Initial mention as a signal to thematic content in technical passages

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Information near the beginning of a passage has often been reported to be recalled better than information appearing later in the passage. The explanation has been that the most important information in a passage is recalled best, and this information usually appears early in a passage. This suggests that there is a linguistic convention that important information should appear in an initial position. That initial mention functions as a signal to the important, or thematic, content of a passage was demonstrated with two experiments in which readers reported what they thought was the main idea or the main item of technical passages. The first experiment unfounded content and position by using passages in which the main idea was expressed by a sentence that appeared either first in the passage or embedded in the middle of the passage. Statements of the main idea resembled the intended theme sentence to a greater extent if this sentence appeared first than if it was embedded. The second experiment showed that statements of the main item tended to name the major referent that appeared first in the passage. The results suggest that readers base much of their abstractive processes on the semantic content of a passage, with superficial features such as initial mention serving to guide or influence these processes.

It has been shown that in memory for prose, information near the beginning of a passage, in the initial position, is recalled better than information that appears later in the passage. One of the earliest demonstrations of this fact was provided by Deese and Kaufman (1957), who showed that as word lists became closer approximations to English prose, the normal serial position curve for word-list recall lost its recency portion, whereas the primacy portion of the curve became more exaggerated. Similar primacy effects for organized prose have appeared in more modern work (e.g., de Villiers, 1974; Frase, 1969; Meyer & McConkie, 1973), usually in the context of the "levels effect." This effect, which has been reported frequently (e.g., Johnson, 1970; Kintsch, Kozminsky, Streby, McKoon, & Keenan, 1975; Thorndyke, 1977), is that information that is at a high level of importance in the propositional structure of the passage content is recalled better than that at low levels. As pointed out by Meyer (1977), the levels effect can be used to explain the better recall of the initially mentioned information: Since the important information usually appears first in the passage, this information will be recalled well due to its importance. Additional support for this explanation appears in the Kintsch et al.

study. The important propositions did tend to have early positions in the passages.

However, perhaps there is a linguistic convention that initial mention itself acts as a cue to importance, and so the most important information should appear in the initial position. Hence, rather than important content merely happening to appear first, the composer of a passage normally places the important information there to ensure that the reader will identify it as important immediately upon beginning to read the passage. We are taught throughout our training in writing that a paragraph should usually begin with a "topic sentence." Thus, rather than a phenomenon to be explained away, the better recall of initially mentioned information is in fact a clue to the important question of how readers identify the important content of a passage.

Some support for the importance of initial mention comes from the special status given to the initial portion of a passage by most theorists of prose comprehension. For example, Carpenter and Just (1977) postulate a "discourse pointer" whose initial state is determined by the initial portion of a passage. From theories of prose comprehension based on schema ideas (e.g., Thorndyke, 1977, 1979), we would expect that the main subject should appear early in the passage to enable the reader to activate the relevant portions of his general knowledge or to perform the initial step of selecting the proper schema. Others point out that initially mentioned information may be required to provide a contextual framework for the passage content (e.g., Bransford & Johnson, 1972) or to define the major passage referents (Clark & Haviland, 1977).

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In the process model proposed by Kintsch and van Dijk (1978), the first propositions to be read in are held in a limited working memory whose later contents are heavily influenced by the relation of later input to what is already being held. The first information from the passage can thus strongly influence what is later considered coherent and what should be stored for later recall. This model suggests that there would be a convention that the first-appearing information in a passage should be suitable for this role by being important or central to the passage content.

In spite of the importance of initial mention, there is very little direct evidence that readers consider information in the initial position as especially thematic or give it special weight in deciding what the passage is about. One study that does provide such direct evidence for an initial-mention convention was reported by Kieras (1978), who used a direct measure of the thematic content of a passage. Subjects read simple passages one sentence at a time and then reproduced from memory the presented sentence that they thought "would make the best title." The overwhelming favorite choice was the sentence that stood at the central position in the propositional structure of the passage. But if this sentence appeared first, it was chosen as the apparent theme more often than if it appeared last. Hence initial mention enhanced the perceived thematic value of the most thematic sentence. Other studies using direct measures, which are reported by Kieras (Note 1, Note 2), show that in naturally occurring passages the judged thematic content usually does appear early in the passage.

Hence there is good reason to think that there is a linguistic convention that thematic or important passage content should appear first in the passage. Consequently, a reader may tend to consider the first information in a passage important, regardless, to some extent, of its actual importance in the passage as a whole.

Clearly, a reader's decision as to the importance of various parts of a passage will be based on many factors, as pointed out by van Dijk's (1979) taxonomy of linguistic devices used to signal important passage content and by the several staging devices studied by Clements (1979). Consequently, as suggested by the Kieras (1978) results, initial mention can be expected to influence, but not completely determine, what the reader considers to be thematic. Initial mention is only one of the theme-signaling devices, and other devices may in fact be more important. However, initial mention is an important one to study first, due to its simplicity and importance in current theories.

This paper contains two experiments on the role of initial mention in readers' judgments of the theme of passages of natural complexity, being either almost verbatim from *Scientific American* or of similar style and content. Before these experiments can be described, it is necessary to summarize the methodological

approach, in which direct statements of the main idea or main item of a passage are the data source, rather than the traditional recall measures.

First, it should be noted that most of the results available in the literature on the importance of various parts of a passage or passage content have been based on recall measures. When other measures have been used (e.g., Clements, 1979; Johnson, 1970), it has been only in a secondary role relative to recall measures. Now if the primary concern of prose comprehension research is educational relevance, then the dependent variable of recall is the obvious choice, since presumably a student's task is to remember the content of what he or she has read. However, since storage and retrieval operations and some time delay are involved in a recall task, this measure does not tap very directly into the immediate products of comprehension. If, as seems likely, identifying the theme of a passage is a process that can occur early in comprehension, a more immediate and pure measure of the perceived theme is needed. Furthermore, there are many real-world reading situations in which, rather than performing a recall task, the reader must engage in tasks requiring abstraction, such as classifying written material or looking for the desired material in a larger piece of prose, such as a technical manual. As an indication of the prevalence of this type of task, Sticht (1977) found that in a military work environment, textual materials were more often used as reference sources than as material to be learned for later recall.

The goal of these experiments was to study how readers identify the important content of a passage. What was needed was a measure of what readers think is important that reflects the immediate results of theme-identification processes going on during comprehension and not the combined products of comprehension, storage, and retrieval operations. This measure consisted of simply asking subjects to report what they thought was the important content of the passage immediately after they read it. To keep memory load to a minimum, the content of their responses was limited in quantity, and the time delay was very short.

A second methodological issue concerns the form of the subject's report. There has been little attention paid to just what the form of thematic information is. The Kintsch and van Dijk (1978) theory simply associates the entire gist of a passage, the macrostructure, with the discourse topic. But a simple analysis (Kieras, Note 3) suggests that a reader can report either the main idea of a passage, that is, the main proposition, or the main item, which would be the main referent under discussion (cf. van Dijk, 1979). Kieras (Note 3) found that subjects could produce well-behaved reports of either main items or main ideas. A main-idea report was obtained by asking subjects to produce a statement in the form of a brief complete sentence, and a main-item report was obtained by asking for a title-like response in the form of a noun phrase. The two report forms are closely

related, as would be expected (e.g., see van Dijk, 1979). The main-idea statements tended to be about the main items, in that popular main items tended to appear as the surface-subject noun phrases of the main-idea statements. The results reported here on initial mention make use of both the main-idea procedure and the main-item procedure.

EXPERIMENT 1

In this experiment, subjects produced main-idea statements to passages excerpted from *Scientific American* that were modified into two versions. In one version, the sentence intended to express the theme appeared first; in the other version, the same sentences appeared in a different order, such that the intended theme sentence was embedded in the middle of the passage. To ensure that subjects did not indulge in responses that were too free-wheeling, the instructions required that the statement meet certain constraints on form and stick fairly close to the passage content. Reading times and response-generation times were also measured, to see if the initial mention of the theme would lead to faster identification of the thematic information.

Method

Materials. A set of 16 passages, each in two versions, was prepared. One version had the theme sentence appearing first; the other version had the theme appearing in the middle of the passage. Composing such passages required a source of passages with known thematic content. Such a source was available from a previous experiment (Kieras, Note 2, Note 3), in which main-idea responses for 30 passages excerpted verbatim from *Scientific American* articles were sorted into categories on the simple basis of apparent similarity. Passages having relatively many of the responses appearing in relatively few categories have definite main ideas, in that the readers tended to agree on what the passages were about. The apparent main ideas of the passages could be determined by examining the most popular response categories. The selected passages were modified as necessary to ensure that the most popular main-idea response appeared to be explicitly expressed by one of the passage sentences (the intended theme sentence) and to enable this theme sentence to be placed in either the first or an embedded position without appearing to seriously damage the coherence or comprehensibility of the passage. The passages were computer-justified to fill 80-character lines and averaged about 10 lines in length. Table 1 presents an example of the two versions of one of the passages.

Design. The theme-position factor was both within subjects and within passages. Each subject read each of the 16 passages, 8 of them in a theme-first version and 8 in the theme-embedded version. The passages were assigned to theme-position conditions at random for each subject, with consecutive pairs of subjects seeing complementary versions. This ensured that if an even number of subjects were run, each passage would appear equally often in the two versions. The order in which the passages appeared was also randomized for each subject.

Subjects. Forty University of Arizona students of either sex served as subjects in return for \$2. Five subjects who either failed to follow instructions or did not finish in the 1-h session time were replaced with new subjects, who read the same versions of each passage as the original subjects.

Table 1
Example of the Two Versions of a Passage

Theme-First Version

Subtle variations in the appearance of a color result from differences in the composition and texture of the surface. The same hue will not look the same on surfaces made of plastic, wood, metal, paper and cloth. In addition to variations due to the material's composition and texture, new color attributes emerge with surface colors. Metallic colors such as gold, copper and silver are new color attributes that appear with the perception of a surface color. Surface colors may vary along dimensions from glossy to matte, transparent to opaque, and fluorescent to nonfluorescent.

Theme-Embedded Version

Surface colors may vary along dimensions from glossy to matte, transparent to opaque, and fluorescent to nonfluorescent. The same hue will not look the same on surfaces made of plastic, wood, metal, paper and cloth. Subtle variations in the appearance of a color result from differences in the composition and texture of the surface. In addition to variations due to the material's composition and texture, new color attributes emerge with surface colors. Metallic colors such as gold, copper and silver are new color attributes that appear with the perception of a surface color.

Equipment and Procedure. A Data General MicroNOVA laboratory computer was used to generate the randomized passage sequences, display the passages, collect the responses, and collect reading and response times (Kieras, 1979). Up to two subjects were run concurrently. Each subject sat in a booth at an 80 character by 24 line upper- and lowercase Teleray video terminal driven at 9,600 baud. When the subject tapped the space bar in response to a prompting message, the passage appeared on the screen. When the subject was finished reading, he or she tapped the space bar again, which caused the passage to disappear and a response-prompting message to appear. The subject then typed in his or her main-idea statement on the terminal keyboard. The statements were limited to 80 characters in length, which ensured that subjects had to prepare a reasonably brief and concise response. After the response was entered, the original prompt message appeared, and the subject could proceed to the next passage when ready. The computer recorded the typewritten responses, along with the time spent in reading the passages and typing the responses. The times were recorded to the nearest 1 sec.

Before beginning the experiment, the subject practiced using the terminal keyboard to become acquainted with how the responses were to be entered. Arrangements were made with the few subjects who did not like to type to write their responses by hand on a note pad. When ready to begin, the subjects read a set of written instructions and were checked to ensure understanding. The subjects then proceeded to read and respond to the 16 passages in the experiment.

Instructions. The instructions were prepared on the basis of earlier experiments to ensure a reasonable consistency in the form of the responses from different subjects. Subjects were told that their responses should state what they thought was the "main idea expressed in each passage." This was specified in more detail by a set of four rules for the response: (1) "It must be a single sentence, not two or three." (2) "It must be a simple sentence that will fit on one line on the computer terminal." (3) "It must be a complete sentence, not a word or phrase." An example was given to ensure that subjects understood the distinction. (4) "Your sentence must express an idea that was actually mentioned in the passage." This was elaborated to explain that simply copying a sentence from the passage was not

expected. Based on the responses in this and other experiments, subjects in fact interpret the phrase "actually mentioned" rather liberally; verbatim extracts from the presented passages are quite rare under these instructions. Hence, the effect of this instruction is best characterized as encouraging subjects to stick close to the passage content in devising their responses and to avoid flippant or humorous responses. Finally, subjects were asked not to pause or waste time while the passage was on the screen.

Results

Reading and typing times. The average reading and typing times for each subject in each of the two theme-position conditions were determined. The reading times averaged 58.3 sec for the theme-first condition and 60.1 sec for the theme-embedded condition. Although this difference is in the right direction, it failed to approach significance ($F < 1$). The typing times were 56.4 and 55.3 sec for the theme-first and theme-embedded conditions, respectively; this difference also failed to approach significance ($F < 1$) and, in any event, is in the wrong direction. Apparently, under these conditions, differences in processing time due to theme position simply do not appear.

Main-idea responses. Some typical responses for the passage shown in Table 1 are shown in Table 2. The responses were rarely verbatim extracts from the passages, but they showed considerable condensation and paraphrasing of the passage material. A method of scoring was required that would assess the extent to which the response was based on particular sentences in the passage. An obvious approach would be to use Kintsch's (1974) propositional analysis method to score how many propositions from the intended theme appear in the response. However, this method, although very rigorous, works poorly for highly paraphrased responses. In order to match such responses to the propositions, such a liberal matching criterion would have to be used that the method would lose most of its rigor.

The method used here was essentially the direct use of a liberal scoring criterion; the responses were rated for apparent similarity or overlap of content with the intended theme sentence on a 0-5 scale, where 0 means no overlap and 5 means that the response contains essentially all of the information in the intended theme sentence. A rating of 3 corresponds roughly to the response containing half of the content of the original

sentence. Each response was also rated for similarity to the alternate first sentence, which was the sentence that appeared first in the theme-embedded versions. Example ratings are shown in Table 2. Two independent raters performed the rating blind with respect to the version of the passage that had been presented. The mean ratings, collapsed across raters, are shown in Table 3.

Since each rater was free to make his own analysis of the content of the criterion sentences and to devise his own scheme for assigning numbers to the degree of overlap, it was expected that there would be differences in their ratings. Hence, rater was included as a factor in the statistical analysis. The ratings were collapsed across passages for each subject and subjected to an ANOVA in which rater, theme position, and similarity criterion were the factors.

As shown in Table 3, the responses were overall more similar to the intended theme than to the alternate first sentence [$F(1,39) = 222, p < .01$]. There was no main effect of theme position ($F < 1$). The key result was a strong interaction between the similarity criterion and the theme position [$F(1,39) = 23.44, p < .01$]. That is, the responses were more similar to the theme sentence if the theme appeared first than if it was embedded. However, the responses were more similar to the alternate first sentence when it appeared first, as in the theme-embedded condition, than when it appeared later in the passage, as in the theme-first condition. This effect was consistent across passages. For the ratings of similarity to the intended theme sentence, 13 of the 16 passages had higher mean ratings in the theme-first than in the theme-embedded condition. For the alternative first sentence criterion, a different set of 13 passages had higher mean ratings in the theme-embedded condition than in the theme-first condition.

As expected, there was a main effect of rater [$F(1,39) = 5.37, p < .05$] and interactions of rater with criterion [$F(1,39) = 5.92, p < .05$] and with the other two factors [$F(1,39) = 5.40, p < .05$]. This final interaction presents no problem with interpretation, however, since the two raters showed identical patterns of ratings for the means corresponding to those in Table 3.

Discussion

These results show that subjects tend to rely on the

Table 2
Example Responses and Similarity Ratings

Response	Criterion Sentence	
	Intended Theme	Alternate First
Surface colors vary depending upon their composition and the specific surface.	4.5	2.0
Surface colors differ according to the texture of the material.	3.5	2.0
Subtle color variations on varying surfaces occur for many reasons.	2.5	1.5
Surface material contributes to the color of an object that is perceived.	2.0	1.0
Materials subtly affect the wavelength of light.	1.5	.0

Note—The ratings shown are the average of the ratings assigned by the two independent raters.

Table 3
Similarity Ratings of Main Idea Statements

Similarity Criterion	Theme Position	
	First	Embedded
Intended Theme Sentence	2.48	2.11
Alternate First Sentence	1.04	1.38

Note—*MSe* = .43 for these means.

initially mentioned item in choosing the main idea of a passage. As anticipated, there were clearly many other factors at work in this experiment, in that subjects did not simply copy the first sentence; the mean ratings of similarity to the first sentence would have been much higher if that had been so. Rather, the subjects usually devised main-idea statements that combined, condensed, and rephrased many parts of the passage. However, the influence of the very same passage sentence on this process was greater if it appeared in the initial position.

It is somewhat surprising that no difference in reading time appeared between the theme-first and theme-embedded conditions, since reading time has been sensitive to the structural "goodness" of similar passages in other experiments (e.g., Kieras, Note 4). One possibility is that subjects could extract a main idea from either version of a passage with equal ease, resulting in no difference in the time taken to process the two versions. Another possibility is that the effect of the theme-position manipulation on reading time was simply too small to show up in the large and highly variable reading times.

EXPERIMENT 2

The above experiment demonstrates the importance of initial mention on the perceived theme of a passage, as measured by statements of the main idea. Demonstrating a similar effect on statements of the main item, however, requires some careful consideration of the experimental materials. As suggested by the Perfetti and Goldman (1974, 1975) studies, the main item of a passage may be simply the most frequently mentioned referent, and, as shown in Kieras (Note 3), identifying a main item can be a very easy task compared with identifying the main idea. Thus, passages that contain only one frequently mentioned item will be easily perceived as having that one item as a topic, regardless of the order of the passage sentences. The simplest way around this difficulty was to use carefully constructed passages that contained two candidate topics, A and B, described in such a way that either topic could be mentioned first in the passage without disruption of coherence. Each passage consisted of two sentences about Topic A, followed by a linking sentence that connected Topic A to Topic B, followed by two sentences about Topic B. The topic that was initially mentioned could be changed by placing the two Topic B sentences first, followed by

the linking sentence, with the two Topic A sentences last. An example of the two versions of such a passage is shown in Table 4.

Such passages are rather unnatural. But, unnatural materials are often used to achieve experimental control in the study of verbal processes. Furthermore, despite the unnatural quality of the passages, main-item responses to them should be meaningful. That is, the reader's interpretation of the second of the two topics will be conditioned by having read about the first, because the propositions about the second topic will be processed in the context of the prior propositions about the first topic. The reader would thus be more directly influenced by what was said about the first topic than by what was said about the second. If the reader is then asked to decide which of the two candidate topics is the single topic, he or she should make a decision that reflects the relative importance of the two candidate topics in the passage content. Hence, these two-topic passages should yield definite information about whether the initially mentioned item is more topical, despite their unnatural and linguistically defective character.

A pilot study using very loose main-item instructions indicated that although there were initial-mention effects, many of the responses named both candidate topics. For this reason, instructions must be used that require that only one topic be named. This experiment used a two-alternative forced-choice procedure, similar to the type of item found on standardized reading tests requiring the reader to choose the best title for a passage.

A further methodological problem that appeared in a second pilot study (see Kieras, Note 2) was that the

Table 4
Example of a Two-Topic Passage

A-First Version

The development of the sea urchin begins when millions of microscopic eggs are ejected into the sea through pores in the spiny shell of the adult. The tiny embryonic sea urchin, which swims about freely and feeds on plankton, is so transparent that its internal structure is clearly visible. The skeleton of the sea urchin develops from two spicules which are made of biocrystals that eventually fuse to form a spherical shell. Structures such as bone, tooth, and shell are made up of biocrystals which are three-dimensional arrays of calcium, silicon and phosphate and carbonate. These biocrystals are chemically indistinguishable from crystals found in the inanimate world.

B-First Version

Structures such as bone, tooth, and shell are made up of biocrystals which are three-dimensional arrays of calcium, silicon and phosphate and carbonate. These biocrystals are chemically indistinguishable from crystals found in the inanimate world. The skeleton of the sea urchin develops from two spicules which are made of biocrystals that eventually fuse to form a spherical shell. The development of the sea urchin begins when millions of microscopic eggs are ejected into the sea through pores in the spiny shell of the adult. The tiny embryonic sea urchin, which swims about freely and feeds on plankton, is so transparent that its internal structure is clearly visible.

Note—Topic A is "the sea urchin," and Topic B is "biocrystals."

topics labeled A tended to be preferred as responses across the board to those labeled B. In this pilot study, Topic A was chosen more often than B when A appeared first, but when B appeared first, A was still chosen more often than B, but not as much so. This asymmetrical effect was due to the bias in favor of Topic A. Although the A-B label is clearly arbitrary, the passages were usually composed by starting with the A topic and then trying to develop a B topic that appeared to be of equal salience. This process could have resulted in the A topics' being better, or more conceptually salient, in some way than the B topics. Another possibility is that Topic A was usually the subject of the linking sentence that interconnected the two topics, and so it could have enjoyed an advantage over the B topic due to the relation of topic-comment assignment at the sentence level to the passage topic (van Dijk, 1979; Kieras, Note 4). This experiment controlled both the topic that appeared as the subject of the linking sentence and the salience relationship between the two topics.

Method

Materials. Double-topic passages from previous experiments (see Kieras, Note 2) were selected, classified, and modified in an attempt to control the apparent salience of the two candidate topics. For this purpose, salience was loosely defined in terms of "superordination." That is, upon careful consideration of the content of the passages, some topics seemed to dominate their partners. For example, the topic pair "computers" and "memory systems" seemed to have an unalterable part-whole relationship. In another example, the passage shown in Table 4 contained detailed information about the sea urchin's life cycle and the fact that its skeleton was made up of biocrystals, which were discussed further. It seemed that while a reader could consider biocrystals as merely an elaborative detail about the structure and development of sea urchins, a reader would not consider the life cycle of the sea urchin to be an illustrative example of biocrystals. Many of the passages thus had topic pairs such that one seemed to be an example of the other, a part of the other, an elaborative detail of the other, or a result of the other. There seemed to be some correspondence between topic preference and this loose, but intuitively compelling, superordination relationship. For purposes of controlling topic-preference bias in this experiment, which of the two topics was superordinate to the other was judged intuitively on an *a priori* basis. The initial judgment was made by one person who was responsible for composing or modifying the passages. The passage topics were then reclassified by consensus of four other people and the original composer.

Six of the passages were selected and modified, and an additional two were composed, so that the two topics did not appear to have the built-in superordination relationship described above, but such a relationship could be contained in a linking sentence to superordinate either concept. These passages were thus expected to show little topic-choice bias other than that produced by the linking sentence. Two different forms were prepared, in which either Topic A or Topic B was the surface subject of the linking sentence, and thereby the superordinate topic. This involved little or no change in the semantic content of the linking sentence other than what appeared as surface subject. As described above, the A-first and B-first versions of the passages were obtained by putting the two sentences for the desired topic first, followed by the linking sentence, and ended by the two sentences about the other topic. Thus there was a total of four versions of each of these eight "balanced" passages.

Other passages from previous experiments contained topic

pairs that appeared to have an unalterable superordination relationship, such as the one about computers and memory systems. Six such "biased" passages were used, with an *a priori* judgment made concerning which of the two topics was the superordinate one. Two versions of each passage were prepared, an A-first and a B-first version.

A final subset of the passages appeared to have topics that were very nearly equal in status, neither being the superordinate of the other. The linking sentence and the remainder of the passage were modified so as to keep the two topics as coordinate as possible. An example of the linking sentence of such a passage is "The Faulkner system is often compared with tillage." Four such "neutral" passages were prepared, each in an A-first and a B-first version.

All passages consisted of five sentences, two about the first candidate topic, followed by the linking sentence, then two about the second candidate topic. Each passage was written and computer-justified to occupy 12 80-character lines.

The materials for the experiment were paper-and-pencil questionnaires generated by a computer program that printed a questionnaire for each subject. Each page contained three passages; below each appeared the instruction "Circle the best title; followed by the two candidate topics expressed as brief noun phrases.

Design. The experiment was both within subjects and within passages. Each subject saw one version of each of the 18 passages. Over the entire experiment, each passage appeared in each of its versions equally often. The questionnaire-generating program used a set of Latin squares to ensure that each subject saw an equal number of passages in each version type and that the assignment of passages to versions was balanced over the whole set of subjects. The order with which passages appeared in each questionnaire was randomized, and the order in which the two candidate topics appeared in the response section below each passage was separately randomized for each passage and each questionnaire.

Subjects and Procedure. Ninety-six University of Arizona students of either sex from introductory psychology classes served as subjects in return for extra class credit. The subjects were run in groups ranging from 1 to 17 in size. The instructions asked the subjects to read each passage and the two suggested titles and then to circle the best one. After reading the instructions on the cover page of the questionnaire, the subjects worked through the questionnaire at their own pace. About 20 min was required to complete the task.

Results

Although some subjects commented that some of the passages appeared to have two topics, there was little confusion about the task, and none of the subjects expressed any dissatisfaction with the forced-choice response format. The number of choices of each candidate topic were counted, and the results were tabulated by passage and passage version.

The *a priori* superordinate judgments corresponded fairly well with the topic-choice biases for the individual passages. Of the preferred topics in the biased passages, five of the six agreed with the judged superordinate. Of the four neutral passages, the preference biases were slight for three. The one exception showed a definite bias, but there had been much dissension concerning its classification. For four of the eight balanced passages, both topics were preferred when superordinated by the surface-subject position in the linking sentence. For three of the remaining four, one of the topics was preferred when it was the linking-sentence subject, but

the other was not. Only one passage failed to show at least one intended superordinate topic to be the preferred one.

Table 5 shows the response distribution for the balanced passages, classified by which topic was superordinate, and also shown collapsed across intended superordinates. Since these data are in the form of a multidimensional contingency table, a discrete multivariate analysis was performed by constructing a log-linear model for the 2 by 2 by 2 frequency distribution corresponding to Table 5 (see Bishop, Fienberg, & Holland, 1975; Reynolds, 1977). The model included three factors, superordinate topic, first topic, and topic choice, and the significance of the individual main effect and interaction terms was evaluated at the .05 level. The analysis showed no main effect of topic-choice category and strongly significant (at the .001 level) interaction effects between superordinate topic and topic choice and between first topic and topic choice. The model parameters indicated that the superordinate topic was chosen more often, and the first-mentioned topic was also chosen more often. The three-factor interaction was not needed to fit the data; the model with all two-factor interaction terms fit well ($.5 > p > .2$).

Hence, there was no significant overall topic preference bias with these balanced passages, and the topic choice depended both on which topic was superordinated by the surface-subject position and which was mentioned first, but these two factors did not interact with each other in determining the choice.

Table 6 shows the response distribution for the biased passages, in which the superordination relation was in the conceptual relationship of the two topics. A log-linear analysis similar to that described above was performed and again showed strongly significant effects, all at the .001 level. There was a main effect of choice category, reflecting the overall bias in favor of Topic A in these passages, and interaction effects between superordinate and topic choice and between first topic and topic choice. Thus, for the four passages in which A was judged superordinate, there is a strong bias in favor of A. For the two B-superordinate passages, there was also a bias in favor of B, although not as strong. But there was an initial-mention effect: A topic was more likely to be chosen if it was mentioned first.

Finally, Table 7 shows the distribution of responses for the neutral passages. In this two-dimensional case,

Table 5
Choice Distribution for Balanced Passages

Passage Type	Choice					
	A-Superordinate		B-Superordinate		Overall	
	A	B	A	B	A	B
A-First	.72	.28	.62	.38	.67	.33
B-First	.47	.53	.29	.71	.38	.62
Mean	.59	.41	.46	.54	.52	.48

Table 6
Choice Distribution for Biased Passages

Passage Type	Choice					
	A-Superordinate (N = 4)		B-Superordinate (N = 2)		Overall (N = 6)	
	A	B	A	B	A	B
A-First	.86	.14	.59	.41	.77	.23
B-First	.61	.39	.26	.74	.49	.51
Mean	.74	.26	.43	.57	.63	.37

Table 7
Choice Distribution for Neutral Passages

Passage Type	Choice	
	A	B
A-First	.76	.24
B-First	.36	.64
Overall	.56	.44

the dependence of the response choice on which topic was presented first can be assessed by the simple chi-square test for identical distributions in the A-first and the B-first conditions. This yielded a significant effect ($p < .001$). There was a slight bias in favor of Topic A, but there was a good initial-mention effect, in which the first-presented topic was chosen more often than the second-appearing topic, and the effect was nearly symmetrical.

Discussion

This experiment shows that an item is more likely to be viewed as the main item of a passage if it is mentioned first, compared with when it appears later. Additional influences on the main-item choice appear to be what appears as a surface subject of passage sentences (see Kieras, Note 4) and what is conceptually superordinate to other concepts in the passage. Since each topic appeared to attract a large number of responses even when it was not signaled as a topic, there must be additional properties of the passage that are playing a role as well.

Undoubtedly, the topic-bias effects could be further studied, and this would reveal some interesting features of what is here loosely termed "superordination." However, detailed study of the topic-choice effects in these two-topic passages would not in fact be a worthwhile effort because such passages are rather unrepresentative of actual prose. They were useful here to show how readers make use of initial mention as a cue to topicality, but they are of little interest otherwise.

GENERAL DISCUSSION

The idea that there is a linguistic convention requiring that the theme be initially stated is supported by these experiments, which showed that this convention is

strong enough that initial mention per se influences the perceived main idea and main item of a passage.

There is an easy criticism of these results: Subjects could simply be "copping out" by picking something from the first-presented sentence as a main idea or main item, either because this is the easiest way to do the task or because they think that this is what they are supposed to do, based on their educational training. Hence, they are not figuring out what they "really" think is the "real" main idea or item. There are several responses to this criticism that dictate its dismissal: (1) Even if subjects were "copping out," the fact that they think the initially appearing information is important in supplying a main-idea or main-item statement actually proves the point. (2) In these experiments, subjects took a long time, about 1 min, to read and prepare a response to a fairly short passage; this amount of effort is inconsistent with a "cop-out" strategy. (3) The subjects took factors other than initial mention into account very strongly and often picked noninitial information to use in their responses. Hence they seemed to be seriously trying to find and state what they thought was the actual main content and not simply picking an easy response. (4) In current theories of comprehension, the first information in a passage plays an important role. From this, it can be argued that the reported effects are plausible enough and consistent enough with current theory that we need not attempt to reduce them to alternative explanations. Thus, these results can be accepted as demonstrating that, since readers expect the thematic information in a passage to appear first, the first-appearing information will tend to be viewed as thematic.

Throughout this paper, it has been asserted that what the reader considers to be thematic depends on many features of the passage other than initial mention. The results of the experiments suggest what some of these features are and show that some parts of the passage content are viewed as highly thematic even when not signaled by initial mention. Explaining both the effects of initial mention and these other passage features requires a theory of thematic content and how readers identify it. A good theoretical basis is the theory of text comprehension developed by Kintsch and van Dijk (1978), in particular, the concept of macrostructure (van Dijk 1977a, 1977b). In this view, a reader does not simply extract and store the immediate or explicit propositions, the passage microstructure, and then stop. Rather, the reader goes on to construct macropropositions that state the gist or point of the passage, usually at a more global level, with the irrelevancies or details left out. The resulting macrostructure is considered by Kintsch and van Dijk to be the global "topic" or "theme" of the passage.

Thus far, the processes that construct the macrostructure have been described only in terms of operations on the semantic content of the passage. This is probably

the most important aspect of the processes, judging from how, in the above results, readers can have strong preferences for thematic material that is not signaled by initial mention. However, Clements (1979) and van Dijk (1979) have described some of the properties of a passage that signal thematic content, and these include not only aspects of the semantic content, but also surface-level features of the passage, such as initial mention and the topic-comment structure of individual sentences. The work in this paper, Clements (1979), and in Kieras (Note 4) shows that such surface-level signals actually do influence the perceived thematic content of a passage. Thus, the processes that construct macrostructure can be characterized as relying mostly on the semantic content of the passage, but as guided or influenced by the surface-level features of the passage.

Although it is relatively simple to show empirically the importance of signals such as initial mention, or even some semantic properties, in governing the apparent theme of a passage, an explicit theory of how readers construct passage macrostructure will be difficult to achieve. The Kintsch and van Dijk (1978) process model is a good beginning, but the macrostructure building processes need to be explicitly represented. An explicit model will have to account for how these processes use a subtle mix of inputs, consisting of the passage propositional content, the reader's general knowledge, and the surface-level features of the passage. Furthermore, data are lacking on the effects of many of the surface-level theme-signaling devices, not to mention on the interactions of these signals with the semantic content of the passage.

Further progress on understanding thematic processes in text comprehension will probably depend on the use of experimental paradigms appropriate to the purpose of analyzing these procedures; it is not clear that the traditional recall paradigm is the best choice, due to the complications of recall-oriented storage and retrieval processes. The main-idea and main-item paradigms described in this paper offer a more direct and theoretically simpler data source compared with recall procedures and so should yield useful information in the future on how readers construct the macrostructure for a passage.

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