A PILOT STUDY OF
THE EFFECT OF GRAMMATICAL VOICE ON STORY RECALL

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In a pilot study of the effect of grammatical voice in a written recall task, a subject pool composed of 18 students rewrote stories read in active (agent/actor in subject position), passive (agent/actor in non-subject position) and truncated passive voice (agent/actor omitted). While the general tendency was to rewrite the stories in active clauses, the voice used in the original stories influenced the grammatical voice used in the written retellings. Specifically, truncated passive clauses were most often employed in retelling of stories which were originally read in truncated passive clauses. It is proposed that the choice of voice in recall is an indication that meaning is coded via syntax as well as semantics, and that syntax may be used to encode sentential meaning in long-term memory. This directly conflicts with previous research in the area, and suggests areas for further research.*

INTRODUCTION

1. For more than thirty years, data from psycholinguistic research in the area of syntax has been frequently interpreted as showing that the meaning of sentences is stored in memory as a kernel.[1] These kernel clauses are defined as active affirmative declarative sentences (e.g. Miller 1962, as reported in Slobin 1968) which are simplified syntactic forms of literal spoken sentences. For example, a sentence uttered with no identified agent (a truncated passive) is said to be transformed from an active kernel:

Someone hit the boy (kernel)   ⇒   The boy was hit (truncated passive)

This idea of simplified representation of form is closely tied to Chomsky's 1957 notion that semantic meaning and sentence structure are organized at separate levels. At the semantic level, the meaning is encoded via words and morphemes. At some point before an utterance is produced, this meaning is then mapped onto syntactic structure by some system of rules specific to a given language. Or, the hearer recodes meaning of a spoken sentence to the kernel's active syntactic form in memory. Many researchers (e.g. Bock and Warren 1985, Mehler 1963; Miller 1962; Sachs 1967) adopted this concept, proposing that semantic meaning is determined before it is mapped to syntactic form.[2] The presumption is that the syntactic form plays a minimal role in the encoding or recoding of sentential meaning.

Research in the verbatim recall of both spoken and written sentences indicates that this may be an inaccurate picture, however. Jarvella 1971 concludes in a study of short-term memory for verbatim text that there is evidence that syntactic encoding precedes semantic decoding. Memory for syntactic segmention of phrases decreased as semantic decoding of sentence information increased,[3] suggesting that syntax is a factor in short-term memory but not long-term. Caplan 1972 and Chang 1980 confirm this finding in spoken and written domains, concluding that clauses serve as units of comprehension.

The finding that syntax is relevant only in short-term memory conflicts with the results of an earlier experiment by Slobin 1968, who investigated the verbal recall of full and truncated passives by children and adults. In the Slobin experiment, each subject was asked to retell two stories; one was read in full passive sentences (which included agents in 'by' phrases), and a different story was read in truncated passive phrases (no agents identified). Each of the stories was four sentences long and equated for number of words per paragraph. About 25% of the sentences told in the full passive stories were retold verbatim (no change in the grammatical voice), with more than 62% of the stories retold in active voice. By comparison, 60% of the truncated passive sentences were retold verbatim, with most of the remainder told in active voice. Slobin concluded that 'form is not totally irrelevant to the meaning of a sentence' and that it might 'serve as a ready receptacle for the underlying semantic content of a sentence.' This conclusion also calls into question the idea that syntax is significant only in short-term memory.

The present study re-examines the role of syntax and memory in a written story recall task adapted from the Slobin experiment. The Slobin experiment itself builds on Sachs' conclusion (1967:438) that 'form which is not

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[1] The term 'grammatical structure' usually includes morphology (word structure) as well as syntax (sentence structure, or more loosely, word order). Morphology is not considered in this paper. In general, syntax is a term which varies in definition depending on the particular linguistic theory being advanced. For the purpose of this paper, syntax can be thought of simply in terms of the word order subject-verb-object and the relevant variants in English. It is significant to note that this discussion only deals with English syntax. Cross-linguistic experimentation would provide further insight into how syntactic form is utilized in the encoding and retention of sentence meaning.

[2] For this paper, I am not distinguishing semantics from pragmatics, although linguists may find this unpalatable. The issue under discussion in this paper is actually the mapping of pragmatic meaning to syntactic structure—the focusing of attention to the agent/actor argument of a verb.

[3] For this paper, long-term memory begins after about 40 ms. This is well below the time for which subjects in the current experiment were given to recall the stories they read. In all cases, the recall task was at least three minutes after a story was read, and could have taken as long as 15 minutes for the final of three recalled stories. In almost any model of memory using short, working and long-term stages, this experiment's recall phase falls into a long-term memory category.

relevant to the meaning is normally not retained.' This touches on the modern functional grammarians' approach to linguistics which has been gaining influence since about 1985. This approach is characterized by the notion that syntax, semantics and pragmatics have overlapping or closely related meaning functions which are not necessarily separable into autonomous levels. The purpose of the current study is to investigate whether meaning which is encoded in a given syntactic voice will be retained in long-term memory. The hypothesis is that meaning which is encoded or recoded via voice will result in the same voice being used in a recall task.

Given this hypothesis, the expectation is that active voice will be seen most often in the retelling of active stories. There should be a low incidence of other voice forms in the retelling of active stories. A similar pattern should develop from the retelling of stories in each voice. Because of these expectations, three forms of grammatical voice are investigated: active, full passive and truncated passive. Active stories include semantic agents ('actors' of the verb) mapped onto the syntactic subjects of each clause, as in: *The vendor kicked the pickpocket*. Stories told in full passive clauses have semantic agents in 'by' clauses located in positions other than the syntactic subject position: *Bob was introduced to his teacher by the principal*. Truncated stories have no overtly indicated agent available to encode: *Cinderella was raised in a small town*.

In addition to expanding the types of grammatical voice, the current experiment also switches to the written domain. In theory, the writing task should call on long-term memory. If syntactic voice is only a factor in short-term memory, there should be little recall of the specific voice of the stories as they are presented.

METHOD

2.1. SUBJECTS. Eighteen graduate and undergraduate men and women from the University of Colorado participated as subjects, 16 in partial fulfillment of requirements for an introductory cognitive psychology course. The remaining two subjects were linguistics graduate students who volunteered to participate.

2.2. MATERIALS. Subjects received an experimental packet containing six isolated stories (see Appendix). The packet was organized into two sets of three stories each. Each set contained one story written in active voice, one in passive and one truncated passive voice. Following each three-story set, three separate sheets of paper were provided for the recall of each story. Each sheet was labelled with the title of the story which was to be recalled, and the sheets were provided in the same order as the stories were presented.

All subjects received the same stories, but story order was varied in each packet based on a modified Latin square design. The stories were written in simple and compound sentences, with topics chosen to appeal to adult college students. Each story sentence contained at least one target clause, which was the basic unit of measurement for the experiment. The targets contained information given in the grammatical voice of the story which was expected to be reproduced in the recall task. For example, in the following sentence from a passive voice story, two passive target clauses are underlined:

> He was hired by a Philadelphia law firm one year before he was stricken by the HIV-virus.

Each story was equated for total number of words and number of target clauses; active stories contained 10 target active clauses each, and both passive and truncated passive stories contained 8 target passives and 2 target actives (10 targets each). Active clauses were added to help mitigate the unnaturalness of totally passive stories. All stories were unique from each other in content. The story types were considered the independent variable conditions and the type of recalled clause (active, passive or truncated) were the measured dependent variables. In this experiment, story and grammatical voice were confounded.

2.3. PROCEDURE. Subjects were seated and given an experimental packet. The experimenter then read the following instructions:

> This is a memory experiment. Please do not open your packets until you are told to do so; you will be directed at every stage of this experiment.
>
> You will be reading two sets of one-paragraph stories. For each story, you will be given one minute to read. Try to remember as much about each of the stories as you can. After reading three stories, you will be given ten minutes to write down as much about each of the stories as you can. You may write the stories in any order, but please write your stories on the appropriately titled pages which are provided, and please write only one story per page. At the end of ten minutes you will be told to stop writing. After a short break, you will be asked to repeat this exercise on a second set of stories. Please do not turn to the stories or begin writing until you are told to do so.

Subjects were given one minute to read each of the first three stories in their experimental packets. After reading a set of three stories, subjects were asked to write each story in whatever order they chose using the titled sheets provided, and were given about ten minutes to rewrite the three stories. Subjects were told to complete the writing of one story before proceeding to a subsequent story, and they were told not to refer back to either the original stories or previous writings. When the written recall of the first set of three stories was completed, the procedure was repeated for the remaining three stories.

RESULTS

3. Recalled clauses were counted based on their classification as active, passive, or truncated passive. For instance, clauses were classified as active if they had an agent in the syntactic subject position (e.g. *Cinderella went*

to the ball). Clauses were classified as passive if they had agents in a position other than syntactic subject position, which in English requires a 'by' phrase (e.g. *Doe was fired by the firm*). Truncated-passives had no agents (e.g. *She was raised in a small town*).

Few difficulties arose in the classification of subjects' recalled clauses. Most clauses were written as simple sentences. Rarely, complex sentence structures made it necessary to carefully identify classifiable clauses.[4] This problem was exemplified by the following:

> Retribution was demanded, even though the terms of the peace agreement stated that no retribution would be taken.

In this sentence, the clause *retribution was demanded* was clearly classifiable as a truncated passive clause and the clause beginning with *the terms of the peace agreement stated* was classified as active. At the end of the sentence, however, *no retribution would be taken* was also counted as a truncated passive clause even though it is embedded in a larger clause of a different voice classification. This decision is justified by the iterative nature of English, which allows sentences to be made up of other sentences and clauses. Such clauses were interpreted as reflecting the voice and agentivity of the original story, which is the concern of this experiment. No attention was paid to the accurate recall of 'facts' or other information, which was irrelevant to this study.

Subjects overwhelmingly wrote in complete sentences, making classification of sentence fragments generally unnecessary. When fragments occurred, the classification of the clause was based on whether or not the agent of the verb had been clearly stated in the recalled material and whether it had been used instead of a complete sentence or clause. For instance, given *Aristide will have an easier time keeping the peace than restoring economic balance (solving the real problems)* [sic] in recall, the fragment in parenthesis was interpreted as a rewording of 'restoring economic balance' rather than as a new clause.

Overall recall of active, passive, and truncated passive grammatical voices is shown in Figure 1. As predicted by Slobin, there was a high percentage of active clauses across the recall task. Full passive clauses and truncated clauses were used at a much lower rate overall. This figure substantiates previous observations that active clauses are used to retell stories even when the original story was told in a grammatical voice other than active. Subjects' mean use of the active, passive and truncated passive clauses were $M=11.7$, $M=4.5$ and $M=5.6$, respectively.
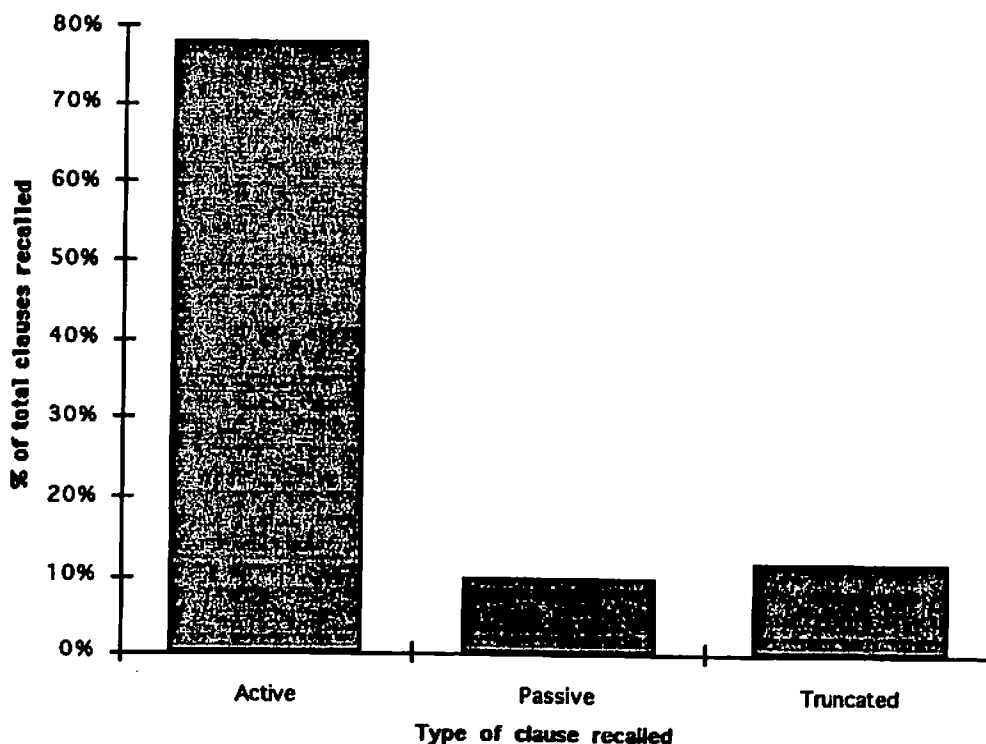

FIGURE 1. Percent of total clauses recalled as a function of clause type.

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[4] The distinction between clause and sentence was made as follows: a clause has a single proposition; a simple sentence is a clause; a complex sentence is made up of multiple clauses.

By looking at the incidence of each kind of voice as used in the recall of each story, a different picture emerges, however. Figure 2 displays the total recalled active clauses as a function of the individual stories. Active clauses occurred most often in recall of the active stories, but was comparatively high in the recall of all story types. As shown in Figure 2, a high percentage of the total active voice clauses was used to recall passive stories.
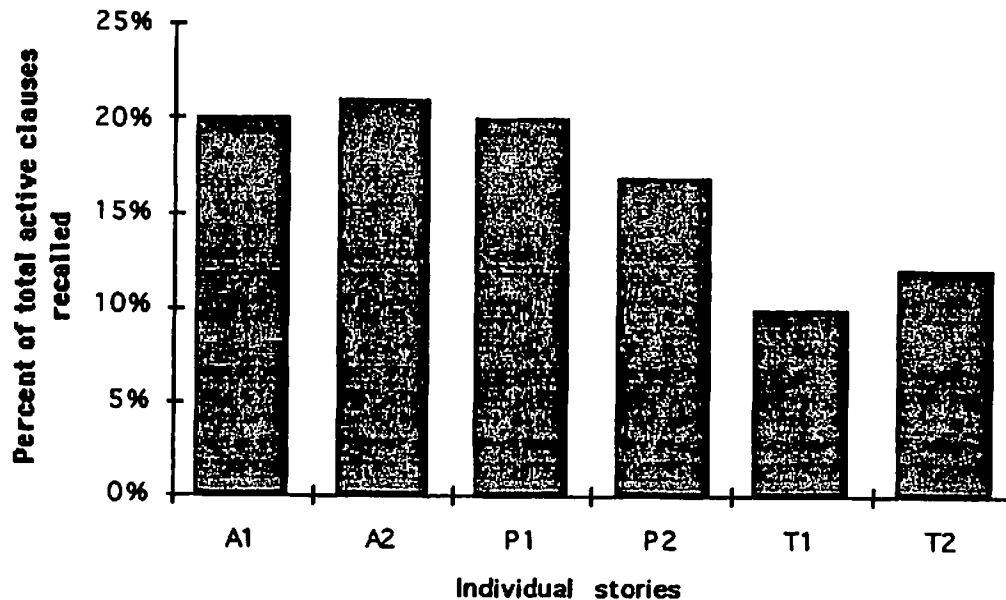

FIGURE 2. Percentage of total active clauses recalled as a function of each story.

Figure 3 displays total recalled passive clauses as a function of the individual stories. Passive clauses were used least often in the recall of active stories than any other story type, and most often in the retelling of the passive stories.
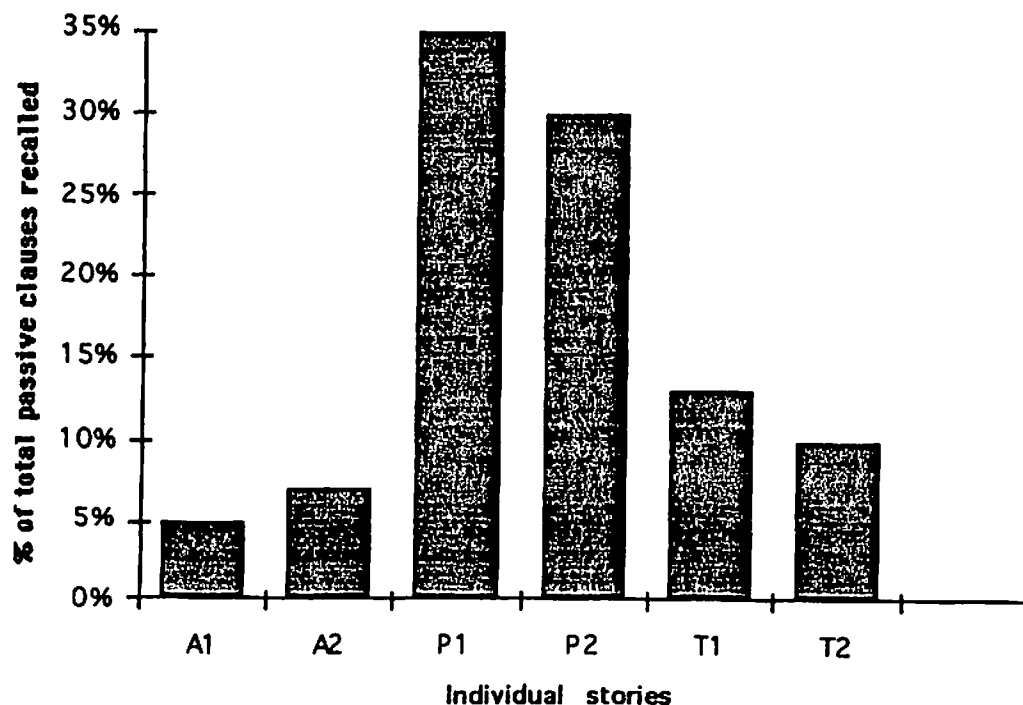

FIGURE 3. Percentage of total passive clauses recalled as a function of each story.

Figure 4 displays total recalled truncated passive clauses used to retell the individual stories. As was the case for the other clause types, truncated passives were used most often in the retelling of the truncated passive stories.
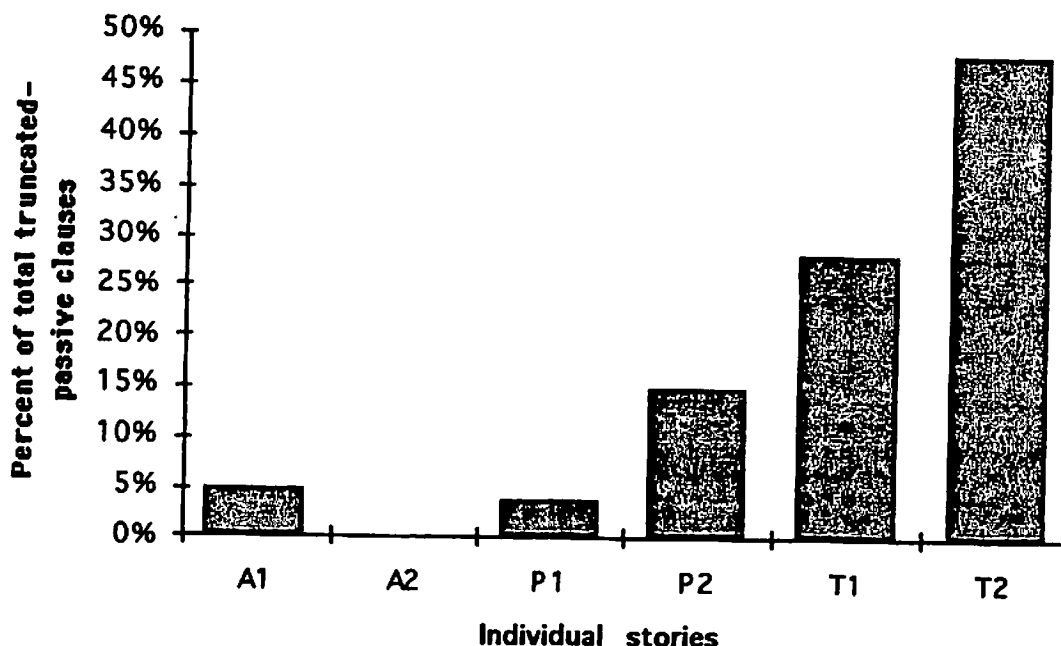

FIGURE 4. Percentage of total truncated passive clauses recalled as a function of each story.

DISCUSSION

4. Consistent with Slobin's findings, and illustrated in Fig. 1, this study predictably showed active clauses were used for recall more than either passive or truncated clauses. But the closer analysis of non-active clauses shows that there may be a pattern of correlation between the voice used in the story and the voice used in recall. Specifically, this study reveals a pattern where active clauses are recalled most often in retelling active stories, passive clauses were recalled most often in the retelling of passive stories and truncated clauses were used more often in the retelling of truncated stories.

This finding suggests that grammatical voice is used beyond the initial stages of encoding sentential meaning to memory, countering the claims of Jarvella 1971, Caplan 1972 and Chang 1980 that syntactic structures are only used in the encoding of information to short-term memory. It seems an unlikely memory task for subjects to decode sentences from an original story read in truncated passive clauses to an active kernel in long-term memory, then subsequently recode back to the truncated passive voice again when the subject rewrote the sentence in the recall task. Even if this were to be the actual process, it is clear that voice plays some role in long-term memory.

The place of voice in long-term memory encoding is in part suggested by psycholinguists who take the approach of the functional grammarians previously mentioned. Tomlin 1991 reports that voice is used by a speaker to direct attention to the semantic role played by arguments of verbs (agent/actor or patient/acted upon). If a speaker wishes to focus attention on an agent, it is placed deliberately into the syntactic subject position (left-of-verb in English). Tomlin's conclusion may explain why such a clear pattern of recalled voice is evident in the current experiment: subjects may interpret the voice used in the original stories as indicators of the importance of the agents. When the semantic meaning of a sentence requires that the agent be the argument of attention, it is placed in the syntactic subject position. If the agent is unimportant, as is the case in full passives and truncated passives, then some other argument is placed in the syntactic subject position. In this way, choice of grammatical voice can be seen as part of the cognitive process of encoding and retrieving information about the importance of an argument. Follow-up work based on the salience of agency in memory is planned.

Finally, a comment about the experiment design. In subsequent work which involves investigation of truncated passives, it may be important to closely inspect the subject matter of the of the truncated stories because subjects may assume a shared knowledge which influences their use or non-use of agents in story recall. In particular, as shown in Fig. 4, the T2/Cinderella story was retold with the highest number of truncated passives ($M=2.6$), accounting for 48% of all truncated clauses in the recall task. Although a t-test between these two stories indicates that the difference between the two recalled means are not significant, (M for T1=1.5), $t(17)=.48$), the high incidence of truncated recall in the Cinderella story suggests further investigation of the content might be warranted.

It is possible that the Cinderella story is so commonly understood that the writer/subjects as a group presumed a shared knowledge of the agents. The implication is that 'the bad guys/ugly stepsisters' are so universally understood to be the agents in this story that most writers did not feel the need to encode them in retelling. This would suggest that some types of truncated passives could actually be some kind of 'zero anaphora'—a covert reference to a presumed but unspecified argument. It may not have been necessary for subjects to code or recall the 'uglies' as agents because they presumed everyone knew the agents in the Cinderella story already. Future work may be planned to investigate this phenomenon, although the incidence of truncated passive use in the other (non-Cinderella) story indicates that the encoding phenomenon discussed in this experiment is still valid. A further investigation of the relationship between zero anaphora and truncated passives is also planned.

To summarize and conclude, this study supports Slobin's conclusion that active clauses are used more often than other syntactic/voice types in recall. But it further shows that this is not a deep enough investigation into how grammatical voice is used to code information. In fact, the implication of this study is that previous approaches which separate semantics and syntax are not adequate. Instead, a cognitive-functional approach indicates that further research into the specific voice types is warranted, and particularly the truncated passive.

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APPENDIX

SERIES A: STORIES WRITTEN IN FULL ACTIVE SENTENCES

The pickpocket story. Fifty-ninth street is called the New York Pickpocket Academy. A pickpocket in a burgundy jacket visits the farmer's market before noon. Melissa recognizes him. She points him out to a vendor named Jack, who follows the pickpocket from truck to truck. Another vendor catches him. The vendor knocks the pickpocket down and beats him up. The man kicks the pickpocket in the upper body and the legs. The pickpocket decides not to press charges.

Dog food testing. Linda was interested in dog food. She noticed advertisers tried to make their products sound appetizing, even though they couldn't reach the real consumer. Linda decided to write a newspaper article on the subject. She ate different kinds of dog food as research for the article. She discussed the merits of both canned and dry dog food. She sampled several common brands, and two brands her vet recommended. She liked Alpo best.

SERIES P: STORIES READ IN FULL PASSIVE.

Bob's first day at school. On the first school day Bob was introduced to his teacher by the principal. He was given a reading book by the teacher, Mrs. Prince. He was shown around the classroom by Mrs. Prince. Bob was greeted by his old friends, who were happy to see him. All the students were asked by Mrs. Prince to introduce themselves. Then a story was read by her. When he came home Bob was asked by his father to tell all about school and he said it was fun. Being read to by Mrs. Prince was nice, he said.

Real Life 'Philadelphia'. Scott Doe's story resembles something written by Hollywood screenwriters. He was hired by a Philadelphia law firm one year before he was stricken by the HIV virus. Doe was allegedly fired by the firm after his positive HIV status was discovered by them. A suit was brought by Doe under the Americans with Disabilities Act. Counter allegations of unsatisfactory performance have been made by the firm. The trial will be closely watched by employers and law firms as it is the first HIV discrimination case to go to trial under the Americans with Disabilities Act.

SERIES T: STORIES READ IN TRUNCATED PASSIVE.

Aristide's return. Jean-Bertrand Aristide was returned to Haiti last week. The ousting of Cédras was celebrated in Port-au-Prince, where the streets were filled. Televisions and radios were set up like impromptu shrines to Aristide. Cries of 'Justice!' were raised and retribution was demanded against the junta and paramilitary. Retribution was demanded, even though peace had been promised. Keeping the peace is likely to be easier for Aristide than solving the country's economic problems.

Cinderella. We have all been told the story of Cinderella. She was brought up in a small town and her life was made miserable. Cinderella was forced to clean floors all day and she was made to sit in the ashes at night. One day an invitation is sent to her ugly stepsisters inviting them to a fancy ball. Cinderella is told she can't go. Destiny is handed to her, though, and she goes anyway.