

INSTITUTE OF COGNITIVE SCIENCE



Technical Report

University of Colorado, Boulder

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Technical Report #94-03

The Influence of Feedback on Two Versions of a Related Text: IV

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Based in part on a paper presented at the 1994 meeting of the Rocky Mountain Psychological Society, Las Vegas, NV.

Abstract

Subjects were presented with either of two 25-sentence versions of a fictitious town. One version (route) described the town as a driver might encounter it, while the other (survey) received a geographic description. Sentences were printed one to a card, and read aloud. Feedback included: (1) limited access to a map during processing, (2) limited opportunity to review previously read sentences during processing, or (3) presentation of entire text after processing. Memorial representation was assessed by either proposition recall or inferential reasoning. In this study subjects processed the text twice under identical feedback conditions. Propositional recall almost doubled after the second processing. There were more correct inferences for the map feedback after the second rereading. Although statistically not significant, generally the text by feedback interactions continued to show both complementary and supplementary effects, depending on type of assistance provided. A model of parallel memorial development is suggested as an explanation for our data.

Almost a decade ago we began to look into the specific contributions of instructional assistance, particularly feedback, to text comprehension (Langer & Keenan, 1984). Feedback is generally defined as assistance subsequent to a response, although obviously help can be provided prior to a response. Examples of the latter include text cueing (Lorch & Chen, 1986), behavioral objectives (Anderson & Faust, 1973) or advance organizers (Ausubel, 1960). What probably is a more critical issue in our work is the general assumption among practitioners and researchers in education that any assistance is better than no assistance (Berliner & Rosenshine, 1977). In fact, the extrapolated belief is that more assistance will lead to more of the sought outcome. This is, as we shall show, not always true.

Indeed, our work in text comprehension would argue for some rather severe constraints on these almost axiomatic assumptions. Other researchers have shown that there are just too many variables to accept a blanket instructional endorsement for the positive effects of assistance, much less determining the specific impact on text comprehension. For example, the processing of text appears to be a function of both text characteristics and prior knowledge of the individual reader (Frederiksen, 1971; Kintsch & van Dijk, 1978). Among the text properties investigated have been structure (Thorndyke, 1977), referential coherence (Kintsch, 1974), and argument overlap (Kintsch & van Dijk, 1978). Given this rather broad interactive state of affairs, appropriate help would not seem to be simply a matter of just doing something.

Still, our early research did follow prevailing beliefs and assumed a constructive effect for feedback on comprehension. Initially we began our processing by using the reconstruction of scrambled text as our experimental paradigm. We believed, first of all, that by using scrambled text the readers would be more dependent upon and sensitive to our assistance. Second, the text reconstruction paradigm involved developing a sentence order which made sense to the reader. The experimental assumption was that the original sentence order could be used as a basis for both

assisting the reconstruction process and determining the appropriateness of the final order (Langer, Keenan, & Culler, 1987).

Our inability to replicate experimental findings and especially to obtain statistically significant interactions, was due in part to our failure to recognize that we had two somewhat related problems: (1) the mechanisms of text processing, which is affected by both text and learner characteristics, and (2) differences among particular levels of comprehension. We should add that in general these issues have not been adequately addressed in educational research concerned with reading processes. This represented both a challenge and a problem in terms of a lack of previous conceptual models. Hence our efforts now became focused on these issues as a means to eventually developing a model.

Some recent work provided us with a strategy for attacking these two problem areas more systematically than in the past. Kintsch's (1988) construction-integration paradigm of text processing seemed to fit in with our prior work on text reconstruction, while a model of qualitatively differing levels of memorial representations (Kintsch, Welsch, Schmalhofer, & Zimny, 1990) presented us with a strategy for addressing more adequately the issue of levels of comprehension outcomes. That is, Kintsch's work allowed us to explore more systematically when or at what stage in the text processing assistance might prove most effective, while a model of differentiated levels of memorial representation could provide more sensitive measures of outcomes.

Kintsch's (1988) thesis was that the initial text propositions are formed directly from the text base and then are subsequently modified by both prior reader knowledge and the developing text base. Basically the micropropositions formed from the text are elaborated and combined into macropropositions. These macropropositions and prior knowledge help organize and elaborate subsequent text propositions. Obviously the internal coherence of the text might require more or less reader input in terms of previous knowledge (McNamara, 1993). The evolving comprehension could be assessed at such levels as surface representation of verbatim text, semantic meaning

defined in terms of propositional recall, and a situation representation assessed by inferential reasoning. Situation memory represents more of a mental model based on prior knowledge and does not seem to be tied directly to the text as are surface and semantic memory. These levels interact simultaneously in text processing, although they can be indexed separately. It is reasonable, of course, to believe that propositional representation may be replaced by situational representation, but it is also plausible that they exist in parallel or mutual support. The implication is that situation memory represents the deepest level of processing, although it is not necessarily true that all processing reaches this level (Kintsch et al, 1990).

To incorporate these conceptual models into our research, we began use of a text base derived from an original series of experiments by Perrig and Kintsch (1985). In their work there were two descriptions of a mythical town called Baldwin. One version was presented as a set of sequential instructions for driving through the town (route version), while the other was presented in the context of spatial or geographic survey descriptions. The texts paralleled each other in that locations in the town are presented in the same sequence, but in the route version location is determined by references to streets and turns, while in the survey version the same place is assigned a geographical referent (e.g., east, west, etc.).

As a consequence our research program underwent a number of transformations: (1) we shortly abandoned the scrambled text paradigm in order to compare our findings of assisted text processing with data from previous research, and (2) we began to utilize distinctively different types of feedback. The latter permitted us a better opportunity to examine possible interactions between content and feedback on differing levels of memorial representation, which was missing in our earlier research.

We modified somewhat the original descriptions of the town, renaming the village Mapleton. There are still two versions, each 25 sentences long. Again, one is a spatial or geographic description (survey version) while the other is a sequential presentation which guides the driver through the town (route version). Also, both

share two sentences that include compass directions, so that it is possible for all subjects to construct a common orientation to the town. (See Appendices A & B). Again, it is important to emphasize that the features of the town in both versions occur exactly in the same order. For example, sentence #5 for the route version reads: "As the road swings left to go up the valley Mapleton can be seen on the other side of the creek, with wooded hills behind it." Sentence #5 in the survey version reads: "At the creek the road swings north to go up the valley where Mapleton can be seen on the east side of the creek, with wooded hills behind it."

In all our experiments, the stories are typed one sentence to a card and read aloud by the subject, in order to control the reading process. The feedback provided has been either an opportunity to (1) view a schematic map of Mapleton during processing, (2) review a sentence just previously read, or (3) read the complete text in paragraph form at the end of the sentence processing. The map showed the highway, the creek, Main Street, and other general features. It had an arrow pointing north, and some of the salient sights of Mapleton were labeled, e.g., Deer Creek, and the Mapleton Inn.

The new line of research began to uncover some differential effects for feedback on comprehension, particularly for situation memory. Our data showed both supplementary and complementary effects for feedback (Langer, Keenan, & Cumbo, 1992; Langer, Keenan, and Bergman, 1993). A complementary effect was defined as assistance provided by a feedback type congruent with the text version. That is, the map is viewed as complementary assistance during processing of the survey version, while sentence review theoretically provides a similar function for the route description. Supplementary or incongruent assistance, was defined in terms of providing map feedback for the route version or sentence review for the survey version. The feedback condition which provided the entire text after processing was arbitrarily characterized as supplementary since it had no impact on processing during reading. This differential assistance appeared to be stronger particularly for situation memory, for both versions, at least in our initial studies (Langer, Keenan, & Schreiner, 1993). Obviously while these

findings are clearly preliminary, nonetheless they provided us with a starting point for a proposed model.

In an earlier study, immediately after processing the text one sentence at a time, regardless of the assistance provided, all subjects had been allowed to read the entire text. Situation memory was enhanced by the additional reading (Langer, Keenan, & Bergman, 1993). However, we really could not tell if this additional reading was responsible for the enhancement of a situation memory compared to semantic memory, or that the addition of a single reading did not contribute significantly to improvement of semantic memory.

In our most recent study we continued our investigation of complementary and supplementary assistance by further examining the effects of increased assistance. Basically we provided an extra reading of the entire text before assessing either recall or situation memory. After the first memorial representation was measured, the other was also assessed, but without additional assistance. Order of assessment was counterbalanced (Langer, Keenan, and Schreiner, 1993).

The major findings were: (1) greater propositional recall for the survey over the route version, (2) when the testing for situation memory preceded the semantic assessment the mean number of propositions subsequently recalled was greater than when semantic preceded situation. There was an order effect in that the propositional recall for the survey version was much greater if situation memory was measured first. That is, semantic memory for the survey version seemed to gain after delay, and without further assistance; and (3) although statistically non-significant, we found again map feedback assisting inferential reasoning more for the survey version, while sentence review had a similar effect for the route version.

In this latest experiment, we addressed the amount of feedback issue directly by having subjects repeat the same processing conditions twice. That is, the experimental condition was repeated twice, with memorial assessments made after each processing. Given our previous work we could assume that propositional recall would be

enhanced, but while there would be changes in inferential reasoning, we could not be sure if they would be of the same magnitude.

Method

Subjects were 84 General Psychology students at the University of Colorado. Texts for both versions (route and survey) were printed one sentence to a card. Three feedback conditions were provided: (1) in the map condition, subjects after reading a sentence, were allowed to look at a schematic map of Mapleton for up to 10 seconds. They could make five such requests any time during processing, for a total of 50 seconds; (2) in the sentence condition subjects after reading a sentence could study the sentence they had just read for an additional 10 seconds. They could make up to five such requests any time during processing, for a total of 50 seconds; and (3) in the text condition, after reading the 25 cards without any assistance during processing, the complete text was made available, which they could study for 50 seconds.

After processing either text under the assigned feedback condition, subjects completed the semantic and inferential parts of the comprehension assessment. Subjects then processed the text again under feedback conditions identical to the first. That is, if they read the route version with sentence review as the feedback condition, they repeated the process. This yielded a six group design (2 text versions by #3 feedback conditions).

To assess semantic memory, subjects are asked to write down what they remembered about the town regardless of order. The recall protocol is scored for both number of propositions and order of report. The route version consists of 25 sentences, 489 words, and 218 atomic propositions. (See Appendix C). The survey version contains 25 sentences, 497 words, and 225 atomic propositions. (See Appendix D). The passages are comparable in terms of word length and number of propositions.

Situation memory is assessed in terms of inferential reasoning (Langer, Keenan, & Bergman, 1992). In this instance all subjects are presented with a 32-card deck. The 30 items consist of original sentences from both versions as well as new sentences. The

latter are paraphrases written in either the route or survey style, and can be either true or false. Subjects read each sentence aloud, and decided whether the sentence was true or false. It follows that an original sentence from either version is by definition true, but paraphrases could be either true or false.

Results

Data was collected on 84 subjects. However, an inspection of the protocols revealed that only 62 subjects apparently had time to fully complete both tasks. All results for both recall and situational memory are based on these subjects. While this represents some loss of data, we felt that the analysis of complete protocols made more sense.

For semantic memory the recall protocols were scored for number of propositions. Propositions were developed following the work of van Dijk and Kintsch (1983) and Bovair & Kieras (1981), but are not identical to either. (See Appendices C and D for notational code).

For example, the sentence "The inn is old but kept in top condition and the meals were superb" yields seven propositions.

<u>Predicate</u>	<u>Arguments</u>
is	inn, old
but	/is/,/kept/
kept	[inn]
in	/kept/,condition
top	[condition]
and	/is/,/were/
were	meals, superb

For recall there was, as predicted, a marked increase in the numbers of propositions. A repeated measures analysis was significant ($F=46.0, df=1,28$). The mean recall scores increased from 26.0 on the first processing to 51.0 on the second.

We continued to find trends consistent with our previous complimentary/supplementary distinctions, although these were not statistically significant. The survey text version seemed to be more effectively assisted by the map

mode of feedback, while the route version was helped more by the text or sentence feedback provided. The text condition was superior to the other two. One possibility is that it is a whole end of trial experience, while the other

Insert Table 1 about here

feedback modes are given on request. Some subjects did not request all the available feedback time offered, so they may have had less learning time. A repeated measures analysis of the trend was statistically non-significant, but suggestive ($F=2,80,df=1,28,p>.05$).

For situation memory the gains in scores between the first and second trials did not parallel those for semantic memory. There was far less variability in the scores. The

Insert Table 2 about here

one significant statistical finding was that there were more correct inferences for the map feedback mode on the second trial ($F=3.70,df=2,28,p<.05$). The superiority of the map feedback for inferential reasoning, which we have discovered earlier, might indicate the beginning of construction of the situation model, i.e., a global representation of the entire passage. Correct inferences made on paraphrase or alternate text items would show that the various features of the town are being considered in relation to each other.

Discussion

In the past we have remarked somewhat facetiously about the ability of our college subjects to recall text, without necessarily giving indication of any processing in depth. This surface representation, in terms of Kintsch's model, can be accomplished at the expense of further processing. This may explain why programmed instruction succeeded so often in achieving reproduction of text, at the expense of knowledge which could be applied elsewhere. Too much assistance may direct the learner away from the development of macropropositions and/or one of the other memorial

representations in order to satisfy task demands which may be met by surface reproduction. On the other hand, a more appropriate choice of feedback, based on content and level of memorial representation sought, could lead to more complex processing of text.

In a similar manner McNamara (1993) postulated that a less coherent text might direct the reader to process at a level involving situation memory. A more coherent text could encourage development of a textbased memorial representation, requiring less need for active higher-order processing. Indeed, in our earlier work, when we used scrambled text, coherence or argument overlap was obviously not immediately apparent to the reader. Hence the assistance provided may not initially helped in terms of processing the text base, and by the time the assistance could be used effectively the readers were relying primarily on internally developed strategies.

Given our last series of experiments in which we manipulated feedback by amount and timing as well as by type, we believe it may be possible now to suggest the outlines of a model of memorial representations assisted by feedback. We shall propose that initially all text is processed at a surface level, and assuming that the task comprehension requirements are minimal, processing probably does not proceed beyond that. In that case assistance is likely to have minimal benefits. especially for adult readers. It also seems plausible that tightly structured and coherent text, such as programmed instruction probably does not need to have the learner supplied with much in the way of additional help. In this instance any memorial processing strategy is likely to be adequate. Alternatively, as we have noted before, with disconnected text assistance is not likely to significantly impact the strategy being used until enough of the text has been assembled to determine if the strategic assumptions were appropriate. Probably prior knowledge and/or early assumptions regarding the text content are the more likely internal influence directing strategy rather than any external assistance.

In the case of the text we have been using more recently, which is in appropriate sequence and references in a general sense to prior knowledge items (e.g., creek, town,

church, inn, etc.) our data lead us to believe we have a different situation. We have noted that type, timing and amount of feedback provided seem to have differential consequences with respect to the various levels of memorial representations. In some instances enhancement of a particular level of memorial representation may occur during processing because of the assistance provided, but without necessarily creating subsequent diminution of another level (Langer, Keenan, & Schreiner, 1993).

Therefore, a growing possibility in our model, taking into account the effects of assistance, is that memorial levels do not evolve in discrete hierarchical stages as depth of processing grows. Rather the levels may develop in a parallel fashion, so that a better situation representation can with appropriate assistance, create a more accurate propositional recall. The reverse can also become true. Growth of representation at one level may take precedence because of the text and assistance given, but does not necessarily result in a loss elsewhere. In short, after surface representation, a possibly interactive and supportive bifurcation into semantic and/or situation memory ensues. Without specific external assistance a more hierarchical model may be encouraged.

From an instructional point of view it is important to recognize that the model requires the assumption that memorial outcomes can be directed by assistance, but somewhat differing outcomes may emerge at a given point in time, with given variations in assistance. The instructional issue is not help, but what kinds of help and for what purposes.

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Table 1: Propositional recall

First Trial

<u>Version</u>	<u>Feedback mode</u>	<u>Map</u>	<u>Text</u>	<u>Sentence</u>
Route		19.8	35.5	30.6
Survey		23.2	27.5	24.8

Second Trial

<u>Version</u>	<u>Feedback mode</u>	<u>Map</u>	<u>Text</u>	<u>Sentence</u>
Route		38.4	63.7	57.8
Survey		51.0	41.6	57.6

Table 2: Inferential reasoning

First Trial

	<u>Feedback mode</u>	<u>Map</u>	<u>Text</u>	<u>Sentence</u>
<u>Version</u>				
Route		18.7	18.8	19.0
Survey		18.3	19.5	18.1

Second Trial

	<u>Feedback mode</u>	<u>Map</u>	<u>Text</u>	<u>Sentence</u>
<u>Version</u>				
Route		20.7	19.0	18.8
Survey		20.5	19.6	19.5

APPENDIX A

NEW MAPLETON: BY SENTENCE Temporal (route) Version

1. Let me tell you about a town called Mapleton where I spent a week on vacation last year.
2. As you drive east toward Biggcity you cross Deer Creek and that is where you will find this little town.
3. The highway runs along the base of the hills before you get to the creek with pasture on the uphill side of the road.
4. On the right side are flat fields of corn and beans, and white barns with red roofs.
5. As the road swings left to go up the valley Mapleton can be seen on the other side of the creek, with wooded hills behind it.
6. Before you get to the bridge there are some small homes along the roadside and then you pass the highschool on your right.
7. Just past the highschool is a small gas station with the shop in the back.
8. At the bridge is an old general store where the young people hang out after school.
9. If you look upstream from the bridge to where the creek runs out of the hills, the Mapleton Inn is just visible on the far side.
10. I could fish up the stream from the Inn or hike in the woods behind it, or just lie around the pool and turn brown.
11. The Inn is old but kept in top condition, and the meals were superb.
12. Crossing the bridge you will see the Canyon Road that goes up to the Inn and disappears behind a bluff.
13. On the town side of the bridge the highway turns back down the creek with the town on your left.
14. There is a light at Main Street where you turn left to go into town.
15. A small business section extends about four blocks along both sides of the street with the newer shops farther from the creek.

16. Mapleton Park is on the left side of the street in the second block and on nice days oldtimers sit on benches watching the traffic.
17. The gray stone building on Main Street is Town Hall with the library upstairs and Police Department in back.
18. The tallest building in town is Holy Savior Lutheran Church which shows its steeple between Town Hall and the creek.
19. Just south across from Holy Savior is St. Catherine's Church, a small but solid red brick building.
20. On the hill behind Town Hall are the older homes, white frame houses shaded by big old silver maples.
21. Newer homes are across town and down toward the highway where it leaves the creek.
22. Main Street turns into a country road out of town and meets the highway again after a few miles.
23. I drove to the end of town once but there is nothing to see except corn fields.
24. If you just stay on the highway it goes down the valley past the town and turns away from the creek.
25. It is too bad that so many drivers pass through town without enjoying the leisure Mapleton offers.

APPENDIX B

NEW MAPLETON: BY SENTENCE Spatial (survey) Version

1. Let me tell you about a town called Mapleton where I spent a week on vacation last year.
2. As you drive east toward Biggcity you cross Deer Creek and that is where you will find this little town.
3. The highway runs along the south side of the hills west of the creek, with pasture on the hills to the north.
4. On the south side are flat fields of corn and beans, and white barns with red roofs.
5. At the creek the road swings north to go up the valley where Mapleton can be seen on the east side of the creek, with wooded hills behind it.
6. At the west end of town are some small homes along the roadside and closer to the creek is the school.
7. Just past the highschool is a small gas station with the shop in the back.
8. At the bridge is an old general store where the young people hang out after school.
9. If you look upstream from the bridge to where the creek runs south out of the hills, the Mapleton Inn is just visible on the east side.
10. I could fish the stream north from the Inn or hike in the woods behind it, or just lie around the pool and turn brown.
11. The Inn is old but kept in top condition, and the meals were superb.
12. East of the bridge is the Canyon Road that goes north to the Inn and disappears behind a bluff.
13. On the east side of the bridge the highway turns back south along the creek with the town further east.
14. There is a light at Main Street where you turn east to go into town.
15. A small business section extends east about four blocks along both sides of the street with the newer shops farther from the creek.

16. Mapleton Park is on the north side of the street in the second block east and on nice days oldtimers sit on benches watching the traffic.
17. The gray stone building on Main Street is Town Hall with the library upstairs and Police Department in back.
18. The tallest building in town is Holy Savior Lutheran Church which shows its steeple west of Town Hall toward the creek.
19. Just south across from Holy Savior is St. Catherine's Church, a small but solid red brick building.
20. On the hill north of Town Hall are the older homes, white frame houses shaded by big old silver maples.
21. Newer homes are south of Main down toward the highway where it turns , east from the creek.
22. Main Street turns into a country road east of town and then goes south to meet the highway again.
23. I drove out east once but there is nothing to see except corn fields.
24. The highway turns south to go back down the valley past the town and turns away from the creek toward the city to the east.
25. It is too bad that so many drivers pass through town without enjoying the leisure Mapleton offers.

APPENDIX C
NEW MAPLETON: PROPOSITIONS

Conventions:

General Principles to ease scoring decisions

1. Approximate original words and sequence.
2. Minimize length, including predicate, "molecular."

Identification Number (first column)

3. Numbered within sentences e.g. 0210 = proposition 10, sentence 2.

Predicates (second column)

1. Verbs, modifiers, connectives, and some prepositions.
2. Some are two-word, hyphenated, e.g. verb-conjunction.
3. Brackets indicate [implicit predicate].

Arguments (third column)

1. Arguments are noun and pronoun phrases and other propositions.
2. Separated by commas, e.g. "loves George, bananas".
3. Brackets indicate [implicit argument] from within the same sentence.
4. Slash indicates proposition, usually by /predicate/ only.

Temporal (route) Version

0101	tell-about	me, you, town
0102	called	[town], Mapleton
0103	spend	I, week
0104	where	/spend/, [Mapleton]
0105	on	/spend/, vacation
0106	[when]	/spend/, /last/
0107	last	year
0201	as	/drive/, /cross/
0202	drive	you
0203	east	/drive/
0204	toward	/drive/, Biggcity
0205	cross	you, Creek
0206	Deer	[Creek]
0207	and	/cross/, /find/
0208	find	you, town
0209	little	[town]
0210	this	[town]

0301	runs-along	highway, base
0302	of	[base], hills
0303	on	/runs-along/, side
0304	this	[side]
0305	of	[side], creek
0306	with	/runs-along/, pasture
0307	on	[pasture], side
0308	uphill	[side]
0309	of	[side], road
0401	on	side
0402	right	[side]
0403	are	fields, /on/
0404	flat	[fields]
0405	of	[fields], /and/
0406	and	corn, beans
0407	and	[fields], [barns]
0408	white	barns
0409	with	[barns], roofs
0410	red	[roofs]
0501	as	/swings/, /can-be-seen/
0502	swings	road, left
0503	to-go-up	/swings/, valley
0504	can-be-seen	Mapleton
0505	on	/can-be-seen/, side
0506	other	[side]
0507	of	[side], creek
0508	with	[Mapleton], hills
0509	wooded	[hills]
0510	behind	[hills], it [Mapleton]
0601	before	/get/
0602	get	you, /to/
0603	to	bridge
0604	are	homes
0605	some	[homes]
0606	small	[homes]
0607	along	/are/, roadside
0608	and	/get/, /pass/
0609	pass	you, highschool
0610	then	/pass/
0611	on-right	[highschool]

0701	is	station
0702	small	[station]
0703	gas	[station]
0704	just-past	/is/, highschool
0705	with	/is station/, shop
0706	in-back	[shop]
0801	at	bridge
0802	is	store, /at/
0803	old	[store]
0804	general	[store]
0805	where	/is/, /hang-out/
0806	hang-out	people
0807	young	[people]
0808	after	/hang out/, school
0901	if	/look/, /is/
0902	look	you
0903	up-stream	/look/
0904	from	/look/, bridge
0905	to	/look/, /where/
0906	where	/runs/
0907	runs	creek
0908	out-of	/runs/, hills
0909	is	Mapleton Inn
0910	visible	/is/
0911	on	/is/, side
0912	far	/side/
1001	could-fish	I
1002	up-stream	/could-fish/
1003	from	/up-stream/, Inn
1004	or1	/could-fish/, /(could) hike/
1005	[could] hike	[I]
1006	in	/[could] hike/, woods
1007	behind	[woods], it [Inn]
1008	or2	/or1/, /lie-around/
1009	lie-around	[I], pool
1010	and	/lie-around/, /turn/
1011	turn	brown

1101	is	Inn, old
1102	but	/is/, /is-kept/
1103	is-kept	[Inn]
1104	in	/is-kept/, condition
1105	top	[condition]
1106	and	/is-kept/, /were/
1107	were	meals, superb
1201	crossing	you, bridge
1202	will-see	[you], Canyon Road
1203	goes	[Canyon Road], /up-to/
1204	up-to	/goes/, Inn
1205	and	/goes/, /disappears/
1206	disappears	[Canyon Road]
1207	behind	/disappears/, bluff
1301	on	side
1302	town	[side]
1303	of	/town/, bridge
1304	turns	highway, /on/
1305	back	/turns/, /down/
1306	down	creek
1307	with	/turns/, town
1308	on	[town], left
1401	is	light
1402	at	/is/, Main Street
1403	where	/is/, /turn/
1404	turn	you, left
1405	to-go	/turn/, /into/
1406	into	/to-go/, town
1501	extends	business section
1502	small	[business section]
1503	about-four	/extends/, blocks
1504	along	/extends/, sides
1505	both	[sides]
1506	of	/both/, street
1507	with	[business section], shops
1508	newer	[shops]
1509	farther-from	/newer shops/, creek

1601	is	Park
1602	Mapleton	[park]
1603	on	/is/, side
1604	left	[side]
1605	of	/left/, street
1606	in	/is/, block
1607	second	[block]
1608	and	/is/, /sit/
1609	sit	oldtimers
1610	on	/sit/, days
1611	nice	[days]
1612	on	/sit/, benches
1613	watching	[oldtimers], traffic
1701	is	building, Town Hall
1702	stone	building
1703	gray	/stone/
1704	on	/is/, Main Street
1705	with	[Town Hall], /and/
1706	upstairs	library
1707	and	/upstairs/, /in-back/
1708	in-back	Police Department
1801	is	building, Church
1802	tallest	[building]
1803	in-town	/tallest/
1804	Lutheran	[Church]
1805	Holy Saviour	/Lutheran/
1806	shows	which [church], steeple
1807	between	/shows/, /and/
1808	and	Town Hall, creek
1901	across-from	/is/, Holy Savior
1902	south	/across-from/
1903	just	/south/
1904	is	Church
1905	St.Catherine's	[Church]
1906	small	/is/, building
1907	solid	[building]
1908	but	/small/, /solid/
1909	brick	[building]
1910	red	/brick/

2001	are	homes
2002	older	[homes]
2003	on	/are/, hill
2004	behind	[hill], Town Hall
2005	white	/are/, houses
2006	frame	[houses]
2007	shaded	[houses]
2008	by	/shaded/, maples
2009	big	[maples]
2010	old	[maples]
2011	silver	[maples]
2101	are	homes
2102	newer	[homes]
2103	across	/are/, town
2104	and	/across town/, /down-toward/
2105	down-toward	/are/, highway
2106	where	/are/, /leaves/
2107	leaves	it [highway], creek
2201	turns-into	Main Street, road
2202	country	[road]
2203	out-of	/turns-into/, town
2204	and	/turns-into/, /meets/
2205	meets	[Main Street], highway
2206	again	/meets/
2207	after	/meets/, miles
2208	few	[miles]
2301	drove	I
2302	once	/drove/
2303	to	/drove/, end
2304	of	[end], town
2305	but	/drove/, /is/
2306	is	nothing
2307	to-see	[nothing]
2308	except	[nothing], cornfields
2401	stay-on	you, highway
2402	if	/stay-on/, /goes/
2403	goes	it [highway]
2404	down	/goes/, valley
2405	past	/goes/, town
2406	and	/goes/, /turns/
2407	turns	[highway]
2408	away-from	/turns/, creek

2501	is	too-bad,
2502	that	/is/, /pass-through/
2503	pass-through	drivers, town
2504	so-many	[drivers]
2505	without	/pass-through/, /enjoying/
2506	enjoying	leisure
2507	offers	Mapleton, [leisure]

APPENDIX D

NEW MAPLETON
Spatial (survey) Version

0101	tell-about	me, you, town
0102	called	[town], Mapleton
0103	spend	I, week
0104	where	/spend/, [Mapleton]
0105	on	/spend/, vacation
0106	[when]	/spend/, /last/
0107	last	year
0201	as	/drive/, /cross/
0202	drive	you,
0203	east	/drive/
0204	toward	/drive/, Biggcity
0205	cross	you, Creek
0206	Deer	[Creek]
0207	and	/cross/, /find/
0208	find	you, town
0209	little	[town]
0210	this	[town]
0301	runs-along	highway, side
0302	south	[side]
0303	of	[side], hills
0304	on	/runs along/, side
0305	west	[side]
0306	of	[side], creek
0307	with	/runs-along/, pasture
0308	on	[pasture], hills
0309	to	[hills], north
0401	on	side
0402	south	[side]
0403	are	fields, /on/
0404	flat	[fields]
0405	of	[fields], /and/
0406	and	corn, beans
0407	and	[fields], [barns]
0408	white	barns
0409	with	[barns], roofs
0410	red	[roofs]

0501	at	creek
0502	swings	/at/, road
0503	north	/swings/
0504	to go up	/north/, valley
0505	where	/can-be-seen/, [valley]
0506	can-be-seen	Mapleton, /on/
0507	on	side
0508	east	[side]
0509	of	[side], creek
0510	with	/can-be-seen/, hills
0511	wooded	[hills]
0512	behind	[hills], it[Mapleton)]
0601	at	/are/, end
0602	west	[end]
0603	of	/west/, town
0604	are	homes
0605	small	[homes]
0606	along	/are/, roadside
0607	and	/are/, /is/
0608	is	school
0609	closer-to	/is/, creek
0701	is	station
0702	small	/is/
0703	gas	/is/
0704	just-past	/is/, highschool
0705	with	/is/, shop
0706	in-back	[shop]
0801	at	bridge
0802	is	store, /at/
0803	old	[store]
0804	general	[store]
0805	where	/is/, /hang-out/
0806	hang-out	people
0807	young	[people]
0808	after	/hang out/, school

0901	if	/look/, /is/
0902	look	you
0903	upstream	/look/
0904	from	/look/, bridge
0905	to	/look/, /where/
0906	where	/runs/
0907	runs	creek
0908	south	/runs/, /out-of/
0909	out-of	hills
0910	is	Mapleton Inn
0911	visible	/is/
0912	just	/visible/
0913	on	/is/, side
0914	east	[side]
1001	could-fish	I
1002	up-stream	/could-fish/
1003	from	/up-stream/, Inn
1004	or 1	/could-fish/, /could] hike/
1005	[could] hike	[I]
1006	in	/could] hike/, woods
1007	behind	[woods], it [Inn]
1008	or 2	/or 1/, /lie-around/
1009	lie-around	[I], pool
1010	and	/lie-around/, /turn/
1011	turn	brown
1101	is	Inn, old
1102	but	/is/, /is-kept/
1103	is-kept	[Inn]
1104	in	/is-kept/, condition
1105	top	[condition]
1106	and	/is-kept/, /were/
1107	were	meals, superb
1201	east-of	bridge
1202	is	Canyon Road, /east-of/
1203	goes	[Canyon Road], north
1204	to	/goes/, Inn
1205	and	/goes/, /disappears/
1206	disappears	[Canyon Road]
1207	behind	/disappears/, bluff

1301	on	side
1302	east	[side]
1303	of	/east/, bridge
1304	turns	highway, /on/
1305	back	/turns/, south
1306	along	/turns/, creek
1307	with	[highway], town
1308	further	/with/, east
1401	is	light
1402	at	/is/, Main Street
1403	where	/is/, /turn/
1404	turn	you, east
1406	to-go	/turn/, /into/
1407	into	/to-go/, town
1501	extends	business section
1502	small	[business section]
1503	east	/extends/
1504	four	/extends/, blocks
1505	about	/four/
1506	along	/extends/, sides
1507	both	[sides]
1508	of	/both/, street
1509	with	[business section], shops
1510	newer	[shops]
1511	farther-from	/newer/, creek
1601	is	Park
1602	Mapleton	[Park]
1603	on	/is/, side
1604	north	[side]
1605	of	[side], street
1606	in	/is/, block
1607	second	[block]
1608	east	/second/
1609	and	/is/, /sit/
1610	sit	oldtimers
1611	on	/sit/, days
1612	nice	[days]
1613	on	/sit/, benches
1614	watching	[oldtimers], traffic

1701	is	building, Town Hall
1702	stone	building
1703	gray	/stone/
1704	on	/is/, Main Street
1705	with	[Town Hall], /and/
1706	upstairs	library
1707	and	/upstairs/, /in-back/
1708	in-back	Police Department
1801	is	building, church
1802	tallest	[building]
1803	in-town	/tallest/
1804	Lutheran	[Church]
1805	Holy Savior	/Lutheran/
1806	shows	which [Church], steeple
1807	west-of	/shows/, Town Hall
1808	toward	/shows/, creek
1901	across-from	/is/, Holy Savior
1902	south	/across-from/
1903	just	/south/
1904	is	Church
1905	St. Catherine's	[Church]
1906	small	/is/, building
1907	solid	[building]
1908	but	/small/, /solid/
1909	brick	[building]
1910	red	/brick/
2001	are	homes
2002	older	[homes]
2003	on	/are/, hill
2004	north-of	[hill], town
2005	white	/are/, houses
2006	frame	[houses]
2007	shaded	[houses]
2008	by	/shaded/, maples
2009	big	[maples]
2010	old	[maples]
2011	silver	[maples]

2101	are	homes
2102	newer	[homes]
2103	south-of	/are/, Main
2104	down-toward	/are/, highway
2105	where	[highway], /turns/
2106	turns	it [highway]
2107	east	/turns/
2108	from	/east/, creek
2201	turns-into	Main Street, road
2202	country	[road]
2203	east-of	/turns-into/, town
2204	and	/turns-into/, /goes/
2205	goes	[Main Street], south
2206	to-meet	/goes/, highway
2007	again	/to-meet/
2301	drove-out	I
2302	east	/drove-out/
2303	once	/drove out/
2304	but	/drove-out/, /is/
2305	is	nothing
2306	to-see	[nothing]
2307	except	[nothing], cornfields
2401	turns	highway, south
2402	to-go	/turns/, down
2403	back	[down]
2404	down	/to-go/, valley
2405	past	/to-go/, town
2406	and	/turns/, /turns-away]
2407	turns-away	[highway]
2408	from	/turns-away/, creek
2409	toward	/turns-away/, city
2410	east	[city]
2501	is	too-bad,
2502	that	/is/, /pass-through/
2503	pass-through	drivers, town
2504	so-many	[drivers]
2505	without	/pass-through/, /enjoying/
2506	enjoying	leisure
2507	offers	Mapleton, [leisure]