprehenders' representations of that text.

We note, finally, that the use of unheralded pronouns constitutes a sort of risk on the part of speakers. Because there are no explicit referents available, speakers will not be understood should they have misassessed what is in common ground. Accordingly we can look to circumstances in which unheralded pronouns are felicitous, circumstances such as those we documented in Table 1, to develop an account of the criteria speakers set for assuming that entities are brought sufficiently into the focus of attention via reference diaries.

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