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AUTHOR Brewer, William F.; Hay, Anne E.
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ABSTRACT

A study investigated reconstructive recall for linguistic style. It was hypothesized that (1) features of linguistic style would be more difficult to recall than underlying content, (2) reconstructive errors would include stylistic forms recalled as standard forms when subjects lacked productive control of a particular feature of a style, and (3) reconstructive errors would include standard forms recalled as stylistic forms when subjects with productive control of a style attempted to style match. Subjects carried out recall tasks with texts of five different styles: Business, Biblical, Academic, Legal, and Primer. Objective procedures were developed to classify the style of the reconstructed responses, and the results showed that a large proportion of the total responses consisted of the predicted types of reconstructive errors. The reconstructive-style hypothesis was used to integrate a range of experimental findings from studies of memory for text. (Author/FL)

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Technical Report No. 286

RECONSTRUCTIVE RECALL OF LINGUISTIC STYLE

William F. Brewer and Anne E. Hay
University of Illinois at Urbana-Champaign

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University of Illinois
at Urbana-Champaign
51 Gerty Drive
Champaign, Illinois 61820

Bolt Beranek and Newman Inc.
50 Moulton Street
Cambridge, Massachusetts 02238

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Abstract

The present experiment investigated reconstructive recall for linguistic style. It was hypothesized that: (a) Features of linguistic style would be difficult to recall compared to underlying content. (b) Reconstructive errors would include stylistic forms recalled as standard forms when subjects lacked productive control of a particular feature of a style. (c) Reconstructive errors would include standard forms recalled as stylistic forms when subjects with productive control of a style attempted to style match. Subjects carried out recall tasks with texts of five different styles (Business, Biblical, Academic, Legal, Primer). Objective procedures were developed to classify the style of the reconstructed responses and the results showed that a large proportion of the total responses consisted of the predicted types of reconstructive errors. The reconstructive-style hypothesis was used to integrate a range of experimental findings from studies of memory for text.

issue of memory for style, as for other topics, Bartlett's classic work gives some preliminary evidence and an interesting theoretical account.

The overall purpose of the present experiment was to study the recall of texts written in styles that most subjects could produce and to develop analytic procedures for classifying the linguistic style of recall errors. In order to carry out this goal it was necessary to go through a complex process of materials development. The overall procedures used in developing the passages to be recalled were designed to ensure that each passage contained some sections in "standard style" and some sections in the designated style. With materials of this type it should be possible to use the linguistic style of the material recalled as an index of the type of processes that have taken place during reconstructive recall.

Method

Materials

Several preliminary studies were carried out to determine which styles undergraduates could produce. This pilot work suggested that subjects from our undergraduate population had moderate productive control over the following five styles: Business, Biblical, Academic, Legal, and Children's Primer. These five styles were used in the following experiments.

For each of the five types of styles chosen for investigation, an experimental passage was developed. The procedures used to develop the experimental passages were designed to ensure that each passage would have some obvious indicators of a particular style (style markers), but would also contain a number of phrases which would be in more standard style. We used a production task to ensure that undergraduate subjects had productive

Much recent research on memory for sentences and memory for discourse has focused on the constructive and reconstructive processes that occur in memory for this type of material. Two basic approaches have been used to study these issues. One approach has used recognition memory procedures to study the rate of forgetting of surface structure information (e.g., particular syntactic forms and particular lexical choices). The essential findings of these studies (Anderson, 1974; Begg, 1971; Graesser & Mandler, 1975; Perfetti & Garson, 1973; Sachs, 1967, 1974) is that surface information is lost from memory much more rapidly than is the memory for the underlying content. Much of the surface information is lost within the first few minutes, but several of the studies have found that some surface information is retained for much longer periods.

The other approach to this topic has been to study the types of errors that occur in recall tasks (Bock & Brewer, 1974; Brewer, 1975; Cofer, Chmielewski, & Brockway, 1976; Flores D'Arcais, 1974; James, Thompson, & Baldwin, 1973). The essential finding of these studies is that subjects frequently do not recall a text in verbatim form, but instead produce many responses that are paraphrases of the initial text. These findings have been interpreted as showing that subjects show good recall for the underlying content, but that during the recall process they frequently reconstruct new surface forms for the retained content.

Linguistic Style

The purpose of the present paper is to suggest that the basic findings on reconstructive memory for text can be looked at as part of a larger set

of issues related to linguistic style. Linguistic style has rarely been studied in psychology, but has been a major topic of investigation by scholars in the humanities (e.g., Chatman, 1971; Freeman, 1970; Love & Payne, 1969).

For the purposes of this paper we will consider linguistic style to be a set of context bound, surface structure conventions (see Enkvist, 1964, 1973). The specific aspects of surface structure of most importance for style are lexical choice, optional syntactic form, and the use of particular idiomatic phrases. The term "context" is intended to be taken very broadly. The context associated with a particular style can be a content domain such as that associated with legal style or scientific style. The context can be a cultural situation such as that associated with the spoken register used by members of a football team during a game or that used by the mourners at a funeral. The context can also be a particular literary genre such as the style associated with romantic poets of a particular period.

It seems likely that the literate speaker of English is capable of recognizing a large number of styles. If one reads a text containing a phrase such as "enclosed please find" most literate speakers of English would recognize it as business letter style; if a text contains a phrase such as "he saith unto them" most literate speakers would recognize it as Biblical style. After extensive exposure to a particular linguistic style one develops strong, context-sensitive, style intuitions. For example in the context of a journal article in experimental psychology a sentence such as "I rounded up about 10 eager undergrads from Frank's section of intro"

is a clear style violation, even though it is essentially identical in meaning with the stylistically appropriate "The subjects in the experiment were 10 volunteers from an introductory psychology course." These examples make clear that linguistic style is one aspect of linguistic competence that must be captured in psychological theories of language understanding and language production.

Linguistic Style and Reconstructive Recall

The introduction of linguistic style as a theoretical construct makes it possible to develop a new, more comprehensive, theory of reconstructive recall. First, we assume that episodic memory for linguistic style is lost from memory rather rapidly. Then, if an individual is presented with a text in a particular linguistic style and is asked to recall it, three basic outcomes are possible depending on the individual's productive control of features of the style: (a) If the text includes stylistic features that the individual understands, but does not have fluent productive control over, then the recall protocols will contain a large number of reconstructive errors as the content is written down in the individual's "standard" written style. This would account for the large number of reconstructive errors in the recall of stylistically unusual text such as Bartlett's (1932) "War of the Ghosts." (b) If the text includes stylistic features that the individual is able to produce and there are multiple surface realizations possible within the style, then the individual will attempt to "style match" during the reconstructive process and will produce reconstructive errors that are consistent with the style of the initial input. There is currently little experimental evidence to

support this prediction and therefore it is one of the basic issues to be examined in the experiments in this paper. (c) If the text includes stylistic features that the individual can produce, and there is only a single appropriate stylistic realization, then the text will be recalled correctly with few reconstructive errors. This would account for the reduced number of reconstructive errors in James, Thompson, and Baldwin's (1973) active sentences and Brewer's (1975) and Bock and Brewer's (1974) preferred forms. In addition to these reconstructive processes it is also possible for there to be direct recall of a particular stylistic feature. Thus, the linguistic style approach predicts three basic types of reconstructive responses (shifts from given style to standard style, style matching errors, and apparent veridical recall), depending on the characteristics of the input style and the individual's control over the features of the style of the material to be recalled.

Bartlett: Recall of Linguistic Style

One of the few previous discussions of the recall of linguistic style is contained in the classic work of Bartlett (1932). Bartlett states that he deliberately chose a text ("The War of the Ghosts") that was deviant from the perspective of his English undergraduate subjects (p. 64). Examination of the text that Bartlett used shows an interesting history with respect to linguistic style. The original text was given in a literal translation from the Kathlamet Indian language (Boas, 1901, pp. 182-184). Then the literal translation was rewritten in a more standard style (Boas, 1901, pp. 182-184) and finally Bartlett rewrote Boas' translation in an

even more standard style. However, throughout these various reworkings of the text, a number of instances of the original Kathlamet style survived, and this made it possible for Bartlett to explore reconstructive recall for linguistic style. For example, one of the sentences in the original text Bartlett gave to his subjects was "Arrows are in the canoe," a stylistic deviation from standard written English. Examination of the recall protocols show that two of Bartlett's subjects reconstructed this sentence in more standard form: Subject N. recalled it as "There are arrows in the canoe" (p. 68) while subject L. recalled it as "There are arrows in our canoes" (p. 70). Bartlett pointed out that nearly all of his subjects commented on the style of the text, and yet their recall of the style was very poor. The subjects frequently transformed the Kathlamet style markers into more standard written style and Bartlett suggested that this was due to the fact that his subjects did not have productive control of this style (i.e., our prediction (a) above).

In addition to the clear description of the reconstruction of text in standard style by subjects who have no productive control of the initial style, Bartlett suggested the possibility of style matching (prediction (b) in the previous section). In fact, a close examination of the recall protocols of one of his subjects (subject H.) shows some tentative evidence for style matching. In several places this subject took fairly standard sentences from the original text and reconstructed them in a more ornate archaic form, apparently in an attempt to match the original style. For example, he recalled the sentence "So one of the young men went /along in the canoe/" as "He thereupon took his place /in the canoe/." Thus, on the

control over some of the stylistic markers which had been omitted from the original passage.

Original passage selection. The process of developing the experimental passages began with the selection of an original text for each of the five styles that was to be studied: (1) Business style. The original passage was a business letter dealing with price information on sofas and carpets, written by the experimenters. The particular business style markers used were derived from a number of books on how to write business letters. (2) Biblical style. The original passage was taken from the King James translation of the Bible, Acts 12:8-12:10. (3) Academic style. The original passage was the opening paragraph of an article from a psychology journal (Greenspoon, J. The reinforcing effect of two spoken sounds on the frequency of two responses. American Journal of Psychology, 1955, 68, 409). (4) Legal style. The original passage was a shortened version of a document dealing with the release and assumption of risk related to joining a hang-gliding organization. The passage was chosen in consultation with a lawyer, who considered it to be a classic example of legal style. (5) Children's Primer style. The original passage was taken from a children's primer (Round About, 1941, p. 72).

The five original passages were selected to be unambiguous examples of the target styles. It was clear that our undergraduate subjects would be able to recognize the style of these particular passages, but we needed to be sure that they could produce surface structure forms in the appropriate styles for each of the target passages. The next two steps in the development of the experimental passages were designed to ensure that

undergraduate subjects had productive control over style markers appropriate for our original passages.

Original passages converted to standard style. The experimenters rewrote each of the original passages in standard informal written style. Thus, for example, in the original Biblical passage, the phrase "the angel saith" was rewritten as "the angel said;" in the original Business letter passage, the phrase "enclosed please find" was rewritten as "we are enclosing. . ."

Original passages--style production. The five original passages rewritten in standard style were given to eight undergraduate subjects. Each subject was given all five passages and was asked to convert each back into its appropriate style. Thus, for example, each subject received the standard version of the Biblical passage and was asked to "Rewrite the following paragraph in King James Bible style." The responses were analyzed and a frequency tally was constructed to indicate which phrases the subjects found easiest to convert to the indicated style. Thus, for the Biblical passage the phrase "the angel said" was rewritten as "The angel said unto him" by three subjects; in the business letter the phrase "We are enclosing" was rewritten as "Enclosed is . . ." by four subjects. The obtained frequency distributions gave an indication of which aspects of the styles of these particular passages our undergraduate subjects could produce.

Final experimental passages. The sequence of procedures described above made possible the development of the final experimental passages. The experimental passages were each constructed by mixing sections from the

original style passage with sections from the standard versions of the same passage. In general, an attempt was made to leave in standard style those phrases of the passage that subjects, in the production study, had shown some ability to convert to the target style. Thus the experimental passages were designed to allow the maximum occurrence of reconstructions to the target style. For example, the section of the Business passage that was written as "Enclosed please find" in Business style, or "We are enclosing . . ." in standard style, was written in standard style in the final experimental passage, since subjects had shown that they had control of that aspect of Business style. This procedure produced final experimental passages that contained some clear style markers from the original passages and also contained a number of phrases in standard style. There were five experimental passages, one for each of the styles selected for investigation. The experimental passages are given in Appendix A.

Recall Procedure

There were 68 subjects, seen in groups of 5 to 10. They were told that they were to take part in a memory experiment and then were given verbatim memory instructions. The instructions stated: "This is an experiment on memory. In this experiment I will read several passages to you and then ask you to recall what you have heard. I will read each passage to you twice. Listen carefully while I read the material and then after I have finished reading the second time, write what you can remember in your test booklets. Please try to remember what I read as exactly as you can." The experimenter read the instructions to the subjects, and then

read the experimental passage. The passage was read aloud twice, and after the second reading, the subjects were given 10 minutes to write their responses. Each subject received only one passage for recall.

Ten usable recall protocols were obtained for each of the five passages. Protocols had to contain at least 40% as many words as the corresponding experimental passage to be included in the study. Passages that did not meet this criterion were removed from the study and replaced with protocols from new subjects that did meet the criterion. This criterion resulted in the replacement of 18 original protocols (2 in Biblical style; 6 in Business style; 5 in Academic style; 5 in Legal style).

Results

In order to score the recall data, the experimental passages were divided into phrase units. Phrase boundaries were defined as those points in the passage where at least two of three judges agreed in placing a boundary. The original pasages ranged from 15 to 23 phrases by this criterion. The phrase units for each passage are indicated in Appendix A.

The recall protocols were divided into phrases that corresponded to those in the original passages. Each phrase in the recall protocols was then classified as: (a) verbatim correct, (b) omitted, or (c) changed from the original passage. Within the responses that were changes from the experimental passage, changes were classified as either: (1) reconstructions to own style (standard style), (2) reconstructions to the original style, or (3) other changes. The small number of responses that bore no obvious relation to any phrase in the original passage were not

included in the analysis. Two different criteria were developed to classify the responses: a style production criterion, based on the results of two rewriting tasks; and a style recognition criterion, based on subjects' ratings of phrases as being in a particular style.

Production Criterion

In order to obtain the data required for the production criterion, 75 subjects carried out a rewriting task. There were two basic types of writing tasks: production of original style and production of standard style. For the production of original style task subjects were given one of the five experimental passages. The instructions stated, "The following passage is partially written in _____ style. However, some of it (words, phrases, sentences) are not in typical _____ style. Please rewrite the passage putting all of it in _____ style." For the production of standard style task subjects were given one of the experimental passages and instructions that stated, "The following passage is in the style of _____. Please rewrite the passage in more natural English. Try to keep the content the same, but change the wording into a style that seems more like your own writing style."

Each of the five experimental passages was rewritten in original style by 10 subjects and in standard style by 10 subjects. The 50 subjects in the recall task each carried out one rewriting task, half were asked to produce original style and half standard style. The rewriting task was carried out after the recall task. The style assigned to a subject in the rewriting task was always different from the style that the subject had

recalled in the memory task. An additional group of 25 subjects were asked to rewrite two passages each, one passage in original style and a different passage in standard style. Thus, each of the original passages was rewritten in original style and in standard style by 10 subjects.

The data from the two rewriting production tasks made it possible to provide an objective classification for each of the phrases in the recall task that was a change from the experimental passages. Each changed phrase was compared to the original style production data and the standard style production data for the same passage. Any phrase on the recall task which also occurred verbatim in one of the protocols from the production of original style task was classified as an example of reconstructed original style. Any phrase on the recall task that occurred verbatim in one of the protocols from the standard style production task was classified as an example of reconstructed standard style. Any phrases which were found both in the original style rewrite protocols and the standard style rewrite protocols were classified as "other" changes. The few instances where there were changes to both original style and standard style within a phrase were also classified as "other" changes. Finally, all phrases which did not appear in protocols from either production task were classified in the "other" category.

Recognition Criterion

The production criterion is a sound objective procedure for classifying recall responses. However, it severely underestimates the true number of reconstructed responses because it classifies only those particular responses that happened to occur in the productions of 10

subjects. The data from the conservative production criterion allowed us to develop a recognition criterion which gives a more realistic index of the proportion of reconstructed responses. Every unique recall response that was a change from the experimental passages was included in a single booklet and was rated by 25 subjects on a 1 to 6 scale to indicate to what degree it seemed to be an example of standard style or of original style. The specific instructions given to the subjects were: "We want you to evaluate the phrases for style. Some of the phrases are in natural English (might have been written by an average college student). Other phrases are taken from _____. After reading each phrase, rate it for the degree to which it falls along the scale from natural English to _____ style. Indicate your judgment by circling the number on the scale that you feel best applied to the phrase. Use "1" if you are sure it is perfectly natural English, and a "6" if you are sure it is in _____ style." Every subject rated every phrase. Order of pages in booklets was randomized.

Mean ratings were obtained for each nonverbatim phrase from the recall protocols. The data from the production task were used to calibrate the recognition task. The criteria for classifying items as either standard style or original style were derived by taking the mean of the ratings for the items that had been classified as standard style or original style using the production criterion. For example, the mean rating score for those phrases in the Biblical style task which had been classified as reconstructions to Biblical style was 4.13, so every item which had a mean rating score of greater than 4.13 was scored as a reconstruction to Biblical style by the recognition criterion. The mean rating score for

those phrases in the Biblical recall protocols which had been scored as reconstructions to standard style on the production criterion was 2.46, so any phrase that had a mean rating score of less than 2.46 was scored as a reconstruction to standard style by the recognition criterion. Any phrase with a mean rating score in between the standard style and original style means was classified as an "other" change. This recognition procedure resulted in a classification of a larger percentage of items as reconstructed to the target style. However, it is still somewhat conservative, since only items above the mean for the production items were classified as instances of reconstructions to a target style.

Recall Data

A sample recall protocol from the Biblical style condition is given in Appendix B. The basic recall data for each experimental passage using the production criterion are given in Table 1. The results show that the reconstructive responses include both shifts to standard style and style matching responses. However, this criterion is very stringent. Recalls were classified as shifted to standard style or original style only if they were identical with one of the responses given in the appropriate rewriting task and this meant that a large portion of the reconstructed responses were classified as "other" responses.

The recognition criterion gives a more accurate reflection of the data so will be used as the criterion for response classification for the remaining presentation of the data. The basic recall data for each experimental passage using the recognition criterion are given in Table 2.

The first result of interest is the large amount of reconstructive recall found in this study: 56.1% of the phrases that were recalled were either reconstructed to standard style or to original style. Clearly the procedure of using style markers to index the reconstructive process shows a striking degree of reconstructive recall in memory for discourse.

Insert Tables 1 and 2 about here.

There is some variability across the five styles. The Academic and Legal passages were harder than the other passages, but the basic pattern of results is consistent across these five very different passages.

In order to examine the details of the reconstructive process it is necessary to be able to follow the course of a particular type of stylistic feature from input to recall. Table 3 presents the recall data broken down in terms of the style of the individual phrases in the experimental passages. The data given in this table show that, of the phrases in the experimental passage that were presented in standard style, 17.6% were recalled verbatim, 20.5% were reconstructed to the style of the original passage, and 12.9% were reconstructed to a different instance of standard style. For phrases that were presented in a particular style, 14.6% were recalled verbatim, 13.0% were reconstructed to standard style and 23.4% were reconstructed to a different instance of the presented style. These data show that the hypothesized style matching process does occur in the recall of discourse, and that for texts with clear style indicators style matching is a very strong factor in determining the form of the recalled discourse.

Insert Table 3 about here.

Discussion

The results show that surface stylistic forms are lost rather rapidly in a recall task and that much of the linguistic form of the response is reconstructed. For example, with the recognition criterion at least 51.2% of the responses (verbatim, style, and standard) retain the underlying content, but only 16.0% of the responses retain the original surface form. The use of texts of clearly different style and the development of procedures to classify responses as to style in this study provided clear support for the hypothesis that the features of linguistic style in a text are lost from memory rather rapidly compared to the underlying content.

The finding that many recall errors result from the subjects replacing a stylistically marked form with a more standard form is consistent with the recent literature on reconstructive recall for linguistic form (Bock & Brewer, 1974; Brewer, 1975; Cofer, Chmielewski, & Brockway, 1976; James, Thompson, & Baldwin, 1973). However, interpretations of this type of reconstructive error in terms of style are more clearly found in much earlier research. In one of the earliest studies of reconstructive memory Binet and Henri (1894, see Thieman & Brewer, 1978, for a translation) found transformations to simpler forms in children's rec of text. They suggested that this kind of error was a type of "ve assimilation" which was due to the children replacing linguistic forms written in "a rather lofty style" with more conversational forms (Thieman & Brewer, 1978, p. 256). Bartlett (1932), as discussed earlier, is also very clear on this

issue. He attributes reconstructive errors of this type to the fact that his English undergraduates did not have productive control of the aspects of Kathlamet style retained in the English translation of "The War of the Ghosts."

In addition to the transformations to standard forms, the results of the present experiment also show that if materials are written in an obvious style and the subjects have control over that style, then there is a strong process of style matching during reconstructive recall. This provides empirical support for Bartlett's (1932) earlier suggestion and adds an important new process to our understanding of reconstructive recall.

The overall finding of very strong reconstructive recall in our experiment raises an interesting problem with respect to the verbatim recall of text. We found strong evidence for both shifts from a presented linguistic style to standard style and attempts to style match. In our initial discussion of the reconstructive recall for style we note that there are also conditions where reconstructive recall will lead to verbatim recall of linguistic form. If the original text is written in a style similar to the subject's own style then the reconstructive process should result in many reconstructions that match the original text. Similarly, if the original text is written in a non-standard style that the subject can produce, and there is only one obvious stylistic form for a given content, then the subject will style match and the resulting reconstructed forms will agree with the original text. This leads to an interesting problem: To what degree are the verbatim recall responses due to actual correct

recall of the initial surface information, and to what degree are they due to successful reconstruction of the particular forms of the initial text? The use of a standard recall paradigm, as in the present experiment, does not distinguish between these two alternatives. However, the overall data showed a very high percentage of reconstructive responses (51.2% of total responses were clearly reconstructed and, since a conservative recognition criterion was used, a considerable proportion of the 11.5% "other" responses were probably reconstructed). Therefore, it is almost certain that some of the 16% verbatim correct responses were simply successful reconstructions and perhaps most of them were.

While the data from the recall experiment are consistent with a position that the linguistic form of all the responses in the recall experiment are reconstructed this seems too strong an interpretation. Clearly human memory is capable of storing large amounts of linguistic surface information. An average speaker of a language such as English has a vocabulary that contains tens of thousands of arbitrary surface forms and the average individual has a number of texts stored in long-term memory in more-or-less exact surface form (cf., Rubin, 1977).

Therefore, we do not wish to conclude from the results of the experiments in this paper that all recall of linguistic form is reconstructed, but that one must be very cautious in using evidence for verbatim recall as evidence for retained surface information. For example, in an earlier paper (Brewer, 1975) one of us pointed out that some synonymous lexical pairs (such as drunk--intoxicated) never showed shifts from one to the other in recall and attributed this to direct storage of

the surface aspects of the word "intoxicated." This interpretation might be correct, but the finding could also be accounted for by style reconstruction. If a recall study used a sentence such as "The defendant, a white male, appeared to be intoxicated," and found verbatim recall it could simply reflect reconstruction by style matching. However, if the study is counterbalanced so that some subjects get the same sentence frame with the lexical item "drunk" and this sentence never shifts in recall to "intoxicated" then some type of non-reconstructive account is probably required.

Recently there have been a number of studies of memory for discourse in more naturalistic settings (Bates, Kintsch, Fletcher, & Giuliani, 1980; Bates, Masling, & Kintsch, 1978; Keenan, MacWhinney, & Mayhew, 1977; Kintsch & Bates, 1977). These studies have been interpreted as showing that, "memory for surface form in natural discourse may be more robust than laboratory studies of connected prose have led us to believe" (Bates, Masling, & Kintsch, 1978, p. 187). However, examination of these studies in light of the evidence for style matching suggests substantial agreement in both lines of research, since the verbatim recalls in several of the naturalistic studies may have been reconstructed.

First it should be noted that the differences between the laboratory studies and the studies in naturalistic settings cannot be due to the variable of naturalistic setting. The two studies with the most ecologically valid settings are the study by Kintsch and Bates (1977) examining recognition memory for statements from a classroom lecture and the study by Keenan, MacWhinney, and Mayhew (1977) investigating

recognition memory for statements occurring in a seminar by members of that seminar. In both of these studies the bulk of the items (the content of the lecture in Kintsch & Bates and the "low interactional" items in Keenan, et al.) showed the standard low memory for surface information found laboratory studies. Thus, it cannot be the naturalistic setting versus laboratory setting that is causing the difference. If there is a difference in the two types of studies it must reside in the characteristics of the items that show apparent good surface memory (i.e., the jokes and extraneous remarks in Kintsch & Bates and the "high interactional" items in Keenan, et al., 1977).

Secondly, examination of the design of some of the naturalistic studies suggests the possible importance of the style matching hypothesis in their findings. In the standard laboratory study the stylistic characteristics of the material are counterbalanced. For example, if one has a text and then constructs surface structure variants to use as foils then half of the variants are inserted in the text. Texts constructed in this fashion contain half crucial items in the original style and half in the style of the experimenter. This type of counterbalancing should eliminate successful memory performance due to style matching. However, the Keenan, MacWhinney, and Mayhew (1977) and Bates, Masling, and Kintsch (1978) studies do not counterbalance their materials for style. Given the strong style matching strategies revealed in the present experiment it seems highly likely that some of the apparent correct recognition of surface information in these studies is due to style matching strategies on the part of the subjects.

In fact, when Bates, Kintsch, Fletcher, and Giuliani (1980) carried out a study using naturalistic materials which were counterbalanced for style they found that much of the apparent high surface memory for their material (a soap opera) was due to style matching strategies but also that there was some evidence for retained surface information independent of the style matching strategies. Thus, it seems to us, that there is no major discrepancy between the naturalistic studies and the laboratory studies. The major finding in both lines of research is that memory for the stylistic aspects of text is poor relative to memory for the underlying content. Both groups of studies show strong reconstructive processes involving linguistic style. Finally, both groups of studies show that some surface information is retained independently of the reconstructive processes, its amount depending on factors such as the number of repetitions, the retention interval, the type of memory test (recognition vs. recall), and on the affective or "interactional" nature of the material.

The reconstructive style hypothesis can be used to give an account of a wide range of findings. In addition to the experiments already discussed, it may also play a role in another series of studies. Bransford and Franks (1971) developed a paradigm in which they showed that if subjects heard parts of complex sentences, they could not distinguish the particular surface realization they had heard from other combinations. This experiment has also been carried out a number of times in a recall paradigm (Bransford & Franks, 1972; Cofer, 1973; Griggs, 1974) with the finding that subjects tend to recall more compound sentences than were in

the acquisition list. This suggests that the subjects may be taking the somewhat choppy single-proposition sentences and reconstructing them in longer, more natural, compound sentences.

Another finding that can be taken to support the style matching hypothesis is in Rubin (1977). This is a somewhat unlikely place to find support for reconstructive memory since the study was explicitly directed at exploring long-term verbatim memory in recall of overlearned texts. However, in the course of this study Rubin points out one case of strong reconstructive memory in the recall of the Gettysburg Address. He found that 6 of 14 subjects recalled "Fourscore and seven years ago our fathers . . ." as "Fourscore and seven years ago our forefathers. . ." This is a classic example of style matching in reconstructive recall.

In conclusion, it seems to us that the hypothesis of reconstruction of linguistic style gives a good account of the present experiment, supports the early suggestions of Binet and Henri (1894), and Bartlett (1932), and provides a framework that allows the integration of a wide range of more recent experiments.

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Table 1

Recall Results: Production Criterion

Passage Style	Percent of Responses by Production Criterion				
	Verbatim	Style	Standard	Other	Omit
Business	15.6	4.8	3.5	33.0	43.0
Biblical	26.0	9.3	11.3	40.0	13.3
Academic	4.7	.7	1.3	42.0	51.3
Legal	8.8	1.9	5.0	36.2	48.1
Primer	22.7	5.9	6.4	35.0	30.0
Overall	16.0	4.7	5.4	36.7	37.3

Note. The total number of responses classified for each passage were: Business 230; Biblical 150; Academic 150; Legal 160; Primer 220.

Table 2

Recall Results: Recognition Criterion

	Percent of Responses by Recognition Criterion				
Passage Style	Verbatim	Style	Standard	Other	Omit
Business	15.6	21.3	10.4	9.6	43.0
Biblical	26.0	19.3	28.7	12.7	13.3
Academic	4.7	29.3	9.3	5.3	51.3
Legal	8.8	16.9	7.5	18.8	48.1
Primer	22.7	23.6	11.4	12.3	30.0
Overall	16.0	22.2	13.0	11.5	37.3

Note. The total number of responses classified for each passage were: Business 230; Biblical 150; Academic 150; Legal 160; Primer 220.

Table 3

Recall Results by Style of Original Phrases

Passage Style & Phrase Type	Percent of Responses by Recognition Criterion				
	Verbatim	Style	Standard	Other	Omit
Business					
Style (8)[a]	16.3	17.5	13.8	11.3	41.3
Standard (15)	15.3	23.3	8.7	8.7	44.0
Biblical					
Style (10)	20.0	24.0	31.0	13.0	12.0
Standard (5)	38.0	10.0	24.0	12.0	16.0
Academic					
Style (10)	5.0	36.0	8.0	6.0	45.0
Standard (5)	2.0	14.0	12.0	12.0	60.0
Legal					
Style (14)	8.6	16.4	2.9	20.0	52.1
Standard (2)	10.0	20.0	40.0	10.0	20.0
Primer					
Style (8)	28.9	25.0	13.6	7.5	25.0
Standard (14)	19.3	23.6	10.0	14.3	32.9
Overall					
Style (50)	14.6	23.4	13.0	12.4	36.6
Standard (41)	17.6	20.5	12.9	11.5	37.6

[a]Numbers in parentheses indicate the number of phrases in the original passage that were classified by the experimenters as standard style or style of experimental passage.

APPENDIX A

Experimental Passages Used in the Recall Study

Business Style

We are in receipt of the letter/you wrote on the 4th of December/about our furniture./ We are enclosing a brochure/telling about our sofas./ As per your instructions/we also enclose herewith a copy of our price list./ Your letter of December the 5th/asking for information about our carpets/has also been received/and its contents duly noted./ At this time/we are out of price lists/for the carpets you asked about./ We will let you know when we get the lists./ However, we will send you/in a separate envelope/a pamphlet describing our carpets/and a sample of our best carpet material./ If you wish to buy any of our outstanding products/please send your order/ at your earliest convenience./

Very respectfully yours,/

Biblical Style

And the angel saith to him/"Draw thy belt tight/and bind on your sandals."/ And so Peter did./ And the angel said to him/"Cast thy cloak around you/and follow me."/ They passed the first guard station,/and then the second,/and came unto the iron gate/that leadeth to the city./ The gate opened of itself,/and the two went out./ They walked through one street,/and suddenly the angel departed from Peter./

Academic Style

The reinforcing effects of various stimuli/presented immediately following a response/have been investigated largely with infra-human subjects./ In the context of experiments/using the operant conditioning paradigm,/I will use the words 'reinforcing stimulus'/to mean a stimulus introduced following a response/that increases the likelihood of that response./ Despite this research using infra-human subjects,/there has been relatively little effort to identify reinforcing stimuli for human beings./ Many people have conditioned humans,/ but they have used only a few types of rewards./ Most of the research involving reinforcing stimuli with humans/has, however,/looked at problems other than the identification of reinforcing stimuli for human subjects./

Legal Style

In light of the facts,/which I hereby acknowledge as true,/that hang gliding is a dangerous and somewhat unpredictable activity/and that the ultimate responsibility for the safety of each person participating in said activity/rests with that person himself/herself;/* I the undersigned assume responsibility for any and all damage and/or* injury/which may accrue to me or other individuals/and/or* property/as a proximate result of the aforesaid activities./ I further state/that I have read the foregoing assumption of risk./ I understand it./ I have executed it freely and voluntarily/for the purposes stated therein./ In witness whereof/I have hereunto affixed my signature this day./

*these slashes were in the original text

Children's Primer Style

Look! Look!/ See Bob and Billy drag their new sleds/to the top of the large hill./ The sleds are red./ Bob and Billy leaped on their sleds/ and sped down the side of the hill./ Oh! Look!/ There is a huge bump on the hill./ Bob and Billy struck the bump./ Over went the sleds;/and over went Bob and Billy./ See them roll!/ They rolled over and over/down the hill/until they both looked like two giant balls of snow./ How they laughed!/ Spot heard Bob and Billy laugh./ He rushed over to see them,/ barking,/jumping,/and wagging his tail./ They all ran home./

APPENDIX B

A Sample Recall Protocol from the Biblical Style Condition

The angel *said unto Peter*/tighten up *thy* belt/and fasten *thy* sandals./ The angel said cast *your cloak* away/and come follow me,/and Peter did./ They passed one guard gate/*and then another*/and then arrived at the iron gates/ *which led into* the city./ They walked down one street/and then another/ *and the angel suddenly disappeared*./

Note. The phrases in the recall protocol that were scored (by the recognition criterion) as reconstructed to standard style are in italic type and those that were scored as reconstructed to Biblical style are in small capitals. Phrases which included both standard forms and style forms within the same phrase were classified as "other" changes.