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How Do Readers Deal with Flashbacks in Narratives?

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Abstract

The study addresses the question of how readers mentally represent narratives containing flashbacks. Do they insert the flashback information at the chronologically appropriate location into their representation or do they encode it as background information about the situation described immediately before? To investigate the two hypotheses three experiments were conducted. Experiment 1 and 2 examine the reading times for flashback sentences during narrative processing and Experiment 3 the structure of the representations that readers construct for narratives containing flashbacks. The results support the chronological hypothesis.

Keywords: text comprehension; reading; narratives; temporal information; flashbacks.

Introduction

An essential aspect of narrative comprehension is to mentally relate the described situations to each other in order to build an integrated representation of the narrated world. In this regard, comprehenders may consider certain dimensions of situations to be especially important. Empirical findings suggest that comprehenders pay most attention to the protagonist, to causality, and to the temporal dimension of the narrated world (e.g., Rinck & Weber, 2003; Zwaan, Magliano, & Graesser, 1995). The special importance attached to temporal information may to some extent be due to the fundamental role that the temporal dimension plays in mentally organizing states of affairs in direct experience. However, the use of the temporal dimension for organizing narrated situations may also be suggested by the structure of narratives themselves. In narratives, the various situations are typically described in chronological order, that is, in the order in which they occur in the narrated world. In order to be better able to assess the importance that comprehenders attach to temporal relations per se, it may be useful to investigate the way in which comprehenders deal with flashbacks in narratives.

In a flashback, an event, process, or state is mentioned that is temporally located prior to the current narrative now point. In the following example, sentence (1b) and (1c) constitute a flashback. John's TV-watching and falling-in-love-with-Antigua occurred prior to the narrative now point, which is established by (1a).

(1a) John went to a travel agency to ask about holidays to the Caribbean.
(1b) Last night he had watched a fascinating TV-report about Antigua.
(1c) He had fallen in love with this island.

Note that the sentences (1b) and (1c) are in past perfect. In English, the past perfect is not obligatory in flashback sentences. However, in German and many other languages, the temporal precedence has to be indicated by the tense.

How do comprehenders mentally organize the situations described in narratives containing flashbacks? If they in fact attach great importance to temporal relations, then it is to be expected that they re-arrange the text information and integrate the flashback information at the chronologically appropriate location into the hitherto constructed representation.

However, there are reasons to suppose that in the case of flashbacks, comprehenders may dispense with a strictly temporal organization of their representation. Discourse linguistic analyses (e.g., Asher & Lascarides, 2003; Kehler, 1999; ter Meulen, 1995) have shown that flashbacks do not appear arbitrarily in a text. Rather, a flashback is closely related to the preceding sentence, providing supplementary information concerning the cause or other aspects of the situation described in that sentence. For example, in the text given above, the mention of John having watched the TV-report elucidates what John had in mind when inquiring about holidays. Thus, a flashback serves a particular discourse function. It is to convey background information about the situation described immediately before. Accordingly, one may suppose that when encountering a flashback, comprehenders attach the information given to the situation described in the previous sentence.

To date, experimental text comprehension research has barely addressed the processing of flashbacks. There are some studies showing that narratives describing events in nonchronological order are more difficult to understand than narratives in which the order of the description matches the order in which the events occur in the described world (e.g., Baker, 1978; Ohtsuka & Brewer, 1992). This match-mismatch issue was also investigated in some studies of the processing of complex sentences containing the connective *before* or *after* (e.g., Hoeks, Stowe, & Wunderlink, 2004; Mandler, 1986; Münte, Schiltz, & Kutas, 1998). However, the results of these studies are mixed. Moreover, it is unclear whether the findings from such studies allow for conclusions to be made as to the processing of flashbacks, as the relation between the two clauses of complex temporal sentences is hardly comparable to the relation between a flashback and the preceding text. In a complex temporal sentence, the function of the subordinate clause is to specify a temporal region within which the time of the situation described in the main clause is located (cf. Kamp, van

Genabith, & Reyle, in press; Moens & Steedman, 1988). Neither of the two clauses has the function to provide background information about the situation mentioned in the other clause.

We conducted three experiments to investigate whether readers construct chronologically organized representations for texts containing flashbacks (chronological hypothesis) or whether they treat flashback information as background information about the situation described immediately before (background hypothesis). Experiment 1 and 2 were concerned with the time needed for processing a flashback sentence. Experiment 3 investigated the organization of the representation that readers construct for a narrative containing a flashback. The passages used in the experiments were in German and the participants were native German speakers.

Experiment 1

Experiment 1 was designed to compare reading times for flashback sentences with those for matching *progression sentences*, that is, sentences moving the narrative forward. According to the chronological hypothesis, comprehenders integrate the information provided by a flashback sentence into the chronologically appropriate section of the hitherto constructed representation. To find this section in the representation can be expected to take extra time. A progression sentence only requires the continuation of the representation. Thus, one would expect that the reading times for a flashback sentence are prolonged.

In contrast, if the background hypothesis is true, then we should not necessarily expect longer reading times for a flashback sentence compared to a progression sentence. To attach the flashback information to the situation that was just encoded may not take more time than to continue the representation.

In addition to these two hypotheses, we also took a weak version of the chronological hypothesis into consideration. Mentally re-arranging information may require considerable effort. For this reason, readers might assume a policy of "wait and see" when encountering a flashback sentence, waiting for the information of the next sentence. If this sentence elaborates the flashback, readers decide to insert the information in its proper chronological position. Thus, prolonged reading times may only be found for the second sentence of a flashback.

Accordingly, the narratives presented in Experiment 1 contained flashbacks consisting of two sentences each, with the second sentence elaborating the event mentioned in the first sentence. Likewise there were two control progression sentences for each pair of flashback sentences (see Table 1). The strong chronological hypothesis predicts prolonged reading times for both the first and second flashback sentence. If only the reading times for the second flashback sentence turn out to be prolonged then this would support the weak chronological hypothesis. The background hypothesis does not predict prolonged reading times for either flashback sentence and would thus be compatible with a null result. However, there are some other reasons why one could expect prolonged reading times for the first flashback sentence. We will come back to this issue in the Discussion of Experiment 1.

Method

Participants Forty-four students at the Technical University of Berlin took part in the experiment.

Materials There were 24 experimental and 26 filler passages. The passages were written in the present tense, which in German is a common means of making a report or story more vivid. The structure of the experimental passages is illustrated by the passage in Table 1. After a few introductory sentences a particular event was described. The description consisted of two or three sentences. The next two sentences were the *critical sentences*. The first critical sentence mentioned a particular event, which was elaborated by the second critical sentence. There were two versions of this pair of sentences. In the *flashback version*, the event was described in a flashback, implying that it occurred in the fictitious world before the first described event. In the *progression control version*, the critical event was described as immediately following that event. The flashback sentences and their progression-sentence counterparts were matched in length (number of words, number of syllables, and rough number of characters) and as much as possible in their lexical items. The *postcritical sentence*, which followed the second critical sentence, described the beginning of a new event in the fictitious world. If this sentence followed the flashback version of the critical sentences, then it returned to the narrative mainline, describing the beginning of the event that followed the first mentioned event. If the sentence followed the progression control version of the critical sentences, then it described the same event, but as occurring after the critical event. Accordingly, the first word of this sentence was either *Jetzt* [*Now*] or *Dann* [*Then*]. The sentence was followed by one or more sentences concluding the story.

Table 1: Sample Passage of Experiment 1 (Translated from German).

Angelika studies biology. Presently, she is an intern in the immunology department at Humboldt University. During this time, she has learnt to execute many tasks independently. At the moment she is in meeting with the professor. He compliments Angelika on her work.

Before, she had made copies of some articles in the library.	Then she makes xerox copies of some articles in the library.
(1st critical sentence, flashback version)	(1st critical sentence, progression control version)
She had taken great care to make proper copies.	She takes very great care to make proper copies.
(2nd critical sentence, flashback version)	(2nd critical sentence, progression control version)
Now / Then she goes to the laboratory. (postcritical sentence)	The professor's approval has motivated her.

To ensure careful reading, there was a verification sentence for each passage, presented to the participants after the end of the respective passage.

Design and Procedure The 24 experimental passages were assigned to two sets A and B, comprising 12 passages each. Half of the participants received set A in the flashback version and set B in the progression control version. The other participants received the two sets in the complementary versions. Experimental and filler passages were presented to the participants in various mixed random orders. Participants read the passages sentence by sentence, self-paced, from a computer screen. A sentence remained on the screen until the participant pressed the spacebar and then the next sentence appeared. Participants were tested individually. They were instructed to read the texts carefully at their normal reading pace.

Results and Discussion

Analyses were carried out on the reading times for the two critical sentences. Outliers were determined for the two sentences in the two versions separately. As the reading times considerably decreased over the course of the experimental session, the sequential position at which a passage was presented to a participant was taken into account. The difference between each reading time and the median of the reading times for the respective sequential position was computed. If a difference score was outlying according to Tukey's (1977) inner-fence criterion, then the respective reading time was discarded. This led to the elimination of less then 5% of the data in each condition. In all analyses to be reported in this article, the significance level was set at .05. F_1 and t_1 represent results of analyses in which the error term was based on participant variability, and F_2 and t_2 represent results of analyses in which the error term was based on item variability.

The mean reading times for the first and second critical sentence in the two versions are displayed in Figure 1. The data were analysed with a 2(sentence) x 2(version) analysis of variance (ANOVA) with repeated measurement on both variables. The main effect of sentence was significant, $F_1(1,43) = 41.75$, $MSE = 36,621$; $F_2(1,23) = 10.51$, $MSE = 70,873$, which is not particularly interesting, however, as the sentences were not matched for length. More important, the reading times for flashback sentences proved to be significantly longer than those for progression control sentences, $F_1(1,43) = 9.10$, $MSE = 39,866$; $F_2(1,23) = 6.85$, $MSE = 34,441$. The sentence x version interaction was not significant, $F_1(1,43) = 1.50$, $MSE = 20,230$, $p > .20$; $F_2 < 1$.

The results are in line with the strong chronological hypothesis, which implies that readers integrate flashback information into the chronologically appropriate location of the hitherto constructed representation. However, there is another plausible interpretation of the results. As flashbacks do not conform to the common chronological structure of narratives it is conceivable that readers when encountering the first sentence of a flashback may be bewildered for a short moment. This could account for the prolonged reading times for the first sentence of a flashback. As to the second flashback sentence, one may suppose that the observed reading-time difference between the flashback and the progression control version was just a spill-over effect from the first critical sentence. This possibility was investigated in Experiment 2.

Experiment 2

In Experiment 2, the passages used in Experiment 1 were presented without the second critical sentence. The main focus of interest was on the reading times for the postcritical sentence, which now immediately followed the first critical sentence. If it is true that the prolonged reading times for the flashback elaboration sentence in Experiment 1 were due to a spill-over effect from the bewilderment elicited by the first flashback sentence, then we should now find a spill-over effect for the postcritical sentence. That is, the reading times for the postcritical sentence should be longer when following the flashback critical sentence, compared to when following the control critical sentence. In contrast, if the prolonged reading times for the flashback elaboration sentence in Experiment 1 were due to processes specifically associated with flashback sentences, then obviously no reading time difference should be obtained for the postcritical sentence.

Method

Participants Forty-four students at the Technical University of Berlin took part in the experiment, none of whom had participated in Experiment 1.

Materials The materials comprised of 24 experimental passages and 26 filler passages. The experimental passages were the same as those in Experiment 1, except that the second critical sentence was omitted.

Design and Procedure The design and procedure were the same as in Experiment 1.
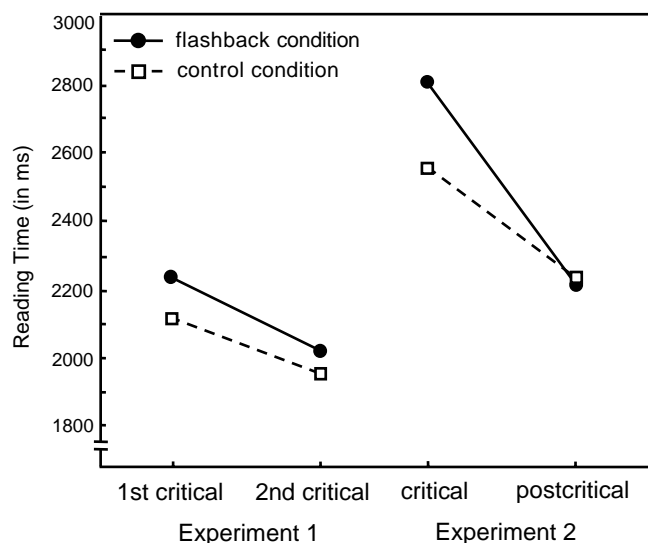

Figure 1: Mean reading times for the critical sentences in Experiment 1 and the critical and postcritical sentences in Experiment 2.

Results and Discussion

Analyses were carried out on the reading times for the critical sentence (identical to the first critical sentence in Experiment 1) and the postcritical sentence. Outliers were determined in the same way as in Experiment 1, resulting in the removal of 5.2% of the data. A 2(sentence) x 2(version) ANOVA yielded a significant main effect of sentence, $F_1(1,43) = 175.75$, $MSE = 50,784$; $F_2(1,23) = 16.33$, $MSE = 273,821$, and a significant main effect of version, $F_1(1,43) = 8.47$, $MSE = 72,985$; $F_2(1,23) = 9.00$, $MSE = 34,847$. The sentence x version interaction was significant as well, $F_1(1,43) = 9.67$, $MSE = 91,975$; $F_2(1,23) = 15.49$, $MSE = 25,000$. As Figure 1 shows, the reading times for the critical sentence were again significantly longer in the flashback version than in the progression control version, $t_1(43) = 4.38$, $SD_{diff} = 395$; $t_2(23) = 4.42$, $SD_{diff} = 268$. In contrast, the reading times for the postcritical sentence were numerically slightly shorter when the sentence followed a flashback sentence compared to when it followed a progression control sentence, with the difference not being significant, $t_1, t_2 < 1$. Thus, Experiment 2 does not provide any evidence for the alleged spill-over effect. With regard to the results of Experiment 1 this suggests that the prolonged reading times for the second flashback sentence are due to the specific processing costs of flashback sentences.

As can be seen from Figure 1, the reading times for the first flashback sentence were longer in Experiment 2 than in Experiment 1. This difference is probably of no theoretical relevance as mean reading times for all other sentences were also considerably longer in Experiment 2 ($M = 2513$ ms) than in Experiment 1 ($M = 2042$ ms).

So far, the results are in line with the chronological hypothesis. However, we do not yet have evidence that readers actually integrate flashback information into the chronological correct position of the representation. To clarify this issue, we conducted Experiment 3.

Experiment 3

Experiment 3 investigated the structure of the readers' mental representation after reading a narrative containing a flashback. We adapted a methodological approach used in studies of the comprehension of chronological event descriptions (Kelter, Kaup, & Claus, 2004; Rinck & Bower, 2000). These studies suggest that an event mentioned in a narrative becomes gradually less accessible as time moves forward in the described world. More specifically, a previously mentioned event was found to be less accessible when much time had elapsed in the described world (e.g., when a long lasting event happened in the meantime) compared to when little time had elapsed. In Experiment 3, we examined if such a temporal-distance effect also occurs for events mentioned in flashbacks, which according to the text, happened either a long or a short time ago in the described world.

Readers were presented with passages each of which described four events that occurred in the described world successively, in the order E1-E2-E3-E4. In the passages, however, event E1 was mentioned in a flashback after the description of event E3. Thus, the order of mention was E2, E3, E1, E4 (see sample passage in Table 2). The information about the duration of E2 was manipulated through a durative adverb, implying either a short or a long duration of E2. At the end of the passage, the mental accessibility of E1 was tested by means of a probe-recognition task.

If the chronological hypothesis is correct, then at the time of testing, readers possess a representation in which E1 precedes E2 (see Figure 2). Therefore, depending on the duration of E2, event E1 would either be temporally relatively close to or distant from the current narrative now point. Given the afore-mentioned relationship between temporal distance and accessibility, the chronological hypothesis predicts that the probe-recognition latencies are longer if the text implies a long duration of E2 compared to if the text implies a short duration of E2.

The background hypothesis does not predict this probe-latency difference. According to this hypothesis, the flashback information is attached to the previously mentioned situation, that is, to E3. Thus, the temporal distance between E1 and the narrative now point at the time of testing is the same in the two E2-duration conditions (see Figure 3). Consequently, the accessibility of the flashback information should not be affected by the information concerning the duration of E2.

Table 2: Sample Passage of Experiment 3 (Translated from German).

Old Mr. Steinbach was an enthusiastic balloonist in his youth. Now his son has given him as a birthday present a flight in a historic balloon. Actually, Mr. Steinbach feels a little too old for such an adventure. The balloon flight will take place today. With mixed emotions Mr. Steinbach climbs into the basket, where the balloon pilot is already waiting for him.

|	
E2	When they take off, Mr. Steinbach feels his old enthusiasm awaken.
	For half an hour / For five hours they fly above the countryside.
E3	Then they land and Mr. Steinbach beams with joy.
E1	Before the take-off he had felt somewhat queasy.
	Because of that he had taken an anti-sickness pill.
E4	Now Mr. Steinbach climbs out of the balloon basket.
	He heartily says good-bye to the balloon pilot.
Probe	PILL
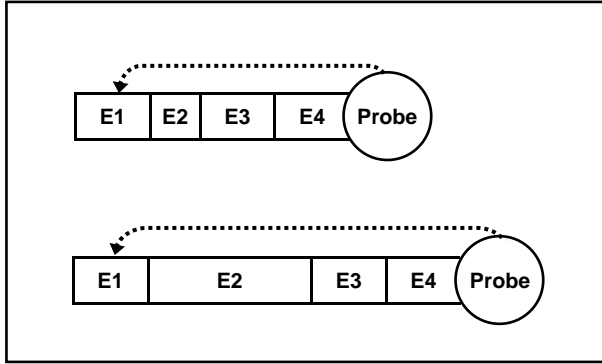
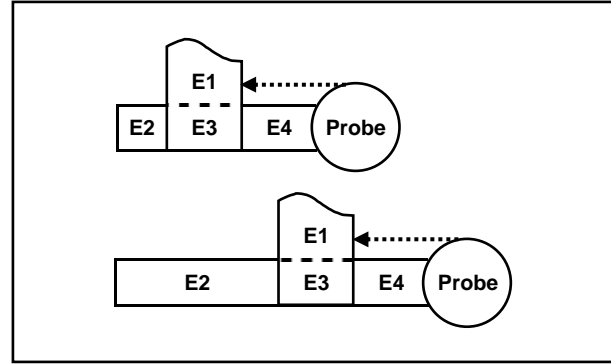Figure 2: Representation according to the chronological hypothesis.

Figure 3: Representation according to the background hypothesis.

Method

Participants Forty students at the Technical University of Berlin took part in the experiment, none of whom had participated in Experiment 1 or 2.

Materials The text materials comprised of 24 experimental and 24 filler passages. The structure of the experimental passages is illustrated by the passage in Table 2. The first section portrayed the setting and introduced the protagonist. Then the situation immediately prior to E2 and the beginning of E2 were described, each in one sentence. The next sentence described E2 and stated its duration in terms of minutes or hours by means of a durative adverb. There were two versions of this sentence, stating either a short or a long duration of E2. The numerical values in the adverbial phrases were selected on the basis of duration estimates that were collected in a separate study. Twenty participants were presented with an abridged version of the first half of each experimental passage, up to the description of event E2 but without the durative adverb. They were asked to give the typical duration for each event E2, as well as the minimal duration and the maximal duration that they considered still plausible in the context. The values corresponding to the 33rd percentile of the minimal-duration estimates were used in the short-duration versions in Experiment 3, and the values corresponding to the 67th percentile of the maximal-duration estimates were used in the long-duration versions. If necessary, values were rounded.

The description of E2 was followed by a sentence describing E3. The next two sentences constituted a flashback, mentioning E1. In the first flashback sentence, explicit reference was made to the time prior to E2. In the second flashback sentence, the critical entity was mentioned whose accessibility was later on tested in the probe-recognition task. The flashback sentences were followed by two sentences describing E4.

For each experimental and filler passage there was one probe word. Probe words were nouns, 5 to 10 characters long (1 – 3 syllables). With the experimental passages, the probe word was the name of the critical entity involved in E1. With 6 of the filler passages, the probe word was previously mentioned in the text. With the remaining 18 filler passages, the probe word had not been mentioned in

the respective text. As in the previous experiments, there was a verification sentence for each passage, presented after the probe-recognition task.

Design and Procedure The 24 experimental passages were assigned to two sets. Sets and versions were counterbalanced across participants, as in Experiment 1 and 2. The passages were presented in the same way as in the previous experiments, with one exception. When the participants pressed the space bar after having read the final sentence of a passage, a short auditory signal occurred and then the probe word appeared on the screen. Participants indicated their positive or negative response by pressing the *l* or *d* key on the keyboard, respectively.

Results and Discussion

Response accuracy Mean percentage of correct responses to experimental probes was 90.4% ($SD = 7.9$) and 91.2% ($SD = 9.2$) in the short and long duration condition, respectively. This difference was not significant ($t_1, t_2 < 1$).

Response times Analyses were carried out on the latencies of correct probe responses and, as control, on the reading times for the sentence immediately preceding the probe. Outliers were determined in the same way as in the previous experiments (4.8% of the data).

Participants needed significantly less time to recognize the probe word in the short E2-duration condition ($M = 1436$ ms, $SD = 257$) compared to the long E2-duration condition ($M = 1482$ ms, $SD = 332$), $t_1(39) = 1.85$, $SD_{diff} = 156$, one-tailed $p < .05$; $t_2(23) = 1.76$, $SD_{diff} = 122$, one-tailed $p < .05$. The reading times for the sentence immediately preceding the probe were almost identical in the short and long E2-duration condition (short: $M = 1883$ ms, $SD = 376$; long: $M = 1877$ ms, $SD = 363$), $t_1, t_2 < 1$.

The finding that the probe-recognition latencies were affected by the information about the duration of E2 supports the chronological hypothesis. According to this hypothesis, the readers inserted the flashback information (E1) into the representation at the chronologically appropriate location, that is, before E2. In other words, they constructed a chronological representation. Thus, a temporal-distance effect on the accessibility of E1 was

observed, analogous to what has been found in studies using chronological narratives.

The result is difficult to explain if one assumes that a flashback is interpreted as providing only background information about the situation described in the sentence preceding the flashback. If this were the case, then the readers of our experiment had integrated the flashback information into the representation of E3. It is unclear why the duration of E2 should affect the accessibility of information contained in the representation of E3.

Conclusions

Our study explored two hypotheses concerning the way in which comprehenders process flashbacks in narratives. According to the chronological hypothesis, comprehenders integrate the flashback information into their representation of the narrated world at the chronologically appropriate location. According to the background hypothesis, they encode flashback information as a supplementary to the situation described just before. Our results support the chronological hypothesis. Experiment 1 and 2 showed that reading flashback sentences takes extra time, suggesting that flashback information is not simply added to the situation described immediately before. Experiment 3 provided evidence that the readers' mental representation after reading a narrative containing a flashback is chronologically organized.

Our results converge with results from other studies indicating that readers pay significant attention to the temporal relations between narrated situations (Gennari, 2004; Magliano & Schleich, 2000; Rinck, Gámez, Díaz, & de Vega, 2003; Rinck & Weber, 2003; Zwaan, 1996; Zwaan et al., 1995). The specific contribution of our study is the finding that readers use the temporal dimension for mentally organizing the narrated situations even if the structure of the narrative and the discourse relations suggest a different kind of organization.

This is only an initial study, a first step towards empirically evaluating the validity of the two different hypotheses on the processing of flashbacks. It may be premature to abandon the background hypothesis. Flashbacks vary with regard to the emphasis that is put on either the event itself or its result. It is conceivable that in the case of when the result is clearly in focus flashback information is processed in the way asserted by the background hypothesis (e.g., *John wore a dark blue suit. He had bought it in an expensive designer store*). Future research is needed to gain insight into the impact of this aspect of flashbacks.

Acknowledgements

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