Psychological research concerning several aspects of the relationship between existing knowledge schemata and the processing of text is summarized in this report. The first section is concerned with dynamic processes of story understanding, with emphasis on the integration of information. The role of prior knowledge in accommodating parts of stories received at different times to each other is illustrated, and schema change and schema maintenance as a basis for integration are considered. The second section emphasizes characteristics of prior knowledge as determinants of selectivity in memory. The issues discussed include: the expected future derivability of information, the degree of constraint provided by schemata, and the performance biases produced by attitudes. The third section investigates variability in the employment of schema-based processing. Among the factors shown in this section to affect the relative utilization of schemata in understanding stories are characteristics of texts and reading tasks and differences between individuals in discourse processing styles. Finally, future directions for schema-theoretic research are suggested. (FL)
Prior Knowledge and Story Processing: Integration, Selection, and Variation

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Abstract

Psychological research concerning several aspects of the relationship between existing knowledge schemata and the processing of text is summarized. Some dynamic aspects of text processing are discussed first. Schema switching produces problems of accommodating the representation of early parts of text as to more recently processed information. The role of knowledge of the world in producing accommodation is emphasized. Situations where schemata need to be maintained rather than altered pose different problems for the integration of text information. Next, issues concerning selectivity in what is remembered from text are considered. Knowledge-based determinants of selectivity (such as the expected future derivability of information, the degree of constraint provided by schemata, and the performance biases produced by attitudes) are shown to contribute effects beyond those predictable from analysis of text-structural properties. The consequences of text and task characteristics and individual processing styles on the relative employment of knowledge-based versus text-based processes are illustrated next. Finally, future directions for schema-theoretic research are suggested.
Prior Knowledge and Story Processing

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Integration, Selection, and Variation

The psychology of discourse comprehension is still in its infancy. Many issues are under debate; many important questions have not been asked. Yet, a consensus appears to have emerged on one fundamental point that must be a tenet of any theory of text understanding: What one already knows will affect what one can come to know. Meaning does not reside "in text." Rather, linguistic analysis of text provides a "blueprint" to guide and constrain the creation of meaning. Existing knowledge is brought to bear to enrich and embellish that blueprint. It is only in the interaction of the linguistic characteristics of texts and the knowledge employed in their understanding that psychological meaning emerges. (For summaries of the development of this viewpoint, see Anderson, 1977; Bransford & McCarrell, 1975; Morgan & Green, in press; and Spiro, in press-b)

Psychological research has shown, for example, that the pre-existing knowledge structures (or schemata) active during comprehension determine which of a variety of qualitatively different interpretations will be imputed to a text (Anderson, Reynolds, Goetz, & Schallert, 1977), affect which extra-textual inferences (logical and pragmatic) will be incorporated in the text's semantic representation and be undifferentiable from literal text content (Brewer, 1977), and, at times, provide a necessary basis for the assignment of even a minimally coherent and plausible interpretation to otherwise apparently well-formed narrative (Bransford & Johnson, 1972).
The present paper discusses research bearing on three other aspects of knowledge-based discourse processing. The first section is concerned with dynamic processes of story understanding, with emphasis on the integration of information. First, the role of prior knowledge in accommodating parts of stories received at different times to each other is illustrated. Whereas the first part of this section is concerned with schema change, the second part focuses on schema maintenance as a basis for integration. The second section is concerned with selectivity in what is remembered from stories. Why are some things better remembered than others? Traditional accounts have emphasized structural importance, usually determined by analysis of the text in isolation (cf., Meyer, 1975) or of characteristics of stories in general (Rumelhart, 1977; Stein & Glenn, 1978). This section instead emphasizes characteristics of prior knowledge as determinants of selectivity in memory. Issues discussed include the following: the effects of schema-based derivability of information on the likelihood of that information being explicitly represented in memory; the need to conform with knowledge of the world as a prod to generate memories; the use of schemata as scaffoldings for the representation and subsequent recall of details from stories; and the effects of one's attitudes on the selective recall of attitude-relevant information. The third section investigates variability in the employment of schema-based processing. Factors shown to affect the relative utilization of schemata in understanding stories include characteristics of texts and reading tasks and differences between individuals in discourse processing styles.
Since I expect that readers of Poetics are not familiar with my work, rather than presenting an isolated piece of current research, I have chosen to review a variety of studies conducted in my laboratory pertinent to the relationship between story understanding and prior knowledge. I hope that a more comprehensive conception of my orientation will accordingly be transmitted to this new audience. I should also note that this paper emphasizes processes by which knowledge structures affect story understanding. No attempt is made to explicate the nature of the underlying schemata in other than a superficial manner. For discussions of knowledge structure theories compatible with the process orientation offered here, the reader is referred to Rumelhart and Ortony (1977) and Schank and Abelson (1977).

**Knowledge Structures and Integration**

**Schema Change**

As narrative proceeds, the knowledge schemata that best fit the text often change. Consider a simple example. An engaged couple discovers that their views differ seriously on the desirability of having children. They quarrel. Later in the story we find that the couple is happily married. At the earlier point in the story, knowledge about the importance of agreement between an engaged couple on the issue of having children would engender negative expectations for the future of their relationship. When we later discover the couple living in harmony, with no mention of the children issue or its resolution, two schema states are left in conflict for the reader—one that anticipates disharmony and a later one that contradicts that expectation.
How do readers deal with such contradictions? One possibility is that conflicting states are allowed to co-exist in the personal understanding of stories (as indicated, for example, by what is included in a re-telling). That is, need for reconciliation or accommodation may be noted, but no specific reconciling information is incorporated into the re-telling. Alternatively, conflicting schemata may produce a state of cognitive disequilibrium with an accompanying impetus for reconciliation. The world is known to be orderly. Unless there is something about a particular genre that permits violations of the world’s orderliness (as in science fiction, for example), the disequilibrium will be corrected by bringing other relevant knowledge to bear to alter the story representation. Elements in the story may be distorted or new information may be imported. In a strong version of this hypothesis, the accommodating information becomes a part of the story’s representation undifferentiable from information that was actually in the story. In other words, later parts of stories may induce new understandings of earlier parts or add new earlier parts, with the old understandings replaced. The process is one of reconstruction. What has already been read is not remembered as it was originally understood; rather, inferences about what must have transpired are made from what is known about later developments. A parallel may be drawn with the activities of a paleontologist who inferentially reconstructs a dinosaur utilizing an assortment of bone fragments (bits of stories) and knowledge about the anatomy and physiology of other dinosaurs (prototypic knowledge about the situations described in a given story). See Bartlett (1932) for further discussion of the reconstruction notion.
The co-existence and accommodative reconstruction hypotheses were tested empirically by Spiro (in press-a). Stories like the one about the engaged couple disagreeing about having children were presented to subjects induced to process them in a more natural manner than in typical laboratory studies of prose comprehension and recall. Subjects in the experiment were instructed, after varying intervals, to recall the story as exactly as possible, without including any inferences or reactions. The results provided striking support for the accommodative reconstruction hypothesis over co-existence. Errors of a reconciling kind prevailed. Subjects tended to remember that the engaged couple had sought out counseling on their problem, had decided to adopt a child, or had not disagreed very strenuously about having children, to take a few examples. In another version of the story, one member of the engaged couple harbors strong feelings against having children and hesitates to inform the other one out of fear that it may doom their relationship. When he finally tells her, he finds that she feels the same way and has also been afraid to discuss it. They are very happy at this point, and their prospects for the future appears favorable. Later, the subjects find that the couple never got married and have not seen each other for years. Subjects exposed to this version incorporated into their recall of the story such things as earlier disagreements about having children, trouble with each other's parents, and a failure of the couple to have ever discussed the matter (leaving them unaware of their agreement about having children). In versions where the earlier and later parts of the story conform (e.g.,
the couple disagree about having children and are later found to have separated), errors in recall of the story were absent.

All of the reconciling importations and distortions had no basis in the story and were not even distantly inferentially related. Furthermore, after a sufficient interval had passed, subjects expressed as much confidence that they had read about their accommodative errors as they had about things they actually had read. (Processing mechanisms underlying these effects will be discussed in the section on derivability.) The distortions and importations of information, which were a response to a need to make what was read make sense given knowledge about the world, and which were based on idiosyncratic existing knowledge of what was most likely to account for contradictions of expected outcomes in a given situation, became equal partners with the literal and inferential content of the stories in the stories' cognitive representations. Engaged couples happy and in agreement at one time can become unhappy at another. Information such as this can logically co-exist; apparently, however, there is a psychological impetus that requires discrepancies with world views that are not resolved in the text to be resolved outside of it. A heuristic model of the processes that operate over time in producing accommodative reconstructions may be found in Spiro (1977).

Schema Maintenance

A change of schema, like that involved in the shift from "the troubled relationship" to "the happily married couple" discussed above, creates an
obvious need for integration. By contrast, it is easy to overlook the processes which produce integration when there is no clear shift in the schemata needed to be brought to bear in understanding a story. For example, it is often the case that a schema signaled for activation at one point in a text will also have to be applied at a later point, despite not being signalled clearly. In other words, besides situations calling for schema change, there will be cases where schemata must be maintained if integrated text understandings are to occur.

Consider this simple passage:

Sally was sitting in her bedroom. She was reading a book. After a while she became hungry. She looked at the clock.

The meaning of the word *clock* in this context is something more than what would be found in a dictionary definition and differs from the prototypical clock that might come to mind by association to the word out of context. The reference for the clock in the story is particularized; it is understood to be a clock appropriate for a bedroom, as compared, for example, to the institutional type of wall clock that would be found in a classroom (Anderson & Shifrin, in press). Note that for the appropriate instantiation of the word to occur, the bedroom scenario explicitly signalled in the first sentence must still be utilized while processing the fourth sentence, despite the absence of an explicit signal.

Memory considerations aside, is schema maintenance an automatic by-product of schema activation? That it is not is demonstrated in an experiment by Spiro, Brummer, and Yeggs (in preparation). They presented
eight-year-old children with passages like the one above. The task was to select from among four alternatives a picture that fit a word in the last sentence of the passage they had just read. In the passage about Sally, the children had to select a picture of a bedroom clock from amongst two other types of clocks and a distractor that was not mentioned in the story. To control for possible biases regarding typicality of instantiations, for half of the subjects the context was altered (e.g., Sally would be sitting in a classroom rather than a bedroom).

The crucial manipulation concerned the placement of the context information (e.g., bedroom) and the target word (e.g., clock). Half of the time they would both be in the same sentence (within-sentence condition), reducing the demands for schema maintenance. Even very young children are adept at making an appropriate instantiation inference under such conditions (see Anderson & Shifrin, in press). The other half of the time context and target were separated across sentences as in the earlier sample passage (between-sentence condition). Under this condition, schema maintenance demands are increased. Each subject read eighteen passages altogether, nine from each of the conditions.

Subjects were equally accurate in the between- and within-sentence conditions in selecting pictures appropriately instantiated as a function of the schema context. Furthermore, response to subsequent questions indicated they virtually always remembered the schema context. The possibility remains, however, that the integration of context and target was not occurring spontaneously; i.e., the integration may have been made
only when they were confronted with three different instantiations of a target word that had not been instantiated during reading. When the integration occurs at the time of test, it should be reflected in some increment in the time to answer the question over the time required to answer when the integration had occurred earlier. Looking only at those cases where a correct answer was given, a different pattern emerged for good and poor readers. Good readers showed no difference in decision times for the between- and within-sentence conditions. Poorer readers were as quick as the good readers in answering for the within-sentence condition, but significantly slower under the between-sentence condition. These results indicate that good readers spontaneously use their activated schemata to instantiate the meanings of words they encounter even when schema activation was not in the same text vicinity as the point at which integration is required. The less able readers, on the other hand, appear to spontaneously utilize their schemata only in the text vicinity of initial activation; they do not appear to be maintaining their schemata beyond that point. The result is a disjointed, one-sentence-at-a-time understanding of the stories. Since the poorer readers perform as well as the better ones in the within-sentence condition, but differ in the performance of the same task in the between-sentence condition (with other factors, such as differential memory for the context, not viable alternative explanations), one can conclude that schema maintenance is an isolatable component of story comprehension (i.e., one that does not automatically occur whenever related processes such as schema activation
do). Additionally, one would expect that the processing demands of schema maintenance would increase with more complex integrations and over longer stretches of discourse for all classes of readers.

Selective Recall from Stories: Beyond Structural Importance

One does not remember everything read in a story. What factors determine which parts of a story are likely to be recalled and which not? We have already illustrated one contributing factor in the discussion of accommodative reconstruction process and the experiment by Spiro (in press-a) involving stories about engaged couples: What is needed to make different parts of a story conform with knowledge of the world is very likely to be incorporated into story recall. Sometimes this will be information actually in the stories or inferable in a direct manner from them. Other times, as we have seen, the reconciling information will be subconsciously confabulated. It should be noted that in the Spiro (in press-a) experiment, distortions and importations of information were virtually nonexistent in other experimental conditions that did not engender conflict with world knowledge and beliefs.

The view of story recall that emerges is one in which partial data (specific memories from the stories—how scant these may be will be indicated in the sub-section on derivability immediately below) is combined with world knowledge to infer what must have occurred in a story. This view may be contrasted with a reproductive conception of story recall in which memory consists of reproducing stored traces of past
experience (i.e., stored memories of a story). Thus, one determinant of what is remembered from a story is what world knowledge dictates ought to have happened. However, such inferential reconstruction must be based on something. The remainder of this section will be devoted to selectivity in the specific memories (the partial data) that guide reconstruction.

Conventional wisdom holds that the likelihood of specific information being recalled is a function of that information's structural importance within a text. Ratings of structural importance (e.g., Johnson, 1970), propositional analyses (e.g., Meyer, 1975; van Dijk & Kintsch, 1976), or story grammar analyses (e.g., Mandler & Johnson, 1977; Rumelhart, 1977; Stein & Glenn, 1978) are employed to generate a hierarchy of ideas in a text. Ideas higher in the hierarchical representation are considered more structurally important and tend to be remembered better than ideas lower in the hierarchy. Although various contextual factors may mitigate the generalizability of such findings (see Spiro, 1975), the approach clearly illustrates an important contributing factor to selective recall of text information. However, structural importance is not the only variable of interest. The remainder of this section will explore effects on selective recall of knowledge variables that are orthogonal to conventional notions of structural importance.

Derivability of Information

Much of the information encountered in stories is somewhat predictable. Consider the following sequence, excerpted from a story:
(a) The karate champion hit the block.
(b) The block broke.

When karate champions hit blocks, the blocks usually break. Thus (b) is not surprising. On the other hand, karate champions occasionally fail in their demonstrations, so the information in (b) serves an uncertainty-reducing purpose and warrants inclusion in the text. How is (imperfectly) predictable information processed and represented in memory? Spiro (1977) hypothesized that such information is only superficially processed and receives either no explicit representation in long-term memory or a very attenuated representation. The information is essentially left to be derived later if needed.

An a priori argument for the hypothesis may be made on efficiency grounds. Much of the information that we are exposed to will never be needed again. If some of this information is derivable from other knowledge, not explicitly storing the information would result in more rapid processing at input and a cognitive economy of representation. Cognitive effort would then be directed to only those times when the information was subsequently needed, and not to indiscriminate effort to represent everything. Further support for the superficial-processing/left-to-be-derived hypothesis is that it helps explain the unusual memory errors in the study of accommodative reconstruction discussed earlier (Spiro, in press-a). If it is common for some information that is encountered not to be explicitly represented in memory, than derivation of memories would also be a common experience. Then, when trying to remember an event, if the pieces explicitly retrieved imperfectly conform with general world knowledge
(as in recalling the problems of the engaged couple and their later happiness, without accompanying explanation), one may simply assume that the missing information needed to produce a conventionally coherent memory was superficially processed at input. The information would then be derived from other knowledge as a matter of course. Hence, the prevalence of high-confidence distortions and importations of information in the accommodative reconstruction study.

Going beyond a priori arguments to empirical validation of the hypothesis is problematic. If information like (a) and (b) above is incorporated in stories, and recall of (b), the (imperfectly) derivable information, is tested, the results will be ambiguous. Successful recall of (b) could be due to retrieval of an explicitly stored memory or to generation from other knowledge. Likewise, failure to recall (b) might be due to an inability to access a stored memory or a failure to generate an unstored memory. This problem was circumvented in a study by Spiro and Esposito (1977) by the addition of information, like (c), inserted in the story before or after the (a) and (b) information.

(c) The karate champion had had a fight with his wife earlier. It was impairing his concentration.

The (c) information vitiates the force of (b)'s predictability from (a). If (c) is before (a) and (b) in the story, (b) can not be left to be derived later. Accurate recall of (b) should than occur. However, if (c) occurs later in the story than (a) and (b), (b) will be superficially processed and left to be derived, but its derivation will be blocked at
the time of test by (c). Hence errors in the recall of (b) should occur. However, if the predictable (b) information is durably represented in memory, it should be accurately recalled regardless of where the predictability-vitiating (c) information is placed.

Spiro and Esposito found error patterns consistent with the superficial processing hypothesis. Several stories, each incorporating (a), (b), and (c) type information, were presented to adult subjects. Where (c) was after (a) and (b) (and only in that condition), subjects responded in a later memory test either that (b) was not mentioned (it did not say in the story whether or not the block broke) or that the opposite of (b) was mentioned (it said in the story that the karate champion did not break the block). Various alternative interpretations of the results were ruled out by control conditions. For example, the results are not attributable to spontaneously "correcting" a representation of (b) after reading (c) or to differential availability of the (c) information at the time of the memory test.

More important for present purposes, the results cannot be accounted for by the relative structural importance of the (b) information. For one thing, the (b) information tended to be central, as in the outcome of a karate champion's performance. In any case, the content of both versions of each story was the same. Thus (b) should occupy the same position in a text hierarchy when (c) is before or after (a) and (b). Rather it seems to be the case that the derivability of information from other knowledge is an additional factor to structural importance in
affecting the likelihood that information from stories will be durably represented in long-term memory and successfully recalled. (For further discussion of the effect and the mechanisms that might underlie it, see Spiro, Esposito, & Vondruska, 1978.)

Scaffoldings for Information

Another knowledge-based factor that contributes to the memorability of information beyond structural importance is the degree of constraint provided by the schemata brought to bear in understanding a story. Anderson, Spiro, and Anderson (1978) constructed two parallel narratives, one about a trip to a fine restaurant, the other about a shopping trip to a supermarket. The narratives were alike, sentence by sentence, in all respects other than their topics. For example, in both stories the same foods are purchased by the same people in the same order, the same extraneous events occur, etc. Note, however, that the "foods purchased" component of a "trip to a fine restaurant" schema is more highly constrained than the equivalent component of a "trip to a supermarket" schema. In the latter case, various combinations of purchases from various food item categories are permitted. For example, on one trip to a supermarket, only snacks and beverages may be purchased. At a restaurant, on the other hand, one typically orders foods from a specific set of categories in a predetermined order that typically does not vary from time to time (e.g., a before dinner drink, an appetizer, a soup, a salad, an entree, etc.). In other words, the restaurant schema provides a more finely differentiated scaffolding to facilitate the encoding and retrieval
of food items than does the supermarket schema. We predicted, therefore, that subjects recalling the entire narrative would remember more of the food items mentioned if they had read the restaurant rather than the supermarket version. This prediction was upheld, despite the fact that the structural importance of the food items in the parallel narratives was equal. Once again, characteristics of the knowledge brought to bear in understanding text have effects on the memorability of information beyond those predictable from the text's organization.

Besides schema constraint, the likelihood of information being recalled is related to schema-determined relevance. Returning to the Anderson, Spiro, and Anderson study, one would expect that the identity of the purchaser of a food item (the narratives involved a couple purchasing food) would have differential relevance in the context of restaurant and supermarket schemata. Since foods purchased in a supermarket are typically shared at a later meal, the significance of the purchaser's identity is less than in the case of a restaurant meal, where the person who orders the food typically eats it. As predicted, correct attribution of food items to their purchasers occurred more often for subjects who read the restaurant rather than the supermarket narrative.

What things are relevant will typically vary from one schema to the next. However, certain types of information tend to be generally relevant across schemata. For example, information bearing on the likely truth of a proposition will tend to be highly relevant in most schema contexts. Consider statements (d) and (e):
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(d) Richard Nixon said X.
(e) The Washington Post reporter said X.

If you believe Richard Nixon is an information source of low credibility, and you read (d), you would be likely to remember that he was the source of the message. On the other hand, if you believe all newspaper reporters to have approximately equal credibility, and you have no reason to doubt X, the source information is less likely to endure than was the case with Nixon. This issue is discussed further in Spiro (1977).

Attitudes and Selective Recall

It is a common intuition that one's attitudes and beliefs will affect what one will recall from exposures to attitude-relevant information. Nevertheless, attempts to specify the nature of the relationship between attitudes and selective recall have a long history of failure. Early problems may be traced to overly simplistic hypotheses. For example, Levine and Murphy (1943) found data indicating that people remember more information favorable to their own attitude than unfavorable to it. After many years of mixed results regarding the favorableness hypothesis, Feather (1969, 1970), among others, pointed out that relative favorableness of a statement will have differing psychological impact depending on whether one agreed with the statement or not. Statements favorable to one's attitudinal positions with which one agrees and unfavorable statements with which one disagrees seem to form more balanced structures (cf. Feather, 1969, 1970; Heider, 1958) than do favorable statements with which one disagrees or unfavorable statements with which one agrees. Using favorableness and agreement in combination to determine relative balancedness, Feather found that subjects consistently tended to recall more balanced statements.
Spiro and Sherif (1975) noted, however, that if favorableness and agreement are correlated (i.e., one is more likely to agree with favorable statements and disagree with unfavorable ones), agreement decisions would be likely to produce a larger pool of balanced than imbalanced statements from an original set that had equal numbers of favorable and unfavorable statements. It is not surprising, then, to find an absolute superiority in recall of balanced statements. Spiro and Sherif argued that the appropriate test of selective recall would be to calculate the proportion of balanced statements recalled out of the total number of balanced statements created by the agreement ratings and compare it with the equivalent proportion calculated for imbalanced statements. With this revised analysis, it was found that statements that produce imbalanced structures are recalled relatively better than those that produce balanced ones. Furthermore, the effect was enhanced for those who had stronger, more ego-involving attitudes on the subject. Thus, one’s attitudes, as well as characteristics of knowledge structures, affect selectivity of recall in a predictable manner.

Variability in Knowledge-Based Processing

Although discourse processing always involves interaction between information in text and prior knowledge, the relative contribution of prior knowledge will vary as a function of characteristics of the material being read, the purposes of reading, and differences between individuals in their processing styles. For example, texts on topics familiar to the intended audience will generally permit greater knowledge contributions
and may even require them if the writer leaves gaps on the assumption that the readers will be able to fill them in. On the other hand, some texts are more self-contained or integral (Spiro, 1977), and therefore, evoke less knowledge-based processing. Along similar lines, the criteria for evaluating texts may differ. As Olson (1977) has pointed out, the goodness of certain texts is determined by their fit with common sense experience and general knowledge of the world; other texts entail a "literate bias" that involves criteria more internal to the text.

Just as there is variability in the extent to which prior knowledge is used to understand text, once a text has been comprehended it may then be assimilated to existing knowledge structures in varying degrees. At one extreme, the representation of a text may be totally differentiated from related knowledge, becoming a separate "compartment" in knowledge and maintaining its particular identity. At the other extreme, assimilation of aspects of a text to various related knowledge structures may result in a near total loss of the text's particular identity; parts of the text (or all of it) will be remembered, but as something related to some general topic, not as parts of the text. For example, when studying law, it is essential that the texts of individual cases maintain their particular identity. On the other hand, if one has been following developments in Iran's crisis, new information on the subject encountered in a newspaper article will tend to be used merely to update the prior knowledge. It is unlikely that the article will be represented in memory as a cohesive whole and remembered as information from that particular article. Rather,
the text will be assimilated to (and perhaps alter) knowledge structures on the Iranian situation.

The purposes for reading at a given time will affect the relative influence of prior knowledge on comprehension and the relative influence of what has been comprehended on the composition of knowledge structures. A manipulation in the Spiro (in press-a) study of accommodative reconstruction, discussed earlier, was intended to bear on both aspects of the relationship between knowledge and comprehension. Some subjects were informed that the stories (e.g., about the engaged couple and their disagreement about having children) were true and that the experimenter was a clinical psychologist concerned with the way people understand situations involving interpersonal relations. It was expected that this orientation would induce both greater use of prior knowledge in understanding stories and greater assimilation of the stories' content to the general store of knowledge concerning similar situations; in general, a greater degree of interaction with prior knowledge was expected. When later developments (e.g., finding out the couple with the serious problem ended up happily married) evoke schemata imperfectly conforming with those generated earlier, the high degree of interaction of the story content with prior knowledge would be expected to produce a heightened sense of conflict between the schema states and a corresponding strongly felt need for reconciliation, as well as a broad base for the generation or reconstruction of accommodating information. It was in this experimental condition that the gross reconciling errors of recall discussed earlier tended to occur. (It should be noted that at the time of recall the subjects were informed that they had
been deceived, and that they were really participating in a memory experiment. They were told to recall only what they had read and to omit all inferences and reactions that were not in the story.)

Other subjects in this experiment were told that it was merely a study of memory. They were to read the story and would later be asked to recall it as accurately as possible. Nothing was mentioned about the story being true. It was expected that subjects in this condition would utilize their prior knowledge only as much as was needed to construct a minimal plausible interpretation of the story and would not integrate what was learned from the story with existing knowledge about similar situations. Rather, since a high level of accurate recall was the subjects' goal, with interference from related knowledge perhaps producing recall error, a strategy of compartmentalizing the story representation seemed to be a possibility. In that case the impetus for reconciliation and the knowledge base for subconscious accommodation might be less than was the case with the other set of instructions (see Spiro, 1977, for a discussion of ramifications of memory sets for cognitive interaction). Incidence of accommodative error would then be expected to be less than in the other condition, a prediction borne out by the data. Accommodating errors rarely occurred when subjects were given the conventional memory instructions. In general, then, operation of schema-based processes may be attenuated by characteristics of the reading situation that promote compartmentalization of the text's cognitive representation.
Finally, the extent to which knowledge structures are utilized in text understanding may be influenced by characteristics of an individual's text processing style. It may be the case that some readers tend to deploy relatively more processing resources towards fitting information in text with prior knowledge, while other readers prefer analyses of text as more self-contained units.

Although conclusions are not definitive at this point, it appears likely that some readers employ schema-based processing to a greater extent than others. Furthermore, for these readers their text processing tendencies seem to be part of a pattern of style preferences that extends to other cognitive tasks. Consider the task requirements of an embedded figures task. One must discover where a target geometric shape that has been memorized is embedded in a complex line and shading configuration currently in the visual field. In other words, a relationship between two structures must be analyzed simultaneously or in rapid succession, with one of the structures externally present and the other internally represented. The processes involved in an embedded figures task bear an abstract resemblance to the requirements in processing text of analyzing the structure of an external text as it relates to internal cognitive structures. Will individuals who are relatively "stimulus-bound" and perform poorly on an embedded figures test also evince less schema-based processing in understanding text (after statistically controlling for correlations with overall verbal ability)? Results thus far indicate a positive response.
Spiro and Tirre (1979) had adult subjects read either the restaurant or supermarket narrative from the Anderson, Spiro, and Anderson (1978) study. Superiority in recall of food items from the former narrative compared to the latter, reflecting the use of schemata as a scaffolding for the encoding and recall of text information, was found for subjects with high embedded figures test scores but was absent for those with low scores. In another study (discussed in Spiro, Note 1), children read stories where either schema-based or text-based processing was inhibited by removing information signaling which schemata needed to be activated or by removing all punctuation and capitalization, respectively. Deleterious effects on comprehension were greater with the former manipulation for high embedded figures test scorers and were greater with the latter manipulation for the low embedded figures test scorers. Again, certain individuals seem to rely relatively more on prior knowledge during the processing of narratives.

Future Directions

Three knowledge-based aspects of text processing have been discussed in this paper; other aspects have been the subject of successful research as well. However, the development of schema-theoretic approaches has lagged in several areas. The list below suggests some of the issues that require greater attention if a comprehensive understanding of the role of existing knowledge in the processing of text is to eventuate.

1. Schema selection: How are schemata evoked by texts and by the contexts in which texts are encountered? This problem is more serious with
written than oral discourse, given the more decontextualized character of the former.

2. Ongoing schema construction: One cannot have a pre-packaged schema for every text situation one might encounter. When appropriate schemata are not available, how are they constructed? A better understanding of processes of schema combination and the transfer of schema for a given situation to other situations with structural similarities is required. In fact, a more refined understanding of the psychology of "thinking" and problem solving may be necessary to really understand the processes of adapting to novelty in text. Tempering these remarks, it should be kept in mind that authors of texts have a Gricean obligation to try to provide explicit information when anticipating the absence of appropriate schemata in their intended audience. Thus the problem may not occur as often as one may think.

3. Sub-processes and their interaction: How do components of schema-based processing interact and how are they deployed and controlled? Both conscious and tacit management of diverse knowledge-based processing activities need to be studied. Which processes are better considered as parts of basic text-processing "competence" and which are more related to "performance" notions such as the efficiency of knowledge-based processing?

4. Aesthetics: Accounting for how prior knowledge is used to form a coherent semantic representation of text does not explain how that one already knows affects aesthetic awareness. Very little can be gleaned
from current schema-theoretic work that can inform a psychology of the appreciation of literature.
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Footnote

1 It should be noted that in the study cited, the information about the couple eventually marrying was encountered as an auxiliary to the story rather than as part of the story itself. In other studies, similar results were obtained when the contradictory information was a part of the story.
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