Thematic awareness and recall of information from text

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Abstract

In a repeated-measures experimental design, twenty-eight college students read and later answered questions about specific pieces of information in two sets of four fictitious biographical passages that differed in terms of the presence of thematic connections (with theme or without theme). As hypothesized, the students recalled more items from the theme set than the non-theme set. The positive effect of thematic connections was strongest for the students who exhibited some awareness of theme. In other words, the students who selected the theme set as the easiest recalled more than those who chose the non-theme set as easiest. The students who picked the theme set as easiest were also more accurate in their prediction estimates of their theme set recall. Student explanations for why one story set was easier than the other were predominantly Story explanations (referring to characteristics of the story) and Order explanations (referring to factors influenced by set order). Students gave different explanations depending on which story set they picked as easiest. As expected, the students who picked the non-theme set as easiest gave relatively few Story explanations. The students reported different patterns of strategy use depending upon whether or not they switched strategies for the different story sets.

It is well established that provision of an underlying theme during text processing activates appropriate prior knowledge and generally increases comprehension and recall (Bransford & Johnson, 1973; Dooling & Lachman, 1971; McCormick, Levin, & Valkenaar, 1990; Schmid & Kulhhavy, 1981). One explanation why the presence of a theme leads to more effective text processing is that it serves as an organizational cue for the reader. Writing text with thematic connections necessitates the use of textual signals, including verbal features (such as headings, overviews, and topical summaries) which help the reader discern the topic structure of a text, or visual features (i.e., highlighting, isolated words) that guide the reader through the text (Lorch & Lorch, 1986). It has been shown that the presence of signals leads to better recall of the text and its organization (Brooks, Dansereau, Spurlin, & Holley, 1983; Dee-Lucas & DiVesta, 1980; Lorch & Lorch, 1993, 1995; Spyridakis & Standal, 1987). Similarly, thematic connections could serve as a type of organizational cue that facilitates text representation.

Another explanation for the beneficial effects of a theme for textual processing is that the theme may reinforce the underlying story grammar schema. According to Mandler (1987), a story contains an event structure composed of episodes. These episodes include a beginning, a complex reaction, a goal path, and an ending; all of which could be figuratively "tied together" by the presence of a theme. Evidence for the influence of story grammar upon text processing includes the finding that stories that do not conform to the story grammar structure are difficult to remember and processed more slowly compared with stories that do conform (Mandler & Johnson, 1977; Stein & Nezworski, 1978). Yussen, Mathew, Huang, & Evans (1988) found that the presence of a story schema powerfully influences both the recall of specific facts from simple stories and the organization of the recall. Further, the probability that an element will be recalled

from a story varies with the importance it plays in the story as defined by story grammar (Mandler, 1984).

Given that the presence of a theme does influence textual processing, one remaining question is regarding the role of the reader's metacognitive awareness of the theme during skilled reading. Research evidence suggests that readers can be taught to be more aware of text signals; further, when readers are aware of signals, they process texts more effectively. When adults were taught to detect the organizational structure of text, such as descriptive text, temporal sequence, causation, problem/solution, comparison, and/or listing, this knowledge served as form of metacognition, providing the reader with information regarding the type of text the author composed and facilitating recall performance (Meyer, Young, & Bartlett, 1989). In a similar way, readers' metacognitive awareness of a theme may facilitate them in effectively organizing the text while reading.

Yet another aspect of skilled text processing is the ability of readers to make judgments about how well they have learned the material and how well they will do on some measure of recall (Maki, 1998). Maki & Berry (1984) refer to this process of monitoring learning from text as metacomprehension. Through metacomprehension, students continually must decide whether to continue studying material or to stop studying because the material is known sufficiently. Prediction accuracy is often low; however, deeper processing influences the accuracy of predictions with more elaborative processing producing greater correlations between predictions and performance (Maki, Folye, Kajer, Thompson, & Willert, 1990; Schommer & Surber, 1986). The presence of a theme could facilitate deeper processing of the textual material by elaboratively tying the content together into a more unified story, and thus indirectly improving the reader's predictions of performance.

Another question is whether the awareness of a theme results in more effective use of text strategies. For example, might readers who are aware of an explicit theme select strategies that capitalize on thematic connections present in the story? Good readers are active using diverse strategies, monitoring their understanding in many different ways, and reacting to what they are reading (Pressley & McCormick, 1995; Wade, Trathen, & Schraw, 1990). Young adults who are good readers are metacognitively sophisticated in that they know how and when to apply appropriate strategies to the various reading tasks they face (Lorch, Lorch, & Klusewitz, 1993). More savvy adult readers will initiate a strategy and compare its effectiveness to the task at hand in order to determine its utility, switching strategies if necessary (Nist, Simpson, Olejnik, & Mealey, 1991; Pressley, Levin, & Ghatala, 1984).

In summary, a critical question is whether readers are explicitly aware of thematic connections during text processing and in what ways this awareness influences text processing. In the present study, students read and later answered questions about information in two sets of four fictitious biographical passages that differed in terms of the presence of thematic connections (with theme or without theme). The purpose of the present study is to explore metacognitive awareness of theme and its relationship to recall, recall prediction, and strategy use.

Method

Participants and materials

Twenty-eight students attending a southeastern university volunteered to participate in the study to receive course credit and were naive with respect to the purpose of the study. Students read and answered questions about two sets of four biographical stories. Each biography contained five pieces of concrete information (descriptions of each fictitious

character's childhood toy, musical instrument, occupation, exercise activity, and current hobby)

presented in separate sentences. The basic structure of the biographical stories was identical,

with only the particular exemplars changing from biography to biography -- see McCormick,

Levin, Cykowski & Danilovics (1984) from which the present biographies were adapted. Each

character lived in a distinct geographical or cultural setting which was described in the first

sentence of each story. One set of stories, set "MRDJ", was about characters living in the

mountains, on the ranch, in the desert, and in the jungle. The other set of stories, set "AIPW",

was about characters in the army, island, poverty, and wilderness. Two versions of each story set

were created: a theme and a non-theme version. In the thematic version of a story set, each

passage included argument repetition (i.e., inter-sentence redundancies and references) and text

signals (i.e., sentence-connecting words such as *because* or *as a result)* that provided support for

a central theme by connecting the five items to the character's setting. The non-thematic version

of a story set contained the same items for recall and the same main character, but with no

underlying theme. See Appendix 1 for sample passages.

Design and Procedure

The experimental treatments were administered to groups of approximately six to ten

students. Materials appropriate for each of the four experimental conditions were represented

within each group so that individual students, rather than groups, constitute the appropriate

experimental unit. Students were randomly assigned to one of four presentation orders in which

story set order (first, second) and the presence of theme (thematic, non-thematic) varied. Thus,

each student was asked to learn the same forty pieces of information in eight stories; however,

the items were presented in differing orders (first or second story set) and were embedded either

within the context of a theme or not.

Before they read the stories, the students were informed that they would be asked to recall the following five pieces of information for each story: the toy, musical instrument, occupation, exercise activity, and hobby of the main character. The students, however, were not given any information regarding the presence or absence of a theme. The students were given one minute to read each of the first set of four stories, one story at a time and were instructed not to look back or ahead in the story set as they read. Then, the students were instructed to recall the key items from each story, one story at a time. Each page requesting recall was headed by a sentence designed to target the correct story recall by describing the theme: for example, "These questions are about the boy who lived in a log cabin in the Alaskan wilderness while he was growing up." After this heading, each test page contained the following questions, each followed by a blank line: What was his/her favorite childhood toy? What musical instrument does s/he play? What is his/her occupation? What is his/her favorite exercise activity? What is his/her current hobby?   The students were given 1.5 minutes per story for the recall task and were instructed not to look back or ahead as they recalled. Identical procedures were followed for the second story set. Following the second recall test, students responded to a questionnaire designed to tap their awareness of differences between the two sets of stories. Specifically, the questionnaire requested students to do the following: 1) indicate which set of stories was easier (first or second, by color of booklet) with a supporting reason; 2) estimate their performance on each set; and, 3) describe the strategies used for both sets.

Results

Story Information Recall

A repeated-measures analysis of variance with two factors (theme and story order) revealed a significant main effect for theme, $\underline{F}(1, 26) = 15.27$, $\underline{p} < .001$, $\underline{MSe} = 5.90$. The

students recalled more items from the theme set than the non-theme set ($\underline{M}$=14.64 vs. $\underline{M}$=12.11), with a moderate-high effect size (.626). The main effect of story order was not significant, $\underline{F}$(1, 26) = .37, $\underline{MSe}$ = 5.90, $\underline{p}$ < .75, nor was the theme by order interaction.

Awareness of Theme

Eighteen students (64%) selected the theme set as easiest. Seven students (25%) thought the non-theme set was easiest; three of the students believed the story sets were equally difficult. Those students who choose the theme set as the easiest ($\underline{N}$=18) recalled significantly more information over both sets ($\underline{M}$=28.17 vs. $\underline{M}$=22.43, p<.05) than those choosing the non-theme set as easiest ($\underline{N}$=7) with an high effect size (.89). See Table 1 for a listing of prediction scores as related to theme awareness. Specifically, these students who chose the theme set as easiest recalled significantly more from the theme stories ($\underline{M}$=15.94 vs. $\underline{M}$=11.14, $\underline{p}$ < .01, effect size=1.51) but there was no difference in the recall from the non-theme stories ($\underline{M}$=12.22 vs. $\underline{M}$=11.29, $\underline{p}$<.30).

Another level of theme-awareness consists of eight students who $\underline{explicitly}$ noticed the theme, which was determined by their comments as to $\underline{why}$ the {theme} set was easier. Those ($\underline{N}$=8) who specifically noticed theme commented as follows regarding the theme set: "the {theme set} stories seemed to have the child's experiences correlated a little better with his surroundings than the {non-theme set of stories};" and, "the five interests of the individual in the {theme set} stories seemed to be more easily associated with one another;" and, "the {theme set} was easier because of their background description, it was easier to remember their traits." The total score of these eight students was higher than all others ($\underline{p}$=.047, effect size=.729).

Recall Predictions

Overall, as assessed by a paired-sample t-test, students predicted they would recall more information from the thematic story set ($\underline{M}$=14.75) than the non-thematic story set ($\underline{M}$=12.81), $\underline{t}$(25)=2.502, $\underline{p}$<.05, effect size=.55. In general, predicted recall corresponded to whatever story set was selected as easiest, as shown in Table 1, with a high correlation ($\underline{r}$=.72) of predicted recall with actual recall. Although not statistically significant, correlations of predicted recall and actual recall were higher for the second set of stories than the first set of stories ($\underline{r}$=.80 vs $\underline{r}$=.63) and for the theme set than for the non-theme set ($\underline{r}$=.84 vs $\underline{r}$=.56). Although the students who picked the theme set as easiest were not more accurate overall in their predictions than the students who picked the non-theme set as easiest, these students were more accurate in their prediction estimates of their theme set recall ($\underline{r}$=.75 vs $\underline{r}$=.49). The students who picked the non-theme set as easiest underestimated their theme set recall (estimated $\underline{M}$=9.58; actual $\underline{M}$=11.14).

Explanations for Why Story Set Was Easiest

Student explanations for why one story set was easier than the other were classified into three general categories: Story, Self, and Order explanations. Both experimenters classified each response independently with 93% agreement, the remainder were resolved via discussion.

Story explanations refer to characteristics of the story including the relationship of the character with the surroundings, level of detail, logic of flow, and interest level. For example, Story explanations include the following: "the set was more to the point, less detailed;" "there wasnt as much extraneous material to get in the way;" "the stories seemed more logical, they flowed much smooth{ly}." "the sentences were longer and more complex;" and, "the set seemed to use more modifiers..."

Self explanations focus on characteristics or actions of the student including concentration and strategy use. For example, Self explanations as to why a set was easier include the following: "I learned to then associate the target information to the person.." and "I concentrated more."

Order explanations emphasize issues due to learning multiple stories including practice, focus on specific items, interference, fatigue, and confusion. For example, Order explanations include the following: "the set was easier simply because it was the second set;" "it was easier to concentrate on the second set because I was used to the forms;" "we had experience with what was expected {on the second set};" and "the set was easiest because it was the first set I read."

Overall, order and story explanations were used by the majority of students, Order (48%) and Story (40%); with a few students using Self (12%) explanations. There were different patterns of explanations, however, for those who picked the theme or non-theme story set as easiest. Students who picked the theme set as easiest gave explanations equally split between order and story, Order (44%), Story (44%), and Self (6%). The students who picked the non-theme set as easiest gave more order, more self, and relatively few story explanations, Order (57%), Story (14%), and Self (29%). These differences, however, were not statistically significant as assessed through a chi-square, $\underline{X}(2)=4.001$, $\underline{p}=.135$.

Report of Strategy Use

The strategies reported by students were classified into the following categories: General Reading strategies (including concentration, focusing on everything, reading twice, and no specific strategy), Special Attention strategies (including rehearsal and focusing on specific items), and Association strategies (including making connections, mnemonics and creating

images). Both experimenters classified each subject independently with 93% agreement, the rest resolved via discussion.

The students who reported using the same strategy with both sets (N=12), primarily used Special Attention (59%) or Association (33%), with a few using General Reading Strategies (8%). Other students switched strategies between the story sets (N=16). For the Non-Theme set, these students who switched strategies primarily reported using Special Attention (57%) and General Reading (36%), with one student reporting use of Association (6%). For the Theme Set, these students reported less use of Special Attention (29%) and General Reading (28%) and more use of Association (43%). Of those who switched strategies, the differences in strategies between the Theme and Non-Theme set were evaluated via a chi-square, and approaches statistical significance, $\underline{X}^2$=5.016, $\underline{p}$=.08.

Discussion

The main effect of theme on recall performance supports previous research indicating that the presence of a theme facilitates text processing (Bransford & Johnson, 1973; Dooling & Lachman, 1971; McCormick et al., 1990; Schmid & Kulhhavy, 1981). Given that the presence of a theme entails appropriate textual organizational cues and story grammar, it appears that these thematically-related connections lead to better cohesion of the textual material, and thus recall.

Not only did the presence of a theme lead to better recall for all students, but depending on how metacognitively aware students were of the presence of theme, it influenced performance. Theme awareness was assessed in three ways: 1) greater recall predictions for thematic story set; 2) judgment of theme set to be easier than non-theme set (together with analysis of explanations and associated strategies); and, 3) explicitly noting the theme as present in the thematic story set.

First, students predicted higher recall on the thematic story set as compared to the non-thematic story set, suggesting that they had a rudimentary level of awareness of story structure differences. This rudimentary awareness may be related to deeper processing of the thematic set, and more elaborative processing is associated with prediction accuracy (Maki et al., 1990).

Second, those students who judged the theme set to be easier than the non-theme set (i.e., the "theme-as-easiest" group), had even better recall. These students had at least a basic metacognitive awareness that something was different about the theme set that contributed to their perceived (and actual) better performance on recall from the thematic story set. Not only did the "theme-as-easiest" group recall more, but also they were more accurate predictors of recall than the other students. Conversely, those choosing the non-theme set as easiest overestimated their non-theme set score and underestimated their theme set score. Since awareness at the level of "theme-as-easiest" is related to better performance and more accurate predictions, it may indicate better monitoring during text processing.

Students' explanations for why the theme set was easiest and analysis of their strategy use also supports this inference. Explanations for why the theme set was easiest by the "theme-as-easiest" group were divided approximately equally between story and order. Those who selected the non-theme set as easiest, however, had few story explanations, attributing ease of processing more often to order and self. This supports the inference that those who chose the non-theme set as easiest tended <u>not</u> to notice the differences in the stories. In contrast, those of the "theme-as-easiest" group were more likely to explain performance as a reflection of story differences. In terms of strategy use, those who switched strategies between the two story sets tended to use more association strategies for the thematic story set.

Third, the eight students (29% of total) who explicitly noted the theme had significantly higher scores than all other students. With their explicit awareness of the presence of the theme, these students could deliberately use the thematic connections to assist them in memorizing the items.

Overall, thematic connections make learning information from stories easier even if students are not aware that thematic stories are easier and especially if students are aware thematic stories are easier. The results have implications for monitoring and comprehension training, indicating that college students should be encouraged to self-monitor with the purpose of discerning underlying text structures and evaluating meaning.

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Table 1. The relationship of prediction and recall to awareness.

Which set easiest?	Total Score	Predicted Non-theme	Actual Non-theme	Predicted Theme	Actual Theme

Theme	18	28.17	12.47	12.22	16.56	15.94
Non-Theme	7	22.43	12.50	11.29	9.58	11.14
No difference	3	28.33	15.33	13.33	15.00	15.00

Appendix. Sample Control and Thematic Versions of a Passage

Control version:

This story is about a boy who lived in a log cabin in the Alaskan wilderness where his parents raised sled dogs. When he was very young, he loved to play with all kinds of vehicles and had a large collection of matchbox cars. He decided to learn to play the tuba after once seeing a German "oompa" band perform. Being a deeply religious person, he naturally gravitated toward a career as a clergyman and currently acts as a guest preacher in the local church. Because softball is his favorite form of exercise, he organized a local team and led them to the district championship last year. He developed his coin collection hobby following a trip to Europe last summer.

Thematic version:

This story is about a boy who lived in a log cabin in the Alaskan wilderness where his parents raised sled dogs. As a child, he loved to play with his matchbox cars, imagining them carrying people to his isolated home. One time when the isolation was a blessing was when he was learning to play the tuba --- no one minded the loud noise in the wilderness. Since he had become very skilled at dealing with his own loneliness and isolation, it is not surprising that he eventually became a clergyman to help others with their problems. He likes to keep in shape by playing softball, although it is often difficult to find enough people in the wilderness to make up two teams. Now his favorite pastime is searching a ghost town, abandoned after the gold rush, for additions to his coin collection.