

TRAINING THE DISTINCTION OF PRAGMATIC IMPLICATIONS
FROM DIRECT ASSERTIONS IN ADOLESCENTS AND ADULTS

by

KRISTIN JO BRUNO

B. A., CALIFORNIA STATE UNIVERSITY, LONG BEACH, 1970

A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Psychology

KANSAS STATE UNIVERSITY

Manhattan, Kansas

1977

Approved by:

Robert J. Harris
Major Professor

Document
LD
2668
T4
1977
B78
C.2

TABLE OF CONTENTS

	Page
INTRODUCTION.	2
The Constructive Nature of Memory.	2
The Development of Memory for Inferences	6
The Choice of Response Categories in Recognition- of-Information Tasks	10
Applications of Implication Research	12
EXPERIMENT 1.	21
Method	21
Results and Discussion	29
EXPERIMENT 2.	36
Method	36
Results and Discussion	40
GENERAL DISCUSSION.	46
REFERENCE NOTES	52
REFERENCES.	53
FOOTNOTES	56
APPENDICES.	57

The Constructive Nature Of Memory

Syntactic and semantic distortions in memory for sentences and connected discourse have been the subject of much psycholinguistic research. Bartlett (1932) found that people remembered verbal passages in a distorted form. Using the method of repeated reproduction of a prose passage, he found that subjects' renditions of the passage were altered each time they were asked to recall the passage after various lapses of time. Often, they altered the passage to conform more closely to their own backgrounds and conceptual frameworks. On the basis of this evidence, Bartlett hypothesized that memory, rather than being reproductive in nature, is actually constructive. That is, a person does not store and retrieve input literally, but rather modifies it on the basis of changes in the environment and his/her beliefs.

Bartlett found distortions in both syntactic and semantic aspects of sentences. Recent work has confirmed his findings. Sachs (1967) has shown that the syntax of a sentence may be remembered on a recognition task if little intervening material is presented. However, the meaning of a sentence is retained long after the specific syntactic features are forgotten. Anderson and Bower (1973) suggested that semantic distortions might be due, in part, to a subject's "implicit thoughts" during presentation of material.

A related problem in Bartlett's experiment is that subjects may fail to discriminate between what they

actually read and their implicit thoughts at the time of reading. Then they might recall their implicit elaborations. For instance, a subject upon reading "Something black came from his mouth," might think "I wonder if that means he was foaming at the mouth." Later he might recall the implicit thought "he was foaming at the mouth," fail to recognize it as such, and give it in overt recall. (p. 346)

Thus, in accordance with Bartlett's construction idea, the subject, not having experienced black things issuing from people's mouths, may have inferred that the character in the story was foaming at the mouth in order for the memory of the passage to conform more closely to his/her background and stored knowledge.

Recent studies of memory for sentences and prose passages in recall and recognition tasks have dealt with the manner in which a person, whose knowledge of the world interacts with what he/she hears, makes inferences which are necessary for comprehension. Bransford, Barclay, and Franks (1972) found that subjects who heard sentences strongly implying a particular spatial relationship tended to falsely recognize sentences explicitly stating the same relationship. For example, subjects who heard (1) more often falsely recognized (2) than subjects who heard the same sentences in which "on" was replaced by "beside".

- (1) Three turtles rested on a floating log and a fish swam beneath them.
- (2) Three turtles rested on a floating log and a fish swam beneath it.

Bransford et al. (1972) explained their results from a constructive memory process approach. Thus, what a person knows about spatial relationships determines how the

semantic aspect of the sentence will be constructed in memory and what inferences will be made.

Johnson, Bransford, and Solomon (1973) extended the findings of Bransford et al. to stories with implied objects used to implement an action (3) and stories implying the consequences of an action (4).

- (3) John was trying to fix the bird house. He was pounding the nail when his father came out to watch him and to help him do the work.
- (4) When the man entered the kitchen he slipped on a wet spot and dropped the delicate glass pitcher on the floor. The pitcher was very expensive, and everyone watched the event with horror.

The experimental group might have heard (3) while the control group heard an identical story except "pounding" was replaced by "looking for". Both groups then heard the same recognition sentence (5) and were asked whether or not it had appeared verbatim in the presentation list.

- (5) John was using the hammer to fix the bird house when his father came out to watch him and to help him do the work.

Thus, for each story, the experimental group heard a story which strongly implied the information in the recognition sentence, while the control group heard a story which clearly made the recognition sentence false. In addition, each group heard several filler stories. The results showed no difference between groups in the number of correct recognitions of sentences actually presented. However, the experimental group's responses evidenced a strong tendency to falsely recognize sentences that had only been implied by the presented material. Similar results with implied

instruments were found by Paris, Sorkin, and Pisoni (Note 1). In addition, Harris (1974) found that subjects asked to judge the truth value of a sentence on a recognition-of-information task tended to judge as true both logically necessary and strongly implied sentences. For example, after hearing (6) subjects judged (7) to be true even though (7) was only strongly implied by (6).

(6) Miss America was able to play the tuba.

(7) Miss America played the tuba.

Brewer (in press) proposed a useful distinction between two types of implications (inferences)¹. The first type, the logical implication (inference), necessarily implies other information to be true. Many of the items used by Bransford et al. (1972) are of this type. For instance, (8) and (9) logically imply (10).

(8) The chair is on top of the box.

(9) The box is to the right of the tree.

(10) The chair is to the right of the tree.

However, as Brewer pointed out, in order to make the inference that the chair is to the right of the tree, one must have general knowledge about spatial relationships, thereby upholding Bartlett's original point and Bransford et al.'s conclusion that inferences may be based on nonlinguistic knowledge.

The second type of implication (inference), called pragmatic, does not logically imply nor directly assert something to be true, but, instead only strongly suggests it to be true. Implications (inferences) of this type can

be found in Johnson et al. (1973). For instance, (3) strongly implies (5). However, one could say (11), thus illustrating that (5) is not necessarily implied by (3), but is only pragmatically implied.

(11) John was pounding the nail, but not with a hammer.

Brewer and Lichtenstein (1975), in a cued-recall study for sentences containing dichotomous and continuous antonyms, found support for a pragmatic implication hypothesis. This hypothesis asserts that when information is stored in memory, it is not differentiated as to whether the representation is the literal surface structure, a logical inference, or a pragmatic inference. Consequently, when a subject recalls information, he/she may remember a pragmatic implication as directly asserted. This finding is critical to the way people evaluate information when they are later asked to remember it.

The Development Of Memory For Inferences

Inferences have also been studied developmentally. Although little work has been done on the way in which children understand logical and pragmatic implications, some related work stemming from Piaget's combinatorial binary propositions has been done. Piaget's analysis of logical reasoning in the period of formal operations consists, in part, of the ability to correctly evaluate the 16 binary propositions of p and q according to a truth table (Piaget, 1949; Inhelder & Piaget, 1958), of the sort used in symbolic logic. The use of four conceptual rules involving logical reasoning (conjunctive, disjunctive, biconditional,

and conditional, the latter two involving cause-and-effect reasoning) have been studied by Bourne and O'Banion (1971), Ward (1972), Ward and Pearson (1973), Paris (1973), and Taplin, Staudenmayer, and Taddonio (1974), among others. The general findings were that there is a developmental trend of improved performance with increasing age, with the conjunctive and disjunctive rules generally being easier than the biconditional and conditional. The greatest change in performance occurred between third and fifth grades and between seventh and ninth grades, thus supporting Piaget's theory of the development of the periods of concrete operations and formal operations which are thought to begin at those ages, respectively (Taplin et al., 1974).

In general, at least one aspect of formal operations must be attained before correct conditional and biconditional (cause-and-effect) reasoning can occur. Piaget (1926, 1928) called this reasoning causal. That is, in biconditional reasoning, the first premise logically implies the second if and only if the first is fulfilled. Sentence (12) pragmatically implies (13). However, according to conditional truth tables, the second premise may or may not hold if the first is not fulfilled. Thus (13) or (14) may be the case. Therefore, correct conditional reasoning involves recognition of the pragmatic nature of the biconditional inference which may often be drawn.

(12) If you mow the lawn, I'll give you \$5.

(13) If you don't mow the lawn, I won't give you \$5.

(14) If you don't mow the lawn, I'll give you \$5.

Rather than calling the older person a more logical thinker, Paris (1973) and Taplin et al. (1974) postulated that a person's understanding of the antecedent premises changes with age. Thus, a third grader may think just as logically within his/her conceptual framework as an adolescent, but the adolescent understands the premises differently. Paris (1973) found that young children tended to relate most premises using a conjunctive strategy which gradually changed to a cause-and-effect strategy with attention being paid to contextual cues at both levels. Paris interpreted his results as evidence that "Comprehension is an active, constructive process dependent upon syntactic, semantic, and extralinguistic factors " (p. 289). Thus, people interpret and respond to conditional statements differently at different ages with older children and adults making fewer pragmatic inferences.

A few recent studies with children have specifically addressed the question of how children make inferences. Paris and Carter (1973) studied second and fifth grade children in order to compare memory for syntactic deep structure in sentences (the interpretive approach) with interaction of input with the individual's background knowledge to produce inferences (the constructive approach). Three-sentence stories containing two premise statements and a filler statement were used. According to the Brewer (in press) distinction, the implications made by these stories were of the logical type. An example of a story is:

The bird is inside the cage. (premise)

The cage is under the table. (premise)

The bird is yellow. (filler)

They administered a recognition task consisting of four sentences per story. These consisted of a true and a false premise and a true and false inference:

The bird is inside the cage. (true premise)

The cage is over the table. (false premise)

The bird is under the table. (true inference)

The bird is on top of the table. (false inference)

The results showed a high incidence of recognition errors for the true inferences, a relatively low incidence for false premises and false inferences, and a low incidence of not recognizing true premises for both grade levels. The second-grade subjects made many more errors than the fifth graders in all categories. Paris and Carter (1973) concluded that their results confirmed similar findings with adult subjects (Bransford et al., 1972) and the idea that comprehension is an active, constructive process similar to Piaget's ideas of assimilation and accommodation.

A related series of studies (Paris, Note 3) extended the above results by taking a developmental approach to the way in which children understand and make inferences. The main point of these studies was to determine if there is a developmental trend in memory for explicit and implied prose material in children aged 6 to 11 years (kindergarten-sixth grades). Using various tasks such as comprehension questions for presented and implied material in a paragraph, free recall of a paragraph, and cued recall for inferred

instruments, they found that children at all ages studied show evidence of the ability to remember explicit information and to make and remember inferences. In addition, a definite developmental trend was found from ages 6 to 11 years with the ability to understand and make inferences increasing with age.

Finally, Harris (1975) studied the responses of children from nursery school through sixth grade on an anomaly-detection task and a recognition-of-information task using complex sentences with factive, nonfactive, and counterfactive verbs taking sentence complements. Factive verbs logically imply their complements to be true (15), while nonfactive verbs pragmatically imply their complements to be true (16).

(15) John knows that Bill is sick.

(16) John says that Bill is sick.

In accordance with previous studies, Harris found that subjects responded to the truth value of complements of nonfactive verbs as though they were complements of factive verbs, thus supporting the intuitive notion that nonfactive verbs may often pragmatically imply the truth of their complements.

The Choice Of Response Categories In Recognition-of-Information Tasks

Acknowledging that answers to questions about inferential material are actually logically indeterminate from the presented sentences, Harris (1975) used a response task (recognition-of-information) in which subjects could respond "yes", "no",

or "can't tell", rather than the typical "yes" or "no" response choice used by most experimenters. For example, Kintsch (1974) asked subjects to respond true or false to test sentences based on short and long paragraphs. Adult subjects read paragraphs which either explicitly or implicitly presented the material in the test sentence. Kintsch predicted that subjects would process and store explicit and implicit information in the same way, and thus there would be no difference in response times or in the likelihood of a correct response, no matter which version of the paragraph the subject read. The results showed that, although response time was greater with the implicit versions, the difference disappeared with a 48-hour delay between presentation and response. However, the error rate was higher for the implicit versions with or without the delay.

Kintsch concluded that subjects do infer information from material upon reading since the error rate did not increase with the time delay. This conclusion was further supported by the change in reaction time with the delay. That is, with the time delay, the surface representation of the text was removed and only the propositional representation (including inferences made during reading) was available, making reaction times the same. Thus, he used a multi-level memory processing explanation to explain failure to obtain predicted results. Another interpretation of this phenomenon found in the logical-pragmatic implication distinction was proposed by Monaco (Note 3). Although

Kintsch instructed subjects to respond true to questions about both directly asserted and implied material, the implications in the paragraphs were of both the logical and pragmatic types. Thus, some (logical) material must necessarily be inferred while other (pragmatic) material may or may not be inferred. Kintsch's subjects sometimes responded to the pragmatic material as true and other times as false, making it difficult to determine the number of inferences made. Therefore, in order to determine whether or not subjects can distinguish pragmatic implications from logical implications or direct assertions, a response choice of indeterminate is a necessary addition to the true-false choice. That is, pragmatic implications are logically indeterminate. By comparing the number of true responses to pragmatic implications with true responses to direct assertions, an index of pragmatic inferences made may be obtained. This is not possible with the true-false response choice.

Applications Of Implication Research

Based on the studies mentioned in addition to others (see Harris and Monaco, in press, for a complete review of the implication literature), it is evident that interpreting implied information as directly asserted is a pervasive phenomenon that extends across age levels. It is obvious that inferencing aids comprehension through integration of new information with stored knowledge. Research on this phenomenon can be readily applied in several settings.

Educators teach inferencing to children as a reading skill to help them integrate discourse. This aids people in understanding written and oral communication throughout life. Two specific examples of the usefulness of research are to consumers and to those participating in the legal process (juror, witness, lawyer, etc.). The ability to understand and make inferences is an important skill when functioning in these roles. Thus, research on the inferencing process can be put to use to improve this skill. However, familiarity with the evidence about this phenomenon can also be used in the real world by those who wish to turn it to their advantage.

Loftus and Zanni (1975) have shown that very subtle implications can be highly influential in the way witnesses remember events. Subjects asked (17) more often answered "Yes" than subjects asked (18) after seeing a film of an automobile accident in which there were no broken headlights.

(17) Did you see the broken headlight?

(18) Did you see a broken headlight?

Loftus and Palmer (1974) found that subjects who were asked to estimate the speed at which cars in a filmed automobile accident were travelling tended to respond with greater speeds when asked how fast the cars were travelling when they "smashed" into each other than when asked the rate of speed when the cars "hit" each other. Thus, questions phrased to pragmatically imply certain conclusions may bias a witness to make a pragmatic inference.

Harris, Teske, and Ginns (1975) played a taped witness's

testimony from a mock trial for subjects pretending to be jurors and then asked them to evaluate statements about the testimony on a recognition-of-information task. This is the response task developed by Harris (1974). Two versions of the testimony were taped. Certain information in one version was pragmatically implied and certain information was directly asserted. The second version asserted the information implied by the first and implied the information asserted by the first. In addition, one group of subjects was given specific instructions on the dangers of taking as fact evidence that was only implied and not directly asserted. The results showed that not only did subjects frequently recognize as true statements which were only implied, but also that the instructions to disregard implications had little, if any, effect. The only time the instructions seemed to have any effect was when the recognition-of-information task immediately followed presentation. The greater the time lapse, the less the effect of the instructions. Harris et al. (1975) concluded that these results presented discouraging evidence for the way in which actual jurors evaluate testimony given by witnesses who imply things that are not necessarily factual and for the way in which implications may be implanted in the minds of jurors by lawyers to further their own cases.

Another area in which implications may be used to deceive is commercial advertising. Although directly asserted false claims are illegal, whether or not implied false claims are illegal is open to question. There are no specific

laws dealing with implications in ads. Consequently, each individual case is reviewed and judged idiosyncratically making it possible for advertisers to introduce subtle implications into the ads. This is unfortunate since research has shown that consumers often make inferences suggested in ads.

Preston (1967) found that subjects who were asked to judge a statement as accurate or inaccurate based on an ad they had read, erroneously judged implied claims as accurate 65.3% of the time. Based on studies such as this, Gardner (1975), in a conceptual paper on deception in advertising, proposed that some ads may interact with the consumer's world knowledge in such a way that the advertiser can lead the consumer to draw a false conclusion without making an explicit false claim. Russo (1976), in extending the work of Jacoby and Small (1975), noted that there are two approaches to dealing with deceptive advertising. One is advertiser oriented in that the ad is judged on the basis of the advertiser's intent to deceive. This approach (taken by the FDA) does not catch the type of advertising that interacts with the consumer's world knowledge. However, the second, consumer oriented approach taken by the FTC does. This approach evaluates the impression the consumer has as a result of the ad. Both Gardner and Russo suggested that the best test of deceptiveness of an ad would be to ask consumers to judge the truth value of claims based on ads and empirically determine if the ad interacted with their world knowledge to produce false beliefs about the product.

In addition to such assessments of ads, it is important also to educate consumers about implications so they can guard against accepting as asserted fact an implied claim. A more recent study by Harris (in press) attempted to do this. He found that subjects tended to remember implications as though they were asserted facts. For example, subjects hearing claim (19) generally remember it as claim (20).

(19) Crust toothpaste fights cavities.

(20) Crust toothpaste prevents cavities.

Harris found that subjects responding on a recognition-of-information task to taped ads remembered implied claims as direct assertions in the delayed condition, thus supporting previous findings. However, in the immediate condition, subjects were better able to discriminate pragmatic implications from direct assertions. In this study, half the subjects in each condition (immediate and delayed) received instructions to avoid interpreting implied information as directly asserted fact. The instructions were able to produce an effect in the immediate condition as evidenced by fewer trues to pragmatic implications than to direct assertions. The instructions here were much more obtrusive than those used by Harris, et al. (1975), indicating that discrimination of pragmatic implications from direct assertions is possible, but that considerable training of subjects is necessary. This conclusion follows from the fact that these more obtrusive instructions were not able to affect the delayed condition.

The present study is the next logical step in attempting

to teach subjects to discriminate direct assertions from pragmatic implications. As was shown by Harris et al. (1975) and Harris (in press) simple instructions must be highly obtrusive in order to produce an effect. Possibly a training session or series of training sessions involving subject-generated answers, discussion, and interpersonal interaction is necessary to adequately teach the discrimination in such a way as to have some effect in long-term memory as well as in an immediate judgment task. The present study attempted to develop such a training procedure.

In order to find adequate training materials, an examination of reading textbooks used by various states in the public schools was made. As was previously mentioned, it was found that one reading skill often emphasized is that of inference making. That is, through examples in stories and accompanying worksheets, students are taught to make inferences in order to improve communication skills. Unfortunately, these exercises tend to instruct students only on how to make inferences and not on how to discriminate implications from direct assertions. Thus, a student may learn how to make inferences very well (and previous studies show that making inferences is a pervasive phenomenon), but he/she may not learn to discriminate pragmatic implications from direct assertions even when it is to his/her advantage to do so. One obvious instance of this is consumer evaluation of commercial advertisements. Possibly it is necessary to be taught not only to make inferences as a child,

but also to make the discrimination between pragmatic implications and direct assertions. If this is the case, it may be beneficial to implement such training in the schools in order to enable people to critically evaluate information.

Thus, the training procedure developed in the present study not only extended the instructions used in previous studies to a complete lesson, but it also incorporated actual classroom materials and was used with both adults and children. The procedure was used to train adults in Experiment 1. Based on those results, the training procedure was modified and used to train both adults and seventh and ninth grade students in Experiment 2. Seventh and ninth grade students were chosen for several reasons. First, Taplin et al. (1974) showed that a developmental change in reasoning skills is observed between ages 12 and 14, roughly coinciding with Piaget's onset of formal operations. In a review of language acquisition after age 4, Palermo and Molfese (1972) concluded that there may be important changes in language development between the ages of 12 and 14. Based on these and other developmental studies, it was expected that a developmental change between seventh and ninth grade (12 and 14 years) would be found. Specifically, it was expected that seventh graders would respond "true" to pragmatic implications more often than ninth graders and adults who would show no difference. This was expected since ninth graders and adults should be formal operational, whereas many seventh

graders should be concrete operational. In addition, seventh and ninth grade textbooks contain exercises in making inferences. Finally, the same materials can be used with seventh graders, ninth graders, and adults, thus providing a direct comparison among age groups.

In summary, the present study was designed to determine whether or not the discrimination of pragmatic implications from direct assertions could be taught to children and adults using actual adapted classroom materials in an interactive training session. It was hypothesized that subjects receiving a training session between a pretest and posttest would remember fewer pragmatic implications as direct assertions on the posttest than a control group receiving no training. A possible criticism of this method of assessing effectiveness of training is that subjects may just attend to posttest items more closely or scrutinize the task items more carefully in the training group. In other words, since training group subjects know that they are expected to avoid making pragmatic inferences, they may spend more time scrutinizing posttest items, pay closer attention to them, etc. Thus, this alternative hypothesis is that subjects will avoid making inferences during retrieval. This retrieval hypothesis must be ruled out, however, due to Monaco's (Note 3) findings. He has shown by manipulating the location of a critical sentence in a prose passage and after intervening material that inferences are made during storage rather than during retrieval. Thus, differences

between the training and control subjects must be due to the improved ability of the training subjects to discriminate pragmatic implications from direct assertions during storage rather than to the other factors mentioned such as increased attention on the posttest, closer scrutiny of task items, etc. during retrieval. Finally, the developmental aspect was added in Experiment 2, not only to test the applicability of the training to general education, but also to develop a technique to apply the inference research to consumer education. Consequently, the testing materials written consisted of two short stories and two series of ads. The stories were similar to stories found in reading textbooks (thus applying the training to reading skills education) and the ads were used to apply inference research to consumerism.

EXPERIMENT 1

The purpose of the first experiment was to develop a training procedure to teach the discrimination of direct assertions from pragmatic implications. A pretest was administered at the start of the session to give the subjects experience with the task and materials and to provide examples for use during the training itself. After the administration of the training procedure to the training group, both groups were given a posttest. The training subjects were expected to respond "true" to implied critical items less often than the control subjects, while the two groups were expected to respond "true" to direct assertions with equal frequency, with the training not affecting them. Thus, the critical predicted interaction was the training by item type interaction.

Method

Subjects

The subjects were 32 undergraduates from Kansas State University who participated to fulfill a course requirement in General Psychology. The subjects were run in pairs.

Materials

Four prose passages were written. Two of the passages consisted of a series of advertisements. The remaining two passages were short stories. The content and vocabulary of the passages were geared to the interests and abilities of junior high school students. Two versions of each passage were then written. One version of each passage explicitly

stated (directly asserted) certain information and implicitly stated (pragmatically implied) other information. The other version of each passage pragmatically implied the information that had been directly asserted in the first version and directly asserted the information pragmatically implied in the first version. Thus, each version of each passage directly asserted half the critical information and pragmatically implied half the critical information.

Each recognition-of-information test consisted of one set of forty items per passage to be answered "true", "false", or "can't tell". Ten of the test items were clearly false, four were clearly true, and ten consisted of information not mentioned in the passage and should have been answered "can't tell". The remaining 16 items were the critical ones. For each version of each passage, eight items consisted of information directly asserted in the passage, and eight items consisted of information pragmatically implied in the passage. The four passages and the forty test items for each passage appear in Appendix 1. The items were ordered chronologically from the passage. All subjects received the same tests.

Design

The design was a 2^4 completely crossed factorial with two factors (order and training) between subjects and two factors (story type and item type) within subjects. There were two groups: the experimental (training) group and the control group. The procedure for each group consisted of three parts: the pretest, the training session or control

(no training) session, and the posttest. All three parts were administered in one one-hour session with the pretests and posttests taking 20 minutes each and the training taking 15 minutes.

There were 8 counterbalancing conditions in the training group and 8 in the control group for a total of 16 counterbalancing conditions (see Table 1). For both the experimental and control groups, subjects in four of the counterbalancing conditions heard version one of each passage, and subjects in the other four conditions heard version two. Within each of these sets of four conditions, order of passage type was counterbalanced in the pretest and posttest. Thus, subjects in each group heard either the story followed by the ad or the ad followed by the story in both the pretest and posttest. Finally, each of the four passages (S1, S2, A1, A2) appeared an equal number of times in the pretest and posttest. Thus, subjects in two conditions in each set of four heard S1 and A1 in the pretest and S2 and A2 in the posttest while subjects in the other two conditions heard S2 and A2 in the pretest and S1 and A1 in the posttest.

Procedure

Pretest. Initially, the subjects were told that they would hear some short stories and some advertisements for stores like those they might hear on the radio or television, and that they would be asked to answer some questions about them later. Before hearing each passage, the subjects were told whether it would be a story or ad and were reminded to listen carefully since they would be asked questions later. If the

Table 1

Presentation Order of Passages for the Counterbalancing Conditions

<u>Counterbalancing Condition</u>	<u>Pretest</u>	<u>Posttest</u>
1	S1,V1 A1,V1	S2,V1 A2,V1
2	A1,V1 S1,V1	A2,V1 S2,V1
3	S2,V1 A2,V1	S1,V1 A1,V1
4	A2,V1 S2,V1	A1,V1 S1,V1
5	S1,V2 A1,V2	S2,V2 A2,V2
6	A1,V2 S1,V2	A2,V2 S2,V2
7	S2,V2 A2,V2	S1,V2 A1,V2
8	A2,V2 S2,V2	A1,V2 S1,V2
<u>Note.</u>	S1 = story 1 S2 = story 2	A1 = ad 1 A2 = ad 2
		V1 = version 1 V2 = version 2

passage were an ad, they were initially given an ordered list of the product names to help minimize confusion of products while listening to the tape. Subjects then listened to the tape recorded passage. After hearing each passage, the subjects were instructed on how to use the answer sheets. The meaning of the response categories was explained with particular emphasis given to "can't tell" to insure that subjects understood how to use it. It was emphasized that subjects should answer with respect to the passage and that they should assume the ads were telling the truth. This is important in advertising since people tend to regard ads skeptically in general. The instructions appear in Appendix 2.

Finally, subjects answered the recognition-of-information test, working at their own rates. The instructions between the passage and the test served as an intervening task. The first test was immediately followed by the second passage of the pretest. The procedure for the second passage and test was identical to the first except that the intervening instructions were slightly shortened by removing the examples. These shortened instructions consisted of a reminder of how to use the response categories.

Training. During this portion of the session, the experimental group was given instruction in discriminating direct assertions from pragmatic implications.

The training began with a general group discussion about the meaning of assertions and inferences. Subjects were encouraged to participate by stating their own definitions and examples whenever possible. Participation by all subjects

was possible since there were only two in each group. Some of the points stressed in the discussion were: 1) that an inference is a conclusion drawn from information that is not directly stated, but is only suggested or hinted at and that this conclusion is the most probable one based on the given information; and 2) that a direct assertion is directly stated information. In addition, it was stressed that inferences are necessary to normal communication, but it is important to distinguish direct assertions from pragmatic implications or a person may act on a false inference as though it were a stated assertion. One example given was:

Suppose you had a teacher who told you all during the first half of the semester that he didn't believe in grades and thought students should work at their own paces. What might you infer or conclude about how he would evaluate you (for example, what kind of tests might he give)?

Here subjects generally answered that the tests would be easy or there would not be any at all.

What type of studying do you think you'd do based on your inference or conclusion?

Subjects generally answered that they would not study very much.

Now suppose that it's the middle of the semester and he says, "I don't believe in grades, but the school says I have to give them, so here's a hard test." How do you think you'd do?

Subjects generally answered that they would do poorly.

So based on the teacher's hints about his grading policy you made an inference that was false, and, by acting on it, you got yourself into trouble. Remember, he never directly stated that he wouldn't grade you. He only said he didn't believe in grades. If he had directly said that he wouldn't grade you, and you had assumed that he was telling the truth, you would

know for sure that he wouldn't give grades and you wouldn't have had to make an inference.

After several examples similar to the one above, subjects worked on a worksheet taken from the seventh grade reading workbook, Open Highways Skillbook Book 7 (Robinson, Monroe, Artley, Huck, Jenkins, and Aaron, 1967), which accompanies the seventh grade reading textbook Open Highways Book 7 (Robinson et al., 1967). The worksheet is presented in Appendix 3. When subjects had completed it (working at their own rates), they were asked to volunteer answers which were discussed. The experimenter followed the guidelines given by the teacher's edition of the workbook. That is, subjects were told the "correct" answer which was the most probable inference. For instance, the most probable answer for (21) is (b).

(21) Standing behind the curtain, she could smell the make-up and feel the hot lights.

Where is she?

- a) at a beauty shop
- b) in a theater
- c) at a dance

This inference was presented as the correct inference, although it was emphasized that the information was implied, not directly asserted. For example, although (b) was presented as the correct inference, it was suggested that (a) and (c) were also possible although not as probable. Thus, it was brought out in the discussion that the initial statement did not explicitly state where she is, but rather suggested that the theater was the most probable place.

Next, the subjects were asked to look at their recognition-

of-information tests from the pretest. For each passage, four pragmatic implications were discussed. The section of the passage containing the information in the item was read to the subjects and the reason for its being a pragmatic implication (and thus answered "can't tell") was explained. Subjects who had answered correctly were encouraged to describe how they had made the discrimination. Finally, an example of a direct assertion was given from one of the passages.

When it seemed that all subjects understood the discrimination, they were told that the posttest would follow. They were instructed to listen carefully to the passages and to try to make the discrimination.

The control group received no such training. During this period they worked on a word search puzzle (see Appendix 4). The puzzle was chosen since it was a verbal task (as was the training group's session), but it was unrelated to inferences. Since the training group's session included much discussion and interaction with the experimenter and the other subjects, the control group's session also included this type of interaction. To achieve this, subjects were encouraged to work on the puzzle together, and the experimenter interacted conversationally with them. Subjects were given 15 minutes to work on the puzzle (the same amount of time as the training session) and were told they need not complete it.

Posttest. The posttest was conducted exactly like the pretest except that the shortened instructions were given

for both tests. Subjects listened to a passage (according to their counterbalancing group), were given instructions in filling out the answer sheets, and completed the test. They then followed the same procedure for the second passage of the posttest.

Results and Discussion

Since "true" responses to direct assertions indicate that the subjects correctly remembered the direct assertions as directly asserted fact, and "true" responses to pragmatic implications indicate an inference was made, the number of "true" responses to pragmatic implications and direct assertions was used as the dependent measure. The pretest and posttest data were analyzed in two separate analyses of variance. The purpose of the pretest was to give subjects experience with the task and materials. In addition, examples from the pretest were used during the training session to teach the discrimination to the training subjects. Since the training was administered after the pretest, the posttest data were the data of primary interest. However, since the pretest data were available, they were also analyzed to demonstrate the equivalency of the groups prior to the treatment. The source tables of the analyses are presented in Appendices 5 and 6, and the complete tables of means are presented in Appendices 7 and 8.

Pretest Results

The main effects of story type and item type reached significance, as did the story type by item type interaction, $F(1, 28) = 20.27, p < .001$. The means in Table 2 indicate that

subjects responded "true" to direct assertions with equal frequency in both story types, but they responded "true" to pragmatic implications more frequently in the ads than in the stories. That is, subjects correctly remembered directly asserted fact equally well in both story types, but made more inferences in the ads than in the stories.

This result is not surprising since the number of "true" responses to pragmatic implications will nearly always be slightly lower than the number of "true" responses to direct assertions. This is the case since responding "true" to direct assertions only requires that the subject remember something explicitly stated in the text while a "true" response to a pragmatic implication requires the subject to make an inference. Thus, "true" responses to pragmatic implications are more variable (and thus less frequent) than "true" responses to direct assertions. The fact that more inferences were made in the ads than in the stories is also understandable. Since the ads consisted of a series of short ads with different product names instead of a cohesive whole as the stories did, it is reasonable that more inferences were made in the ads. This finding is supported by Preston and Scharbach (1971) who presented 12 messages, three ads, three personal letters, three business memos, and three news stories, to subjects and asked them to judge whether five statements about each message were accurate or inaccurate. Of the five statements, two were direct assertions, one was a false control, one was an independent (indeterminate) control, and one was a "logically

invalid derivation" (inference). Preston and Scharbach found that subjects made significantly more inferences to the ads than to any other type of message. Based on interviews of subjects, they concluded that people use a special conceptual framework to understand ads. Subjects tend to be more "tolerant" of what the advertiser "meant to say". That is, subjects tend to listen for implied information as well as directly asserted information more in the ads than in other communication forms since they know that ads are a form of persuasion. Thus, implied information is perceived as information the advertiser actually meant to directly assert.

The order by story type by item type interaction also reached significance, $F(1, 28) = 5.07, p < .05$. The means in Table 3 indicate that when the ad comes first, the difference in the number of inferences made between ads and stories is greater than when the story comes first. It is possible that practice accounts for this order effect. When the ad was first, the more difficult story type (ad) did not benefit from practice, while the easier story type (story) did, thus emphasizing the difference between the two. On the other hand, when the story was first, the easier story did not benefit from practice while the more difficult ad did, thus reducing the difference between them.

Finally, the critical factor, training, was not significant, nor were any interactions involving it. This provides evidence of the effectiveness of the random assignment since the groups did not differ initially.

Table 2

Mean Number of True Responses (out of 8) for the Pretest Story
Type by Item Type Interaction

Story Type	Item type	
	Direct Assertions	Pragmatic Implications
Ads	6.78	6.19
Stories	6.72	4.50

Table 3

Mean Number of True Responses (out of 8) for the Pretest Order
by Story Type by Item Type Interaction

Story Type	Item Type	
	Direct Assertions	Pragmatic Implications
Ad before Story		
Ads	6.69	6.13
Stories	7.00	4.00
Story before Ad		
Ads	6.88	6.25
Stories	6.44	5.00

Posttest Results

As in the pretest, the main effects of story type and item type as well as the story type by item type interaction, $F(1, 28) = 31.86$, $p < .001$ were significant. An inspection of the means in Table 4 indicates that the discrimination of direct assertions from pragmatic implications was better in the stories than in the ads although the training factor is collapsed in this interaction.

However, unlike the pretest, the main effect of training was highly significant, $F(1, 28) = 16.63$, $p < .001$. The means in Table 5 show that the training group responded "true" less often than the control group as was predicted. Unfortunately, the predicted training by item type interaction did not reach significance. The means in Table 6 suggest that although the subjects in the training group made fewer inferences to pragmatic implications than the control subjects, the training subjects also responded "true" less frequently to direct assertions than did the control subjects. This indicates that the training was effective in teaching subjects to critically evaluate information as evidenced by the significant main effect of training. But the means of the critical interaction suggest that this critical "set" made the training subjects more skeptical about answering "true" to all items in general. Thus, the number of "true" responses to direct assertions was also lowered, although to a lesser degree.

A critical examination of the training procedure provided a possible explanation for this generalized effect across

Table 4

Mean Number of True Responses (out of 8) for the Posttest Story
Type by Item Type Interaction

Story Type	Item Type	
	Direct Assertions	Pragmatic Implications
Ads	5.81	5.34
Stories	6.47	3.44

Table 5

Mean Number of True Responses (out of 8) for the Posttest
Main Effect of Training

Training Group	Control Group
4.45	6.08

Table 6

Mean Number of True Responses (out of 8) for the Posttest
Training by Item Type Interaction

Training	Item Type	
	Direct Assertions	Pragmatic Implications
Training	5.50	3.40
Control	6.78	5.38

pragmatic implications and direct assertions. The worksheet used in the training session teaches the student how to make inferences, but not how to discriminate pragmatic implications from direct assertions. In the training session, the worksheet was used intact, although the discussion did not follow the one suggested by the teacher's guide exactly. Specifically, the modification involved discussing the probabilistic nature of the truth value of the alternatives. The most probable inference was pointed out as the correct one, but it was also pointed out to subjects that the other two alternatives were also possible although not as plausible. In other words, throughout the training, the focus was on the implication items. The instructions, training, and examples from the pretest all emphasized the dangers of answering "true" to pragmatically implied items. Direct assertions were simply mentioned as being true absolutely with no probability factor involved. This suggests that possibly the subjects' attention was riveted on the implication items to the extent that they became generally skeptical to all items. Thus, possibly a more balanced training procedure was needed in which direct assertions would be given equal emphasis with pragmatic implications during the discussion. Thus, Experiment 2 involved modifying the training procedure in this way, and in addition to testing adults, also tested seventh and ninth grade students.

EXPERIMENT 2

The first purpose of the second experiment was to modify the training procedure to more clearly emphasize the discrimination of pragmatic implications from direct assertions. Instead of focussing the subjects' attention almost exclusively on responding "can't tell" to pragmatic implications, the second procedure equally emphasized responding "true" to direct assertions. This was accomplished by modifying the worksheet and the verbal examples used in the training session.

The second purpose of Experiment 2 was to add the developmental dimension. This was done to determine the feasibility of training the discrimination for public school education in general and consumer education in particular. To accomplish this, seventh and ninth grade students were tested in addition to the adults. Based on Piaget's theory in which a transition from concrete to formal operations is thought to occur between the ages of 12 and 14, it was predicted that ninth graders and adults in the training group would respond "true" to pragmatic implications less frequently on the posttest than the seventh graders. Thus, the critical predicted interaction was the age by training by item type interaction.

MethodSubjects

The subjects were 32 undergraduates from Kansas State

University and 32 seventh graders and 32 ninth graders from Manhattan Junior High School who were run in groups of four. The seventh and ninth graders were selected at random from physical education classes to insure a cross section of ability and socioeconomic background.

Materials

The materials were identical to those in Experiment 1.

Design and Procedure

The design was a 3×2^3 completely crossed factorial with two factors (age and training) between subjects and two factors (story type and item type) within subjects.

The procedure was identical to Experiment 1, except that since neither the order variable, nor any interaction involving it on the posttest in Experiment 1 was significant, counterbalancing of type of passage within pretest and posttest and the use of order as a variable was dropped. This left four counterbalancing conditions in the experimental group and four in the control group, or a total of eight counterbalancing conditions. The presentation order for the four groups is presented in Table 7.

The only other change was in the training procedure for the experimental group. Since the results of Experiment 1 showed that the training reduced the number of "true" responses to pragmatic implications, but also reduced the number of "true" responses to direct assertions, the training was modified to equally emphasize direct assertions and pragmatic implications and the differences between them. The training session up to the worksheet was identical to the session in

Table 7.

Presentation Order of Passages for the Counterbalancing Conditions

<u>Counterbalancing Condition</u>	<u>Pretest</u>	<u>Posttest</u>
1	S1,V1 A1,V1	S2,V1 A2,V1
2	S2,V1 A2,V1	S1,V1 A1,V1
3	S1,V2 A1,V2	S2,V2 A2,V2
4	S2,V2 A2,V2	S1,V2 A1,V2

Note. S1 = story 1 A1 = ad 1 V1 = version 1
 S2 = story 2 A2 = ad 2 V2 = version 2

Experiment 1. However, the worksheet itself was modified so that half the items were direct assertions and half pragmatic implications, instead of all pragmatic implications as in Experiment 1 (see Appendix 9).

When subjects had completed the worksheet (working at their own rates), they volunteered answers which were discussed. The main emphasis in the discussion was to be sure subjects understood when the item was a direct assertion and when it was a pragmatic implication. For example, (22) is a direct assertion,

(22) He drove into the service station and said to the man,
"Fill it up, please."

Where is he?

- a) at an airport
- b) at a gas station
- c) at a department store

since it directly states that he is in a service station. However, (21) is still a pragmatic implication since it only implies that she is in a theater. Although that is the most probable answer, it is possible that she is at a beauty shop or a dance.

Finally, the discussion of the pretest recognition-of-information tests was identical to Experiment 1 except that two direct assertions and two pragmatic implications were discussed for each passage instead of four pragmatic implications and one direct assertion. In general, direct assertions and pragmatic implications and their differences were equally discussed and emphasized throughout the training

in Experiment 2, instead of placing the emphasis solely on the pragmatic implications as in Experiment 1.

The control session (word search task) for the control group was identical to the one in Experiment 1.

Results and Discussion

As in Experiment 1, separate analyses of variance were conducted on the pretest and posttest data. The complete listings of sources of variance are presented in Appendices 10 and 11, and the complete tables of means are presented in Appendices 12 and 13. The dependent measure was again the number of "true" responses to direct assertions and pragmatic implications.

Pretest

The main effects of story type and item type, as well as the story type by item type interaction, $F(1, 90) = 26.94$, $p < .001$, were significant. An inspection of the means in Table 8 indicates a pattern of results similar to Experiment 1. Subjects responded "true" to direct assertions with equal frequency in the ads and stories, but they responded "true" to pragmatic implications more frequently in the ads than in the stories. This again indicates that the ads were more difficult than the stories since more inferences were made in them.

There were no differences in the critical factors of age and training, indicating that the age groups did not differ on the pretest, nor did the experimental and control groups initially differ, thus confirming random assignment.

Posttest

Training results. As in the pretest, the main effects of story type and item type and the story type by item type interaction, $F(1, 90) = 12.95$, $p < .001$, reached significance. The means in Table 9 again confirm the finding that the ads are more difficult, as evidenced by the fact that subjects made more inferences in the ads than in the stories. Unlike the pretest analysis, however, the posttest analysis indicates a highly reliable training effect, $F(1, 90) = 36.19$, $p < .001$. In addition, the training by story type interaction was significant, $F(1, 90) = 6.31$, $p < .05$. The means in Table 10 indicate that the training had the desired effect of reducing the number of "true" responses made by experimental subjects relative to control subjects. The training session effected this reduction to the same level in both stories and ads as indicated by the nearly identical means. The means for the control group again indicate that more "true" responses were made in the ads than in the stories when no training was given.

Developmental results. The only significant source of variance involving age was the age by item type interaction, $F(2, 90) = 5.83$, $p < .05$. The means in Table 11 suggest a developmental trend in which the discrimination of direct assertions from pragmatic implications improves with age. To determine whether or not the change occurs between the ages of 12 and 14, a test of simple main effects was conducted initially for age. The simple main effect of age for direct assertions was nonsignificant, $F(2, 93) < 1$, while the

Table 8

Mean Number of True Responses (out of 8) for the Pretest
Story Type by Item Type Interaction

Story Type	Item Type	
	Direct Assertions	Pragmatic Implications
Ads	6.73	6.41
Stories	6.55	5.07

Table 9

Mean Number of True Responses (out of 8) for the Posttest
Story Type by Item Type Interaction

Story Type	Item Type	
	Direct Assertions	Pragmatic Implications
Ads	6.06	5.38
Stories	6.25	4.45

Table 10

Mean Number of True Responses (out of 8) for the Posttest
Training by Story Type Interaction

Training	Story Type	
	Ads	Stories
Training	4.98	4.97
Control	6.50	5.73

simple main effect of age for pragmatic implications reached significance, $F(2, 93) = 4.90, p < .05$. Based on this result, pairwise comparisons of the three age means were conducted for pragmatic implications using the Scheffé test. Specifically, the three comparisons were seventh graders and ninth graders, ninth graders and adults, and seventh graders and adults. The results showed that the adults differed from the seventh graders, while the seventh and ninth graders and the ninth graders and adults did not differ, $CR_S(2, 93) = 60.24, p < .05$. This result confirms that there is a developmental trend of improved ability to make the discrimination with age. Thus, the difference in number of "true" responses to direct assertions and pragmatic implications increases with increasing age. This result does not support the prediction that a developmental change occurs between the ages of 12 and 14, as evidenced by the failure to find a difference between seventh and ninth graders. Instead, it indicates a general improvement in the ability to make the discrimination with age, even beyond ninth grade.

Discussion. These results again show that the training procedure was able to reduce the number of "true" responses made by experimental subjects relative to control subjects. In addition, the training by story type interaction indicated that the training was able to reduce the number of "true" responses to the same level in both story types. However, the critical predicted interaction of age by training by item type failed to reach significance. The means in Table 12 indicate that although there was a decrement in

Table 11

Mean Number of True Responses (out of 8) for the Posttest
Age by Item Type Interaction

Age (Grade)	Item Type	
	Direct Assertions	Pragmatic Implications
7	6.23	5.47
9	5.91	4.83
Adult	6.33	4.44

Table 12

Mean Number of True Responses (out of 8) for the Posttest
Age by Training by Item Type Interaction

Age (Grade)	Item Type	
	Direct Assertions	Pragmatic Implications
Training		
7	5.50	4.88
9	5.44	4.47
Adult	5.88	3.56
Control		
7	6.97	6.06
9	6.38	5.19
Adult	6.78	5.31

the number of "true" responses to pragmatic implications for the experimental group relative to the control group, there was also a decrement in the number of "true" responses to direct assertions, although the decrement was not as great. Thus, the modified training procedure was still unable to differentially affect direct assertions and pragmatic implications.

Finally, although the hypothesis that a developmental change between the ages of 12 and 14 was not supported, a general developmental trend was found. That is, the hypothesis that the seventh graders would not make the discrimination as well as the ninth graders and adults, who would not differ, was not supported. Instead, a general trend toward an improved ability to make the discrimination with increasing age was found since the seventh graders and the adults did differ. This suggests that this linguistic ability is not complete by ninth grade.

General Discussion

The first experiment was an attempt to begin to find a training procedure to teach the discrimination between direct assertions and pragmatic implications. A good beginning point seemed to be the inference-making worksheets provided by seventh level textbooks. In this procedure the subjects' attention was focussed on avoiding comprehending pragmatic implications as direct assertions. Consequently, subjects seemed to develop a skeptical set to all items in general with the frequency of "true" responses to both pragmatic implications and direct assertions dropping relative to the control.

The second experiment attempted to modify this beginning by equally stressing direct assertions and pragmatic implications and focussing subjects' attention on discriminating between the two. This was accomplished by modifying the worksheet to include half implications and half direct assertions. In addition, the instructions, general discussion, and examples were modified to stress direct assertions and pragmatic implications equally. A developmental aspect was also added by training seventh and ninth graders in addition to adults. Although the training procedure was still not able to differentially affect pragmatic implications and direct assertions, the result of these modifications was that the frequency of "true" responses to pragmatic implications made by the experimental subjects decreased more than the frequency of "true" responses to direct assertions relative to control subjects, indicating a trend toward the differential effect.

These experiments, while not producing the desired discrimination since there were fewer true responses to both direct assertions and pragmatic implications, do present positive evidence that the avoidance of remembering pragmatic implications as direct assertions can be taught. This is an advance over previous studies attempting to instruct subjects on this discrimination, in that an effect of instructions was obtained in a long term memory task. Harris et al. (1975) were unable to produce any effect, and Harris (in press) was able to affect the immediate condition only. This study indicates that more powerful training is effective in reducing the number of "true" responses to pragmatic implications. Next, a training procedure that differentially affects pragmatic implications and direct assertions is needed.

One of the major changes in this training procedure from other less effective instructions was to involve the subjects in the learning process. That is, instead of merely delivering a lecture on direct assertions and pragmatic implications, the experimenter involved the subjects in a discussion and in exercises designed to facilitate active participation in learning. For example, after completing the worksheet, subjects were asked to volunteer answers and then participate in a discussion of why all alternatives to an implication item might also be correct and thus illustrate the probabilistic nature of the item. Possibly a further modification would improve performance to affect pragmatic implications and not direct assertions.

One possible change is suggested in Fischhoff and Slovic's (Note 4) study on training subjects to avoid the

hindsight bias when evaluating scientific research. Hindsight bias is the tendency of people to overestimate the prior predictability of an outcome when they know what the outcome was. By asking two groups of subjects (foresight group and hindsight group) to estimate probability of replication of an experiment, Fischhoff and Slovic concluded that the "availability of reasons" hypothesis best accounted for the hindsight bias. That is, when hindsight subjects were asked to think of reasons for a particular outcome, those who could think of no reason for the unreported outcome systematically overestimated the probability of replication of the reported outcome and subjects who could think of no reason for the reported outcome systematically underestimated the probability of replication. However, forcing subjects to consider the alternatives (by asking them to write reasons for both outcomes) had the effect of partially debiasing the hindsight subjects.

This work has an obvious bearing on the present training procedure. Possibly instead of merely asking subjects to participate in a discussion of the alternatives of an implication item, they should be asked to write alternatives or reasons for alternatives. That is, possibly thinking of one's own reasons and writing them down is a more active process than participating in a discussion in which participation is more limited. Thus, perhaps each subject's participation in actively thinking of alternatives, followed by a general discussion to expose them to other's ideas, would have a greater effect on the ability to discriminate

pragmatic implications from direct assertions.

Another modification that is promising is an attempt to extend the training to a series of sessions. Most skills in school are learned over a period of years with repeated exposure to the skills. The discrimination of direct assertions from pragmatic implications is undoubtedly a difficult task. It is probable that expecting subjects to learn it during one 15 minute session is unrealistic. Thus, an obvious next step would be to modify the procedure to allow deeper processing through more active participation and to extend the training session to a series of sessions which could eventually be incorporated in consumer awareness and general education curricula. In attempting to simulate the real world this would be a more realistic approach.

A further consideration in an attempt to simulate the real world is the effect of repetition. It is rare in the real world for a consumer to be exposed to an ad just once. Maybe the discrimination of direct assertions from pragmatic implications cannot be learned well enough to catch pragmatic implications upon one exposure. In this case, a consumer could possibly learn the discrimination well enough to differentiate direct assertions from pragmatic implications with increased exposure to the passages. This would also be more reflective of the real world.

The developmental trend found in Experiment 2 did not show the expected change between the seventh and ninth grades. Instead, the trend indicated that the ability to discriminate

direct assertions from pragmatic implications improves with age in general. Paris and Upton (1976) have hypothesized that children learn strategies for inferencing that change with age. In free recall of stories containing implications, a developmental trend, not attributable merely to changes in memory capacity, was found in children aged 6 to 10 years. Paris and Upton suggested that perhaps young children have not learned that spontaneous inferencing and integration of information aids comprehension. That is, older people have learned a strategy for comprehension that allows deeper processing (as Craik and Lockhart, 1972, suggested). That strategy involves making inferences and integrating them with other information in semantic memory. This elaboration aids recall. Paris and Upton concluded that these strategies may be teachable to young children to aid memory. Based on this work and the developmental trend in the present study, it is possible to conclude that people continue to learn and improve comprehension strategies beyond the stages suggested by Piaget. That is, children learn to make inferences and improve comprehension strategies with age. However, the discrimination of direct assertions from pragmatic implications continues to improve between ninth grade and adulthood. It would be informative to follow this trend through high school age students. It is rare to find a psycholinguistic ability that is not fully developed by ninth grade.

Finally, it is important to note that Paris and Upton (1976), Fischhoff and Slovic (Note 4), and the present study

all suggest that comprehension and judgment strategies and discriminations can be taught. This has obvious implications for our educational system. If memory can be aided by teaching comprehension strategies and critical evaluation of such real world information as scientific research and advertising, then it seems important that educational institutions be made aware of it. This is clearly an area where knowledge of basic research could be used by educators to improve instruction of our young.

REFERENCE NOTES

1. Paris, S. G., Sorkin, J. R., & Pisoni, D. B. The role of implied instruments in sentence memory. Paper presented at the Midwestern Psychological Association, Chicago, May, 1974.
2. Paris, S. G. Developmental changes in constructive memory abilities. In Children's memory for meaningful material. Symposium presented at the biennial meeting of the Society for Research in Child Development, Denver, April, 1975.
3. Monaco, G. The construction of implications as a storage phenomenon. Master's Thesis, Kansas State University, 1976.
4. Fischhoff, B., & Slovic, P. On the psychology of experimental surprises. Unpublished manuscript, Decision Research, Eugene, Oregon, 1976.

REFERENCES

- Anderson, J. R., & Bower, G. H. Human associative memory. New York: Winston-Wiley, 1973.
- Bartlett, F. C. Remembering. London: Cambridge University Press, 1932.
- Bourne, L. E., Jr., & O'Banion, K. Conceptual rule learning and chronological age. Developmental Psychology, 1971, 5, 525-534.
- Bransford, J. D., Barclay, J. R., & Franks, J. J. Sentence memory: A constructive versus interpretive approach. Cognitive Psychology, 1972, 3, 193-209.
- Brewer, W. F. Memory for the pragmatic implications of sentences. Memory & Cognition, in press.
- Brewer, W. F., & Lichtenstein, E. H. Recall of logical and pragmatic implications in sentences with dichotomous and continuous antonyms. Memory & Cognition, 1975, 3, 315-318.
- Craik, F. I. M., & Lockhart, R. S. Levels of processing: A framework for memory research. Journal of Verbal Learning and Verbal Behavior, 1972, 11, 671-684.
- Gardner, D. M. Deception in advertising: A conceptual approach. Journal of Marketing, 1975, 39, 40-46.
- Harris, R. J. Memory and comprehension of implications and inferences of complex sentences. Journal of Verbal Learning and Verbal Behavior, 1974, 13, 626-637.
- Harris, R. J. Children's comprehension of complex sentences. Journal of Experimental Child Psychology, 1975, 19, 420-433.
- Harris, R. J. The comprehension of pragmatic implications in advertising. Journal of Applied Psychology, in press.
- Harris, R. J., & Monaco, G. E. The psychology of pragmatic implication: Information processing between the lines. Journal of Experimental Psychology: General, in press.
- Harris, R. J., Teske, R. R., & Ginns, M. J. Memory for pragmatic implications from courtroom testimony. Bulletin of the Psychonomic Society, 1975, 6, 494-496.
- Inhelder, B., & Piaget, J. The growth of logical thinking from childhood to adolescence. London: Routledge, 1958.

- Jacoby, J., & Small, C. Deceptive and misleading advertising: The contrasting approaches of the FTC and the FDA. Journal of Marketing, 1975.
- Johnson, M. K., Bransford, J. D., & Solomon, S. K. Memory for tacit implications of sentences. Journal of Experimental Psychology, 1973, 98, 203-205.
- Kintsch, W. The representation of meaning in memory. Hillsdale, New Jersey: Erlbaum, 1974.
- Loftus, E. F., & Palmer, J. C. Reconstruction of automobile destruction: An example of the interaction between language and memory. Journal of Verbal Learning and Verbal Behavior, 1974, 13, 585-589.
- Loftus, E. F., & Zanni, G. Eyewitness testimony: The influence of the wording of a question. Bulletin of the Psychonomic Society, 1975, 5, 86-88.
- Palermo, D. S., & Molfese, D. L. Language acquisition from age five onward. Psychological Bulletin, 1972, 78, 409-428.
- Paris, S. G. Comprehension of language connectives and propositional logical relationships. Journal of Experimental Child Psychology, 1973, 16, 278-291.
- Paris, S. G., & Carter, A. Y. Semantic and constructive aspects of sentence memory in children. Developmental Psychology, 1973, 9, 109-113.
- Paris, S. G., & Upton, L. R. Children's memory for inferential relationships in prose. Child Development, 1976, 47, 660-668.
- Piaget, J. The language and thought of the child. London: Routledge, 1926.
- Piaget, J. Judgement and reasoning in the child. London: Routledge, 1928.
- Piaget, J. Traite de logique. Paris: Armand Colin, 1949.
- Preston, I. L. Logic and illogic in the advertising process. Journalism Quarterly, 1967, 44, 231-239.
- Preston, I. L., & Scharbach, S. E. Advertising: More than meets the eye? Journal of Advertising Research, 1971, 11, 19-24.
- Robinson, H. M., Monroe, M., Artley, A. S., Huck, C. S., Jenkins, W. A., & Aaron, I. E. Open Highways Skillbook Book 2. Glenview, Illinois: Scott, Foresman & Co., 1967.

- Robinson, H. M., Monroe, M., Artley, A. S., Huck, C. S., Jenkins, W. A., & Aaron, I. E. Open Highways Book 7. Glenview, Illinois: Scott, Foresman & Co., 1967.
- Russo, J. E. When do advertisements mislead the consumer: An answer from experimental psychology. In B. B. Anderson (Ed.), Advances in Consumer Research (Vol. 3). Cincinnati: Association for Consumer Research, 1976.
- Sachs, J. S. Recognition memory for syntactic and semantic aspects of connected discourse. Perception & Psychophysics, 1967, 2, 437-442.
- Taplin, J. E., Staudenmayer, H., & Taddonio, J. L. Developmental changes in conditional reasoning: Linguistic or logical? Journal of Experimental Child Psychology, 1974, 17, 360-373.
- Ward, J. The saga of Butch and Slim. The British Journal of Educational Psychology, 1972, 42, 267-289.
- Ward, J., & Pearson, L. A comparison of two methods of testing logical thinking. Canadian Journal of Behavioural Science, 1973, 5, 385-398.

FOOTNOTES

¹In order to make the terminology precise, a distinction between inference and implication must be made. Inference will be used to refer to a conclusion drawn by a hearer, while an implication will refer to information strongly suggested, but not directly stated, in a passage.

APPENDIX 1

TEST MATERIALS

Critical sentences in the stories are in parentheses. The first entry is the pragmatic implication, and the second is the direct assertion. A blank signifies that the omission of a sentence constitutes part of the pragmatic implication.

STORY 1 (S1)

(John poisoned his wife./John poisoned his wife by giving her a poisoned drink.) (Hadn't the trial proved it?/The trial proved John guilty.) Think of the evidence. (That morning Mary, John's wife, called the plumber at 9:00./That morning Mary, John's wife, called the plumber at 9:00 to ask him to come fix the sink.) He went to the house and left at 11:25. "She was fine then," he said. (Mary left the house at 12:30, according to her mother who lived next door./Mary left the house at 12:30. Her mother, who lived next door, saw her leave.) (It was a very cold day, and Mary ran down the street toward the shopping center./It was a very cold day, and, because she was cold, Mary ran down the street toward the shopping center.) (She was gone all afternoon./She was shopping all afternoon.) (On her way home, she stopped at a telephone booth./On her way home, she stopped at a telephone booth to make a telephone call.) (Mary's mother said she must have come home after 5:00/Mary came home after 5:00)(because the evening newspaper had already been thrown onto the porch/because the papercarrier had already thrown the paper onto the porch)(/at 5:00 as usual.)

Mary's mother had been watching for Mary to come home so she could ask her to coffee the next day. (On her way to Mary's house, her mother heard someone yelling./On her way to Mary's house, her mother heard Mary yelling at Mary's teenage daughter, Sue.) (When she went into the house, she found Mary frowning as Mary looked from her daughter, Sue, to the broken dishes on the floor./When she went into the house, she found Mary frowning as Mary looked from her daughter, Sue, to the dishes on the floor which Sue had broken.) (Just then Mary's two year old son tripped over his blocks and began to cry./Just then Mary's two year old son tripped over his blocks, fell down, and began to cry.) (So Mary's mother offered to keep the children overnight./So the children stayed with Mary's mother overnight.) John had been at work all day and came home at 6:30. John and Mary were alone all evening. At 8:00 the next morning Mary's mother found her. (A doctor and policeman came to the house./She called the doctor and policeman who came to the house.) (The doctor said she had been poisoned./Mary had died of poisoning.) No one else had a chance to poison her, so of course John's guilty, isn't he?

TEST ITEMS FOR STORY 1

(Response choices are true, false or can't tell)

Critical Items

1. John gave Mary a drink with poison in it.
2. The trial proved John guilty.
3. Mary asked the plumber to come fix the sink.
4. Mary left her house at 12:30.
5. Mary ran down the street because she was cold.
6. Mary was shopping all afternoon.
7. Mary stopped to make a telephone call on her way home.
8. The papercarrier threw the newspaper on the porch.
9. Mary yelled at her daughter, Sue.
10. Mary's daughter, Sue, broke the dishes.
11. Mary's two year old son fell down.
12. The children stayed with Mary's mother overnight.
13. Mary died of poisoning.
14. Mary came home after 5:00.
15. Mary's mother called the doctor and policeman to the house.
16. The newspaper usually comes at 5:00.

True items

1. John's wife's name is Mary.
2. Mary's mother lives next door to John and Mary.
3. The plumber went to Mary's house.
4. Mary ran towards the shopping center.

False items

1. Mary's mother lives two blocks away from Mary.
2. The evening newspaper didn't come that day.
3. Mary didn't leave the house all day.
4. Mary wasn't found for several days.
5. The plumber couldn't come to Mary's house the day of the murder.
6. John came home at midnight.
7. It was a hot day.
8. Mary's mother said that several people came to John and Mary's house the night of the murder.

9. Mary and John live in an apartment.
10. Mary's son was married.

Indeterminate Items

1. Mary and John live in Kansas.
2. The story takes place in December.
3. Mary and John ate steak for dinner.
4. Most people think that Mary is beautiful.
5. Mary is a nurse.
6. Mary's father is not living.
7. John plays golf every Saturday.
8. John has a sister.
9. John works in a bank.
10. Mary has a flower garden.

STORY 2 (S2)

Doug and his father weren't getting along very well. You see Doug's dad had wanted to be a doctor when he was young, but he went to work instead of going to college (/ because he didn't have enough money). Doug was almost finished with high school and wanted to play in a band, but Doug's father wanted (more for his son/him to go to college and become a doctor). Already Doug and three of his friends had a band, although they didn't have much experience. So they played for school dances (for free/to get some experience), and none of them had much money. When Doug wanted to learn to play the guitar, his father paid for the the guitar and the lessons. So Doug thought that his father (had treated him well/had given him what he wanted) in the past. Now Doug needed a better guitar if his band was to earn a living by playing. This is where the disagreement between Doug and his father started. Doug's father would only buy the guitar (on one condition/if he went to college).

So it seemed to Doug that he would have to get the money himself. He started looking for a part-time job, but because he didn't have any (experience/skills) he wasn't very hopeful. First, he (decided to call/called) music stores. Then he went in person. (He was soon discouraged./No one wanted to hire him.) One store owner told him (to come back when he was older/not to come back). Another (took one look at Doug's hair/thought Doug's hair was too long) and closed the door.

A week later, one hundred dollars (was missing/was stolen)

from Doug's mother's wallet. (You can imagine how she felt./ She felt very upset.) She immediately called the police. (There was soon a knock on the door/The policeman soon knocked on the door.) When Doug got home, Blackie (/Doug's dog didn't rush out to greet him as usual. He went into the house and his mother and father told him what had happened. He felt so bad to see how his parents felt that he confessed (/to taking the money). At first he got (you know what kind of reaction/an angry reaction) from his father. But after they talked for a long time, Doug's father understood how much Doug's band meant to him. So they made a compromise and both Doug and his father felt satisfied with it.

TEST ITEMS FOR STORY 2

(Response choices are true, false, or can't tell)

Critical items

1. Doug's father didn't go to college because he didn't have enough money.
2. Doug's father wanted Doug to go to college and become a doctor.
3. Doug's band played at school dances to get experience.
4. Doug thought that his father had given him what he wanted in the past.
5. Doug's father would only buy a new guitar if Doug went to college.
6. Doug wasn't hopeful about getting a job because he didn't have any skills.
7. Doug called music stores first about getting a job.
8. No one wanted to hire him.
9. One store owner told him not to come back.
10. Another store owner thought Doug's hair was too long.
11. One hundred dollars was stolen from Doug's mother's wallet.

12. Doug's mother felt very upset about the money.
13. The policeman knocked on the door.
14. Blackie was Doug's dog.
15. Doug took the money.
16. When Doug confessed, his father's reaction was an angry one.

True Items

1. Doug wanted a new guitar.
2. Doug needed some money.
3. Doug was in a band.
4. Doug wanted to get a part-time job.

False Items

1. Doug's father was a doctor.
2. Doug didn't want to play in a band.
3. Doug had a lot of money.
4. Doug wanted a new drum set.
5. Doug and his father never disagreed.
6. Doug didn't try to get a job.
7. Doug's mother was glad to find the money gone.
8. Doug and his father were not able to compromise.
9. Doug was in college at the time of the story.
10. Doug's mother had died when Doug was 5 years old.

Indeterminate Items

1. The story took place in December.
2. Doug's mother was a teacher.
3. Doug was the youngest member of his band.
4. Doug had brown hair.
5. Doug had a sister.
6. Doug's family lived 3 blocks from the high school.
7. Doug had his own stereo.
8. Doug liked to ride his bicycle.
9. Doug's last name was Jones.
10. Doug usually ate a hamburger for lunch.

AD 1 (A1)

Goodcompany slashes prices! Come to our big semi-annual sale and save on all your shopping needs. Here are just a few of the great bargains available for a limited time only at Goodcompany:

Do you have tired, aching feet? Goodcompany has cushion sole shoes (that are just right for you/that will cure your tired, aching feet) now at reduced prices. Look in your closet at last spring's clothes. (To be sure your clothes are in style this spring/Since last spring's clothes are out of style) visit our fashion boutique. (If even your best friends are avoiding you,/To keep your friends from avoiding you,) brighten up your smile with Sparkle, the truly different mouthwash. All through the year, protect your family from colds. Buy Cure-all cold capsules. (Cure-all kills germs!/Cure-all prevents colds!) Organizer, the great new school notebook, (will be your best friend/will keep your work organized) when you need to find information for your next test fast! Don't attend school another day without Organizer! If your schoolwork always looks messy, you'd better look at the pen you're using. (Try Cal's Carrot, the new marking pen!/Try Cal's Carrot, the new marking pen! It will make your schoolwork neat.) Joe Nameless, the football star, (says he eats Cornies breakfast cereal to keep fit./eats Cornies breakfast cereal. It keeps you fit.) (Joe also says, "Cornies taste great!"/Cornies also taste great!) Fight acne pimples. Eat right, wash your face often, and use Allgone. (Acne will disappear./It will make your acne disappear.)

Lastlonger denim jeans are made for the active young person. Work and play as hard as you can. Lastlonger jeans (will work and play with you./will last a long time.) From the makers of Stars candy bars there comes a new taste treat, Planet bar! All the great tastes everyone loves in Stars are combined with a secret new ingredient to give Planet its unique taste.

(/If you liked Stars you'll also like Planet.) Try one today. Every great basketball rebounder has a spring in his/her jump. Sky High tennis shoes have miracle bounce. (Need a spring in your jump?/They will make you jump higher.) (Do you want your dog to love you? Give him/Your dog will love you if you give him) Doggie Yum Yums. Your dog may be your best friend. Do him a favor and treat him to Doggie Yum Yums. Don't let people point to your sagging nylons and call you baggy legs. Memaire nylons have amazing new memory fiber. (After it stretches it bounces right back to its place/After it stretches it remembers its place) to give you a no-sag look. Get Memaire with memory fiber.

So hurry on down to Goodcompany's big sale. (While the limited supply lasts, get your free bottle of Goodcompany's multiple vitamins./There are only a few of the free bottles of Goodcompany's multiple vitamins left. Get yours now.) They're going fast so come get yours now. And remember: These are just a few of the great deals you'll get at Goodcompany. Goodcompany (is determined to give you, our customer,/has) the best prices in town.

TEST ITEMS FOR AD 1

(Response choices are true, false, or can't tell)

Critical Items

1. Goodcompany's shoes will cure tired, aching feet.
2. Last spring's clothes are out of style.
3. Sparkle mouthwash will keep your friends from avoiding you.
4. Cure-all cold capsules prevent colds.
5. Organizer, the new notebook, will keep your work organized.
6. Cal's Carrot, the marking pen, will make your schoolwork neat.
7. Cornies breakfast cereal will keep you fit.
8. Cornies breakfast cereal tastes great.
9. Allgone acne pimple lotion makes acne pimples disappear.
10. Lastlonger jeans will last a long time.
11. If you like Stars candy bars, you'll also like Planet candy bars.
12. Sky High tennis shoes will make you jump higher.
13. Your dog will love you if you give him Doggie Yum Yums.
14. Goodcompany has the best prices in town.
15. The memory fibers in Memaire nylons remember where they belong after they stretch.
16. The free bottles of Goodcompany's multiple vitamins are almost gone.

True Items

1. The same company makes both Stars and Planet candy bars.
2. Joe Nameless is a football star.
3. Goodcompany is having a sale.
4. Goodcompany is giving away free vitamins.

False Items

1. Goodcompany is a gasoline station.
2. Goodcompany has just raised all its prices
3. All dogs hate the taste of Doggie Yum Yums.
4. Joe Nameless says he hates Cornies breakfast cereal.

5. Goodcompany says their shoes will make your feet hurt.
6. Goodcompany is determined to give you the worst prices in town.
7. Goodcompany advertised winter clothes.
8. The sale at Goodcompany will go on forever.
9. There is an unlimited supply of free vitamins at Goodcompany.
10. Organizer, a notebook, has not been advertised.

Indeterminate Items

1. Goodcompany is in New York City.
2. Joe Nameless went to Hawaii on vacation.
3. Goodcompany hired 200 workers.
4. People like to work at Goodcompany.
5. James T. Smith owns Goodcompany.
6. Cure-all cold capsules are green.
7. Sparkle mouthwash tastes like mint.
8. Lastlonger jeans come in only one color.
9. Stars candy bars weigh one pound.
10. A pair of Sky High tennis shoes costs \$25.00.

AD 2 (A2)

Cheapermarket asks this question: Where can a person go to get high quality and low prices these days? The answer? (Come down to see us and find out./Cheapermarket.) Here are only a few of the great buys at Cheapermarket:

Dippy chips, the great new corn chips (were made to go with/taste great with) dip. Dippy chips were made strong so they won't break when you dip into your favorite dip! So try Dippy chips, the delicious new corn chips. Are you tired of staring at the same boring white paper when you're doing your schoolwork? Rainbow, the brightly colored notebook paper, is designed to (make your schoolwork more exciting/improve your schoolwork). So try the peppy paper--Rainbow! If you're the star on the basketball court until the fourth quarter gets you down, you need Instant Energy. Instant Energy is a delicious snack that will give you the energy to (keep you on that court/be the fourth quarter star, too!) So stay in the game with Instant Energy. Do you love chocolate, but it doesn't love you? I'm talking about the way your face breaks out everytime you eat your favorite chocolate snack. Here's good news from the makers of Sweetenall the sugar substitute: Introducing new Fake-olate the delicious new snack that tastes like chocolate without pimple causing fat. Try Fake-olate. Not only will your mouth love it, but (your face will love it, too/your face won't break out either.) It's annoying to have to worry about getting stains on your clothes when you're sliding into home plate. That's why we've invented Alloff. Alloff puts a protective coating on

your clothes. If you want your uniform to always be stain free, use Alloff. (It'll help/It'll prevent) your clothes from becoming stained. Do you ever have trouble falling asleep? Everyone does occasionally. When you need some help to make you feel drowsy, take Knockout, the gentle but effective sleep capsule. In a survey of 500 doctors, over half reported that they recommended (the ingredients in Knockout Capsules/ Knockout Capsules) to help make you drowsy so you can get to sleep. So, take the doctors' advice. Buy Knockout. Aren't you tired of sniffles and runny noses all winter? Tired of always feeling less than your best? (Get through a whole winter without colds. Take Eradicold Pills as directed./Taking Eradicold Pills as directed will get you through a whole winter without colds.) Ladies, don't you really want to look your very best? (Women who use Roy G. Biv Hair Color really care about looking their very best./Women who really care about looking their very best use Roy G. Biv Hair Color.) Think of yourself in any one of Roy G. Biv's seven beautiful and natural shades of hair color. Don't you deserve such rich and vibrant color? Tipsi-Cola is the refreshingly different soft drink. (People of the Now Generation drink Tipsi-Cola/ People who drink Tipsi-Cola are of the Now Generation). Oh, I see you drink Tipsi-Cola. In those early years dental care is so terribly important. Don't let cavities hurt your child's teeth. Brush with Crust Fluoride. (Crust fights cavities/ Crust prevents cavities). Your children will like its minty flavor, too. When anyone in my family is sick, I want the very best care possible for them. That's why I buy St. Abraham's

the coconut-flavored aspirin. After all, (isn't quality the most important thing to consider in buying aspirin?/quality is the most important thing to consider in buying aspirin.) If quality care is important to your family like it is to mine, buy St. Abraham's aspirin. Wouldn't it be great if you could make him cold-proof? Well, you can't. Nothing can do that. But there is something you can do that may help. Have him gargle with Gargoil Antiseptic. Gargoil can't promise to keep him cold-free, (but it may help him fight off/but it will help him prevent) colds. During the cold-catching season, have him gargle twice a day with full-strength Gargoil. Watch his diet, see that he gets plenty of sleep, and there's a good chance he'll have fewer colds, milder colds this year. Has your love life been "on the rocks" recently? Do you need some "magnetism" to pull those beautiful blondes and brunettes back to you? What you need is Tarzan After Shave. Make all those Janes go wild over that fresh, manly scent. They will love the attractive effect it has on you. Get your love life back on course where it belongs. (Have the girls come flocking to you like birds around the jungle water hole. Slap yourself with Tarzan After Shave./Tarzan After Shave will bring the girls flocking to you like birds around the jungle water hole.) In a survey conducted by a leading university, doctors were asked what they used to relieve pain from aching muscles. (The majority of those reporting said/75% of those questioned reported) that they themselves used Biceptennial Cream Rub. So, buy what the doctors use themselves-- Biceptennial Cream Rub for those

tired, aching muscles.

These are only a few of the bargains you'll find this week at Cheapermarket. (People who shop at Cheapermarket really care about their families/People who really care about their families shop at Cheapermarket). So hurry down to Cheapermarket today!

TEST ITEMS FOR AD 2

(Response choices are true, false, or can't tell)

Critical Items

1. Cheapermarket has high quality and low prices.
2. Dippy chips corn chips taste great with dip.
3. Using Rainbow, the brightly colored notebook paper, will improve your schoolwork.
4. Instant Energy will give you the energy to be the fourth quarter star, too.
5. Fake-olate, the chocolate substitute, won't make your face break out.
6. Alloff will prevent your clothes from becoming stained.
7. If you take Eradicold Pills as directed, you will not have any colds this winter.
8. If a woman uses Roy G. Biv Hair Color, she must really want to look her very best.
9. If you drink Tipsi-Cola, you must be of the Now Generation.
10. If you brush regularly and properly with Crust Fluoride, you will have few if any cavities.
11. The most important feature to consider in buying aspirin is its quality.
12. Gargling with Gargoil Antiseptic helps prevent colds.
13. If a fellow uses Tarzan After Shave, girls will come flocking to him.
14. A majority of doctors questioned in a survey reported using Biceptennial Cream Rub for aching muscles.

15. A majority of doctors in a survey recommended Knockout Capsules to help make you drowsy and fall asleep.
16. People who really care about their families shop at Cheapermarket.

True Items

1. Fake-olate is a substitute for chocolate.
2. Instant Energy will give you energy.
3. Tipsi-Cola is a soft drink,
4. Crust Fluoride has a minty flavor.

False Items

1. Cheapermarket only sells car parts.
2. Dippy chips are potato chips.
3. Alloff is an oven cleaner.
4. Tarzan After Shave has an unpleasant odor.
5. Biceptennial Cream Rub is mainly to be used as a sun tan lotion.
6. Knockout Capsules will help you in a boxing match.
7. Children dislike Crust Fluoride's flavor.
8. Rainbow notebook paper only comes in white.
9. Cheapermarket has the highest prices in town.
10. Roy G. Biv Hair Color only comes in one shade.

Indeterminate Items

1. Knockout Capsules were proved more effective than Somnifex, Nytol, or Compoz in laboratory tests.
2. Tipsi-Cola is especially good with salted nuts.
3. Dippy chips come in a blue bag.
4. There is a money saving coupon in every package of Instant Energy.
5. Cheapermarket has stores in 7 states.
6. If you buy a package of Rainbow paper this week, you will get a free pen.
7. Cheapermarket advertises on the radio.
8. Gargoil Antiseptic is made in Kansas.
9. Tarzan After Shave stings if you have a cut.
10. Eradicold Pills are smaller and easier to swallow than most other tablets.

APPENDIX 2

INSTRUCTIONS TO SUBJECTS

Before story 1 and story 2:

You are going to hear a short story. Listen carefully to the story because after you hear it, I will ask you to answer some questions about it.

Before test 1 and test 2 for the stories:

When I tell you to begin, read each sentence on your answer sheet. Then decide whether the sentence is true or false according to the story or whether you can't tell because there wasn't enough information in the story for you to decide. For each sentence check "true", "false", or "can't tell". Remember, you check "can't tell" if the story didn't give enough information for you to know whether the sentence is true or false. For example, if you heard the story: Jane woke up feeling very nervous because she was having a test in English today. She quickly ate breakfast and hurried to school.

and the sentence you read about the story was:

Jane ate cereal for breakfast today.

you would check "can't tell" because the story didn't give you any information about what Jane ate for breakfast. Are there any questions?

Before ad 1 and ad 2:

You are going to hear an advertisement for a store. Listen carefully to the advertisement because after you hear it, I will ask you to answer some questions about some of the products for sale. Pretend that you are a regular customer

of this store and assume that it tells the truth in its advertisements.

Before test 1 and test 2 for the ads:

Now I'd like you to pretend to be a customer thinking about what you're going to buy at the sale. When I tell you to begin, read each sentence on your answer sheet. Then decide whether the sentence is true or false according to the ad or whether you can't tell because there wasn't enough information in the ad for you to decide. For each sentence check "true", "false", or "can't tell". Remember, you check "can't tell" if the ad didn't give enough information for you to know whether the sentence is true or false. For example, if you heard the ad:

Squeeze-it bread is delivered fresh daily to your local supermarket. Get some today!

and the sentence you read about the ad was:

Squeeze-it bread is packaged in a plastic bag.

you would check "can't tell" because the ad didn't give you any information about the package the bread comes in. Are there any questions?

APPENDIX 3

WORKSHEET FOR TRAINING PROCEDURE 1
(Robinson et al., 1967, p. 59)

An author states some ideas outright. He only hints at, or implies, other ideas. The reader must draw conclusions from the hints given by the author. When the reader does this he is making inferences.

Below are eight numbered sentences about which you can make inferences. Under each sentence is a question and three possible answers. In order to answer each question, you will have to make an inference. Check the correct answer.

1. Standing behind the curtain, she could smell the make-up and feel the hot lights.

Where is she?

- ☐ a. at a beauty shop
☐ b. in a theater
☐ c. at a dance

2. He trembled as he picked up a magazine and sat down to wait for his name to be called.

Where is he?

- ☐ a. in a train station
☐ b. at home
☐ c. in a dentist's office

3. He slid into home and was safe.

What is he doing?

- ☐ a. playing baseball
☐ b. ice-skating
☐ c. almost late

4. She briskly carried away the tray, propped up the pillows, and marked the chart.

What is she?

- ☐ a. a waitress
☐ b. a nurse
☐ c. a housewife

5. He sat in his seat munching popcorn while he stared straight ahead.

Where is he?

- ☐ a. at school
- ☐ b. at a movie
- ☐ c. at the zoo

6. Crawling along the ground toward the barbed-wire fence, he adjusted his helmet and signaled the others to follow.

What is he?

- ☐ a. a football player
- ☐ b. a farmer
- ☐ c. a soldier

7. "Fill it up, please," he said to the man.

Where is he?

- ☐ a. at an airport
- ☐ b. at a gas station
- ☐ c. at a department store

8. She timidly opened the door and looked around the room, wondering which seat would be assigned to her.

Where is she?

- ☐ a. at a new school
- ☐ b. at home
- ☐ c. at a movie

APPENDIX 4

WORD SEARCH PUZZLE

RAIN, HAIL, SLEET AND SNOW

A P R I L H U I S H O W E R S M P B A R O M E T E R D Y T
 I N O A T A M C B W E A T H E R B A L L O O N V A P N H O
 R E L A T I V E H U M I D I T Y R P M M T I Z N W I N D S
 N E I E O L M T Z Y M T E B H E I Z M P I S D M B N C R V
 T M G C C S Z O N Z B M W R U Z N I C E S T O R M B L N Z
 V Z H U N T P H J I H S Q R N W G M A Y Z U P O S O Z V M
 O T T E R O Y B H D R P W N D O F L O W E R S T P W I N D
 Z E N Z P N R T S E Z X Q M E Z M Z V X S E Z X L C C R W
 I C I C L E S M W W P N Z D R O P L E T S F L Y A K I T E
 P R N Q O S Q O R P L Z H L H L Z L V R T V W X S L R Z A
 Z N G I W I H L T O R N A D O X X G A P U H G M H N M L T
 Q N H G L S L Z P I G N Z G K B M P P Z V Y H T H T P I H
 O P G I D O M C F N Q Y Z B I F S N O W F L A K E S C G E
 A I R C U R R E N T S F H L L Z V T R M N P I Z R T U B R

AIR

AIR CURRENTS

BAROMETER

CLOUDS

DEW

DEW POINT

DROPLETS

DUST

EARTH

EVAPORATION

FOG

FROST

HAIL

HAILSTONES

HURRICANE

ICE

ICE STORM

ICICLES

LIGHTNING

MOISTURE

RAIN

RAINBOW

RAINFALL

RELATIVE HUMIDITY

SLEET

SNOWFLAKES

SUN

TORNADO

WEATHER BALLOON

WIND

APPENDIX 5

PRETEST SOURCE TABLE FOR EXPERIMENT 1

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>
Between Subjects			
Training	1	7.03	1.98
Order	1	1.13	0.32
Training x Order	1	0.50	0.14
Error	28	3.56	
Within Subjects			
Story Type	1	24.50	11.69***
Training x Story	1	4.50	2.15
Order x Story	1	0.03	0.01
Training x Order x Story	1	0.78	0.37
Error	28	2.09	
Item Type	1	63.28	43.15***
Training x Item	1	1.53	1.04
Order x Item	1	4.50	3.07
Training x Order x Item	1	0.13	0.09
Error	28	1.47	
Story x Item	1	21.13	20.27***
Training x Story x Item	1	0.13	0.12
Order x Story x Item	1	5.28	5.07*
Training x Order x Story x Item	1	0.78	0.75
Error	28	1.04	

*p < .05

**p < .01

***p < .001

APPENDIX 6

POSTTEST SOURCE TABLE FOR EXPERIMENT 1

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>
Between Subjects			
Training	1	84.50	16.63***
Order	1	0.03	0.01
Training x Order	1	6.13	1.21
Error	28	5.08	
Within Subjects			
Story Type	1	12.50	6.30*
Training x Story	1	0.78	0.39
Order x Story	1	1.13	0.57
Training x Order x Story	1	0.03	0.02
Error	28	1.98	
Item Type	1	98.00	79.11***
Training x Item	1	3.78	3.05
Order x Item	1	0.50	0.40
Training x Order x Item	1	0.03	0.03
Error	28	1.24	
Story x Item	1	52.53	31.86***
Training x Story x Item	1	0.13	0.08
Order x Story x Item	1	0.03	0.02
Training x Order x Story x Item	1	6.13	3.71
Error	28	1.65	

*p < .05

**p < .01

***p < .001

APPENDIX 7
PRETEST MEANS FOR EXPERIMENT 1

Training		Training		Control	
Order		Ad-Story	Story-Ad	Ad-Story	Story-Ad
Story Type	Item ^a Type				
Ad	DA	6.50 ^b	6.50	6.88	7.25
	PI	5.75	5.50	6.50	7.00
Story	DA	7.13	6.38	6.88	6.50
	PI	3.75	5.00	4.25	5.00

^aDA = direct assertion PI = pragmatic implication

^bTo clarify the table, this cell represents the mean number of true responses to direct assertions in the ads in the order of ad before story in the training group.

APPENDIX 8

POSTTEST MEANS FOR EXPERIMENT 1

Training		Training		Control	
Order		Ad-Story	Story-Ad	Ad-Story	Story-Ad
Story Type	Item ^a Type				
Ad	DA	5.50 ^b	4.63	6.13	7.00
	PI	4.13	4.50	6.25	6.50
Story	DA	6.13	5.75	7.13	6.88
	PI	3.00	2.00	4.00	4.75

^aDA = direct assertion PI = pragmatic implication

^bTo clarify the table, this cell represents the mean number of true responses to direct assertions in the ads in the order of ad before story in the training group.

APPENDIX 9

WORKSHEET FOR TRAINING PROCEDURE 2
(adapted from Robinson et al., 1967, p. 59)

An author states some ideas outright. He only hints at, or implies, other ideas. The reader must draw conclusions from the hints given by the author. When the reader does this he is making inferences.

Below are eight numbered sentences about which you may make inferences. Under each sentence is a question and three possible answers. In order to answer each question, you may have to make an inference. Check the correct answer.

1. Standing behind the curtain, she could smell the make-up and feel the hot lights.**

Where is she?

- ☐ a. at a beauty shop
☐ b. in a theater
☐ c. at a dance

2. He trembled as he picked up a magazine and sat down to wait for his name to be called.**

Where is he?

- ☐ a. in a train station
☐ b. at home
☐ c. in a dentist's office

3. He hit the baseball, slid into home, and was safe.*

What is he doing?

- ☐ a. playing baseball
☐ b. ice-skating
☐ c. almost late

4. She briskly carried away the tray, propped up the pillows, and marked the chart.**

What is she?

- ☐ a. a waitress
☐ b. a nurse
☐ c. a housewife

5. He went into the show and sat in his seat munching popcorn while he stared straight ahead.*

Where is he?

- ☐ a. at school
- ☐ b. at a movie
- ☐ c. at the zoo

6. Crawling along the ground toward the barbed-wire fence, he adjusted his helmet and signaled the others to follow.**

What is he?

- ☐ a. a football player
- ☐ b. a farmer
- ☐ c. a soldier

7. He drove into the service station and said to the man, "Fill it up, please."*

Where is he?

- ☐ a. at an airport
- ☐ b. at a gas station
- ☐ c. at a department store

8. On her first day at the new junior high she timidly opened the door and looked around the room, wondering which seat would be assigned to her.*

Where is she?

- ☐ a. at a new school
- ☐ b. at home
- ☐ c. at a movie

*Direct assertion

**Pragmatic implication

APPENDIX 10

PRETEST SOURCE TABLE FOR EXPERIMENT 2

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>
Between Subjects			
Age	2	0.14	0.04
Training	1	6.25	1.77
Age x Training	2	7.54	2.14
Error	90	3.53	
Within Subjects			
Story Type	1	54.75	35.82***
Age x Story	2	0.07	0.05
Training x Story	1	0.75	0.49
Age x Training x Story	2	0.01	0.01
Error	90	1.53	
Item Type	1	77.94	66.36***
Age x Item	2	0.82	0.70
Training x Item	1	0.94	0.80
Age x Training x Item	2	0.01	0.01
Error	90	1.17	
Story x Item	1	32.09	26.94***
Age x Story x Item	2	0.13	0.11
Training x Story x Item	1	0.13	0.11
Age x Training x Story x Item	2	1.26	1.06
Error	90	1.19	

* $p < .05$ ** $p < .01$ *** $p < .001$

APPENDIX 11

POSTTEST SOURCE TABLE FOR EXPERIMENT 2

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>
Between Subjects			
Age	2	9.70	2.71
Training	1	129.50	36.19***
Age x Training	2	2.66	0.75
Error	90	3.58	
Within Subjects			
Story Type	1	13.13	5.36*
Age x Story	2	1.01	0.41
Training x Story	1	15.44	6.31*
Age x Training x Story	2	1.39	0.57
Error	90	2.45	
Item Type	1	148.75	80.31***
Age x Item	2	10.79	5.83*
Training x Item	1	0.32	0.17
Age x Training x Item	2	3.20	1.73
Error	90	1.85	
Story x Item	1	29.82	12.95***
Age x Story x Item	2	1.39	0.60
Training x Story x Item	1	0.00	0.00
Age x Training x Story x Item	2	0.95	0.41
Error	90	2.30	

*p < .05

**p < .01

***p < .001

APPENDIX 12

PRETEST MEANS FOR EXPERIMENT 2

Training		Training			Control		
Age (Grade)		7	9	Adult	7	9	Adult
Story Type	Item ^a Type						
Ad	DA	6.69 ^b	6.88	6.94	6.75	6.38	6.75
	PI	6.44	7.13	6.38	6.44	5.88	6.19
Story	DA	6.38	6.94	6.50	6.81	6.06	6.63
	PI	5.13	5.38	5.06	5.19	4.81	4.88

^aDA = direct assertion PI = pragmatic implication

^bTo clarify the table, this cell represents the mean number of true responses to direct assertions in the ads for seventh grade training subjects.

APPENDIX 13

POSTTEST MEANS FOR EXPERIMENT 2

Training			Training		Control		
Age (Grade)		7	9	Adult	7	9	Adult
Story Type	Item ^a Type						
Ad	DA	5.13 ^b	5.31	5.50	7.06	6.50	6.88
	PI	5.13	4.75	3.81	6.44	5.75	6.38
Story	DA	5.88	5.56	6.25	6.88	6.25	6.69
	PI	4.63	4.19	3.31	5.69	4.63	4.25

^aDA = direct assertion PI = pragmatic implication

^bTo clarify the table, this cell represents the mean number of true responses to direct assertions in the ads for seventh grade training subjects.

TRAINING THE DISTINCTION OF PRAGMATIC IMPLICATIONS
FROM DIRECT ASSERTIONS IN ADOLESCENTS AND ADULTS.

by

KRISTIN JO BRUNO

B. A., CALIFORNIA STATE UNIVERSITY, LONG BEACH, 1970

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Psychology

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1977

A large body of information processing research has been concerned with the way in which implications in prose are processed. It has been found in that literature that people often make inferences based on implied information in texts, and subsequently remember those inferences as directly asserted fact. Not only is this phenomenon important for the understanding of human information processing, but it also has important ramifications for several applied areas such as eyewitness testimony, general courtroom testimony, and advertising in which implication can be used to deceive.

The purpose of the present study was to develop a training procedure, that could be used in general public school and consumer education, to teach the discrimination of implication from directly asserted fact. In Experiment 1 a training procedure was developed and tested with adults. Based on those results a second training procedure was developed and tested with adults and seventh and ninth grade students in Experiment 2. The training procedure was found to be effective in reducing the number of inferences made, but it also caused subjects to be more skeptical of directly asserted fact. Thus, further modifications for future training procedures were suggested. Finally, a developmental trend, independent of training, in which the discrimination of implication from directly asserted fact improves with increasing age was found.