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The Power of Fiction: Reading Stories in Abnormal Psychology

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Keywords

Fiction, Story, Textbook, Memory retention, Transportation

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Abstract

We compared the instructional efficacy of a narrative text (i.e., a story) and an expository text (i.e., a textbook excerpt). Students enrolled in Abnormal Psychology classes read about the disorder, *dissociative fugue* from a story, a textbook, or both. The story contained literary elements that increased transportation into the story world. We predicted that this would facilitate memory encoding and improve subsequent test performance. Students who read the story achieved higher quiz scores and evidenced greater free recall about the disorder than those who read the textbook. They also reported greater transportation into the discourse. The combined reading conditions were more efficacious than either alone. The advantage of having read the story was evident up to 3 weeks later when students were retested. Our results suggest that, across text genre, the experience of being transported into discourse accounts for greater test performance over time.

Keywords: fiction, story, textbook, memory retention, transportation

Introduction

Educators have long believed that students benefit from exposure to a variety of instructional genres. They therefore incorporate fictional media into their curricula (Dubeck, Bruce, Schmuckler, Moshier, & Boss, 1990; Smith, 1993). A psychology course, for example, might include a reading of *The Three Faces of Eve* (Thigpen & Cleckley, 1983/1957) to enhance students' understanding of dissociative identity disorder, and a history course might include *The Killer Angels* (Shaara, 1987) to help students understand the civil war. In terms of written discourse, *narrative texts* (i.e., texts that present a topic through causal, thematic, and temporal discourse) and *expository texts* (i.e., texts that more directly describe and explain a topic; Brewer, 1980) facilitate the learning process in different ways. For example, narrative texts are typically encoded into episodic memory, whereas expository texts are encoded into semantic memory (Potts, St. John, & Kirson, 1989). Although narrative texts have not emerged as clearly superior to expository texts in terms of instructional value (Wolfe & Mienko, 2007), we propose that narrative texts have untapped instructional potential. We designed the present study to expose that potential.

Storied narratives offer considerable intuitive appeal, and there is evidence that students find stories more enjoyable and instructional than expository texts and that they prefer to

be tested on stories (Fernald, 1987, 1989). However, data regarding the educational value of the two text genres are mixed and inconclusive. Narrative texts have outperformed expository texts when followed by cued recall tasks (Graesser, Hautt-Smith, Cohen, & Pyles, 1980). Expository texts have performed better when followed by free recall tasks (Hartley, 1986) and short answer questions (Alvermann, Hynd, & Qian, 1995). In several studies, neither genre has outperformed the other (Cunningham & Gall, 1990; Kintsch & Young, 1984; Roller & Schreier, 1985; Wolfe & Mienko, 2007). One potential explanation for the inconsistent performance of storied narratives is that stories differ in their ability to *transport* the reader (Gerrig, 1993) into the story world. We predicted that the superiority of a storied narrative would be a function of its ability to transport the reader, thereby facilitating memory encoding and improving subsequent test performance.

Transportation

When transported into the story world readers tend to decrease monitoring and suspend evaluation (Green & Brock, 2000). Decreased evaluation might seem undesirable to educators, in that we expect our students to read critically. However, if the ultimate goal is to encode text as true semantic information, a story that transports the reader might be efficacious. Readers who experience transportation tend to perceive the story as more realistic and to align their beliefs with story content (Green, 2004; Green & Brock, 2000). Marsh, Meade, and Roedigger (2003) found that readers encoded story information as valid, real-world knowledge even when it contradicted what was known about the real world. Further, a week after reading a story, readers believed that facts from the story were known to them prior to reading. Marsh and Fazio (2006) found that even when readers were cautioned about the fictional nature of the facts within a story, they regarded the information as true when they were tested. Collectively, these findings suggest that even when the goal is to read and encode factual information, high levels of evaluation and critical thinking are not a necessary condition. On the basis of these findings we embedded factual information that we wanted readers to remember, in a story that would facilitate transportation into the story world.

Development of the narrative text

To develop a storied narrative that would facilitate the encoding of information more effectively than would a textbook excerpt, we drew on literary theory, and on research in the area of memory encoding and retrieval. Expository and narrative texts are encoded into different memory loci. Expository texts are typically incorporated into *semantic memory*, the storehouse of encyclopedic information; narrative texts are typically compartmentalized into *episodic memory*, the memory system for discrete episodes and events (Potts, St. John, & Kirson, 1989). When reading from a textbook, the proposition, "Schizophrenia is not contagious" (example based on Gerrig & Prentice, 1991) is encoded directly into semantic memory. When tested on this information the student recalls reading about schizophrenia in the textbook, but the specific facts may have decayed due to lack of cohesion and context. Conversely, when a student reads "Schizophrenia is not contagious" from a storied narrative, the proposition is encoded as part of a cohesive *situation model* (Johnson-Laird, 1983; Van Dijk & Kintsch, 1983), the mental representation of the story. Because the proposition is linked to the situation model, the student more easily recalls that the protagonist afflicted with schizophrenia was not contagious.

In order to develop a situation model, readers invoke vivid autobiographical memories (Larsen & Seilman, 1988; Mar, Oatley, & Eng, 2003); in so doing, they partake vicariously in the experiences, thoughts, and emotions of story characters. Storied narratives present psychologically realistic characters and interpersonal dynamics that prompt readers to

identify with protagonists (Ozyurek & Trabasso, 1997) and to mentally simulate social situations (Mar & Oatley, 2008). Readers perceive similarities between themselves and story characters with respect to age, life stage, social goals, and/or personal goals. Therefore, reading that "Schizophrenia is not contagious" from a storied narrative might have an instructional advantage, in that readers are aroused emotionally and cognitively when encoding the proposition into memory. The protagonist afflicted with schizophrenia is shunned by his peers, who fear contagion. Readers feel *empathy* (concordance of affect) for this character, and *counterempathy* (negatively valenced affect; Zillmann, 1994) toward the peer group. Fiske (1989) commented that the greater the identification with story characters, the poorer the capacity for critical appraisal. Janit and Millis (2004) found support for this idea, in that students who read about characters with whom they strongly identified altered their beliefs according to propositions they read in the story. Students who read about bland characters were less likely to align their beliefs with story content. Thus, reading from a textbook that "Schizophrenia is not contagious" might have an instructional disadvantage when compared with the story, in that the textbook evokes relatively little emotional arousal and, arguably, very little cognitive arousal in most college students.

In developing the story for the present study, we used the aforementioned theory and research as guidelines. We developed interesting characters with whom students would readily identify. We included literary elements such as surprise, suspense, and curiosity (Brewer & Lichtenstein, 1982) to increase readers' emotional experience. We were highly descriptive in order to facilitate the creation of a rich situation model in episodic memory.

Predictions

We predicted that a narrative text (i.e., a story) about someone afflicted with dissociative fugue would produce greater recognition and recollection of specific symptoms associated with that disorder than an expository text (i.e., a textbook excerpt) about that disorder. In Study 1 we assessed recognition via multiple-choice and true/false questions. We assessed students' test performance at two time points, immediately after reading and 1 week later. In Study 2 we added a free-recall task to assess uncued recollection. To assess the story's robustness, we increased the latency between reading and test-taking from 1 week to 3 weeks. Lastly, we predicted that the narrative text would facilitate greater transportation into the discourse than would the expository text, and that transportation would therefore serve as a mediator of test performance.

Experiment 1

Method

Participants

Participants were 96 undergraduate students enrolled in abnormal psychology courses at a southeastern university. The study was conducted in the students' regular classrooms during class periods. Students participated in exchange for course credit. Full participation required students to be present for both sessions, which were one week apart. Students who were present for only one of the two sessions ($n = 20$) were excluded from the analyses. Students who indicated at the second session that in the interim they had sought additional information about the disorder ($n = 7$) were also excluded from the analyses. The number of participants included in the analyses was 69.

Materials

Textbook. An excerpt from *Abnormal Psychology in a Changing World, Sixth Edition* by Nevid, Rathus, and Greene (2005) was selected. The section on *Dissociative Fugue*, found within the chapter entitled *Dissociative Disorders*, formed the basis of the textbook condition. The section is comprised of four informational paragraphs about dissociative fugue (473 words) and a short vignette about a man who was diagnosed with the disorder (319 words), for a total of 792 words. Participants in the textbook condition were given photocopies of the textbook pages, and therefore were aware the information came directly from a textbook.

Story. The eight-page story entitled *Fugue* formed the basis of the story condition. The story, which was written specifically for this study, introduces a female protagonist who develops dissociative fugue. She temporarily loses her memory and flees her home in California. She travels to Illinois where she briefly assumes a new identity before regaining her memory. We sought to equalize the amount of factual information about the disorder across textbook and story conditions. From the textbook we identified 20 distinct *target propositions* about the disorder, for example, "Whereas people with amnesia appear to wander aimlessly, people in a fugue state act more purposefully," "The person may not think about the past or may report a past filled with false memories without recognizing them as false" and "...the person may appear 'normal' and show no other signs of mental disturbance." We embedded these propositions in the story. A list of the target propositions appears in Table 1. The length of the story was 3,501 words. Although the story was longer than the textbook excerpt, it contained only 20 propositions that directly explain the disorder. The remaining discourse was contextual information about characters and places.

Table 1. Target Propositions Identified in the Textbook and Embedded in the Story

<p>Fugue... is believed to affect only about 2 people in 1,000 within the general population. Fugue derives from the Latin <i>fugere</i>, meaning "flight." ...the person may appear "normal" and show no other signs of mental disturbance. ...the person ...is unable to recall past personal information. ...they typically do not recall the events that happened during the fugue state. ...the fugue state protects one from traumatic memories or other sources of emotionally painful experiences. ...may assume an identity that is more spontaneous and sociable than their former selves. Fugue is a dissociative disorder. Then one day, quite suddenly, their awareness of their past identity returns to them. Then one day, quite suddenly... they are flooded with old memories. Whereas people with amnesia appear to wander aimlessly, people in a fugue state act ore purposefully. The person may not think about the past or may report a past filled with false memories without recognizing them as false. Some stick close to home... Less common is the pattern in which the fugue state... involves travel to distant places. The individual's former sense of self returns in a matter of hours or a few days. Less common is a pattern in which the fugue state lasts for months or years... ...the fugue state is not considered psychotic because people with the disorder can think and behave quite normally...</p>

It is most likely to occur in wartime... or in the wake of another kind of disaster or extremely stressful event.

...the new identity is [typically] incomplete and fleeting.

...he couldn't remember his past but he didn't seem concerned about it.

When he came face-to-face with his wife again, he claimed he didn't recognize her...

...their former selves... were typically "quiet" and "ordinary."

Quiz. A 20-item quiz was derived from the target propositions. Ten items were multiple choice questions with four possible answers, and ten items were true/false questions. An item analysis revealed that one quiz item did not effectively discriminate between those who did well on the quiz and those who did poorly (discrimination index = .54). Therefore, this item was dropped before scoring the quiz. Final quiz scores were the number of correct responses out of 19.

Questionnaire. The Narrative Questionnaire (NQ; Green & Brock, 2000) is a 12-item self-report measure of the degree to which participants become "transported" into the discourse they read. The NQ presents items such as, "While I was reading the narrative, I could easily picture the events taking place" and "I was mentally involved in the narrative while reading it." NQ items are presented in 7-point Likert-type format, where 1 = *not at all* and 7 = *very much*. Green and Brock reported adequate internal consistency (Cronbach's alpha = .76) and demonstrated adequate discriminant and convergent validity. The NQ was administered to examine our prediction that the narrative text would facilitate greater transportation into the discourse than would the expository text.

Procedure

Students were randomly assigned to either the textbook condition or the story condition and participated as one large group, thus receiving identical verbal instructions. They were told that they would be given reading material related to their abnormal psychology course, and that related tasks would follow. They were cautioned not to skim or speed read, but rather to relax and enjoy reading. To ensure a quiet reading environment, each reading packet contained instructions about how to proceed through the tasks. Written instructions in the packets informed students in the textbook condition that they would read a section from an abnormal psychology textbook about a psychological disorder. Students in the story condition were informed that they would read a story about a psychological disorder. Once students had finished reading, they were directed to take the quiz and complete the NQ without referring back to the reading material.

Students were given a 75-minute class period in which to complete all tasks and all completed the tasks in 25 to 60 minutes, depending on reading condition. The experimenter thanked students, and told them he would return in 1 week to debrief them. No mention was made of retaking the quiz. One week later the experimenter returned and asked participants to retake the quiz, after which participants were debriefed. We were able to match participants' data, yet protect their anonymity, by asking them to use codenames on all their materials.

Results

Quiz data. A 2 (text genre: story/textbook) X 2 (time assessed: immediately following the reading/1 week after the reading) mixed-model analysis of variance (ANOVA) was conducted on the quiz total scores. Both of the manipulated variables had an impact on the quiz scores: text genre, $F(1, 67) = 15.67, p < .001, \eta^2 = .19$, and time assessed, $F(1, 67)$

= 21.25, $p < .001$, $\eta^2 = .24$. Students who read the story achieved higher quiz scores ($M = 15.48$, $SD = 2.75$) than students who read the textbook ($M = 13.23$, $SD = 2.26$). Thus, students who read the story demonstrated greater knowledge of dissociative fugue. Further, across genres, higher quiz scores were produced immediately following the reading ($M = 14.80$, $SD = 2.67$) than 1 week later ($M = 13.75$, $SD = 2.86$). The interaction between text genre and time assessed was not significant, $F(1, 67) = .51$, $p = .48$.

Transportation. To test whether the story was more transporting than the textbook excerpt, a one way ANOVA was computed on NQ total scores. As predicted, there was a significant effect of text genre, $F(1, 59) = 4.81$, $p = .03$, $\eta^2 = .08$, such that students reading the story were transported into the discourse ($M = 54.70$, $SD = 9.10$) to a greater degree than students who read the textbook ($M = 49.15$, $SD = 10.37$).

To determine whether the highly transporting nature of story was accounting for the differences in test performance, we compared the ANOVA discussed above with an analysis of covariance (ANCOVA) in which scores on the NQ served as the covariate. If the significant effect of text genre disappeared when the variance associated with transportation was removed, then an argument could be made that transportation mediated the effect of the text genre.

A 2 (text genre: story/textbook) X 2 (time assessed: immediately following the reading/1 week after the reading) ANCOVA was conducted on the quiz total scores with NQ scores serving as the covariate. A significant effect of text genre was still found, $F(1, 58) = 6.99$, $p = .01$, $\eta^2 = .11$ with those reading the story still performing better ($M = 15.06$, $SD = 2.70$) than those reading the textbook ($M = 13.53$, $SD = 2.22$). Thus, the extent to which readers were transported did not account for the difference between text genres. With transportation as a covariate, scores no longer differed as a function of time assessed, $F(1, 58) = 1.12$, $p = .30$ and the interaction between text genre and time assessed was still not significant, $F(1, 58) = .77$, $p = .76$. Thus, the extent to which the readers were transported into the text did account for long term retention of the material.

Experiment 2

Experiment 2 was conducted to replicate, extend, and clarify the findings of Experiment 1. We added a *textbook-plus-story* condition because prior knowledge and experience with story-related themes has been shown to facilitate transportation into a story (Green, 2004) and increase memory of facts presented in a story (Kuhara-Kojima & Hatano, 1991; Schneider, Korkel, & Weinart, 1989). We predicted that preliminary reading of the textbook information would enhance subsequent story reading and that this combination would outperform the story alone. We also added a *textbook-retyped* condition, identical to the original textbook excerpt, only retyped in the same font as the story. This condition was included to rule out the potential confound that the photocopied textbook excerpt decreased readability due to its smaller font. To more thoroughly assess memory we added an uncued recall task, which was administered before the quiz. Finally, we extended the latency between the initial reading of the information and the second memory assessment from 1 week to 3 weeks.

Method

Participants

The participants were 117 undergraduate students enrolled in abnormal psychology courses at a southeastern university. As with Experiment 1, students participated in their regular classrooms during regular class periods in exchange for course credit. Full participation required students to be present for both sessions, which were 3 weeks apart. Students who were present for only one session were excluded from the analyses ($n = 25$), as were students who had sought additional knowledge about the disorder in the interim ($n = 6$). The number of participants included in analyses was 86.

Materials

The reading materials were (a) the textbook excerpt and (b) the story used in Experiment 1, along with (c) a combination of the textbook and the story, and (d) the textbook excerpt retyped so its font and appearance resembled the story. The quiz from Experiment 1 and the NQ were reused in Experiment 2. The quiz item that was dropped from Experiment 1 was dropped from Experiment 2 because it persisted in discriminating poorly between stronger and weaker quiz-takers. The recall task required students to remember as many facts about dissociative fugue as they could, and write them down on a blank page.

Procedure

The procedure for Experiment 2 was largely the same as Experiment 1, except for the inclusion of the recall task, which was presented immediately following the reading. Only after participants had completed the recall task could they continue to the quiz. They were instructed not to refer back to their recall data while taking the quiz. All participants completed the experiment within the allotted 75-minute class period. As with Experiment 1, the experimenter told participants he would return at a later time to debrief them. The experimenter returned after 3 weeks to readminister the recall task and quiz.

Results

Quiz data. A 4 (text genre: story/ textbook-photocopied/ textbook-typed/textbook-plus-story) X 2 (time of assessment: immediately following the reading/3 weeks after the reading) ANOVA was conducted on the quiz scores. Both of the manipulated variables had an impact on the quiz scores: text genre, $F(3, 82) = 8.57, p = .001, \eta^2 = .24$, and time assessed, $F(1, 82) = 45.03, p = .001, \eta^2 = .35$. Tukey's post hoc comparisons were computed on main effect means to determine which means were significantly different from one another. See Table 2 for descriptive statistics. Reading the textbook-plus-story was not significantly different from reading the story alone. Reading the textbook-plus-story produced higher quiz scores than did reading either the typed or photocopied textbook. There were no differences between the story and the typed version of the textbook; however, the story did outperform the photocopied text. The typed and photocopied versions of the textbook did not produce different scores. Thus, consistent with Experiment 1, the story outperformed the textbook, particularly when readers were exposed to both the story and the textbook material. Also consistent with Experiment 1, across genres, higher scores were produced immediately after reading the material ($M = 15.01, SD = 2.66$) than 3 weeks later ($M = 13.44, SD = 2.57$); and the interaction between text genre and time assessed was not significant, $F(3, 82) = .95, p = .42$.

Table 2. Mean Quiz and Recall Scores as a Function of Text Genre

	M	SE	
<i>Quiz Scores</i>			
Story-plus-textbook	15.64	.46	
Story Only	14.94	.43	
Typed Textbook		13.48	.50
Photocopied Textbook	12.58	.44	
<i>Recall Scores</i>			
Story-plus-textbook	8.80	.56	
Story Only	7.13	.53	
Typed Textbook		6.04	.61
Photocopied Textbook	5.98	.54	

Recall data. Recall data were coded and tallied by two raters: an assistant professor of psychology and a psychology graduate student. Recall total scores were submitted to similar analyses as the quiz data above. A 4 (text genre: story/ textbook-photocopied/ textbook-plus-story/ textbook-typed) X 2 (time assessed: immediately following the reading/ three weeks after the reading) ANOVA on this variable mirrored the main effects found for the quiz scores. See Table 2 for descriptive statistics. Text genre influenced uncued recall of information about the disorder, $F(3, 82) = 5.46, p = .002, \eta^2 = .17$, such that students who read the textbook-plus-story recalled more facts ($M = 8.80, SD = 2.99$) than students who read either the typed or photocopied textbook. Those who read the story alone did not differ from those who read either textbook version. There was no difference between the story-plus-textbook and the story alone. Across genres, recall was greater immediately following the reading ($M = 8.91, SD = 3.58$) than 3 weeks later ($M = 5.09, SD = 2.53$), $F(1, 82) = 172.72, p = .001, \eta^2 = .68$.

Further, a significant interaction emerged between text genre and time assessed, $F(3, 82) = 3.07, p = .03, \eta^2 = .10$. The means and standard deviations associated with the cells are presented in Table 3. Immediately after reading, text genre influenced recall, $F(1, 82) = 6.46, p = .001, \eta^2 = .19$, such that students reading the textbook-plus-story recalled more facts than any other condition. No other differences were found among the conditions. Three weeks later the effect of text genre was marginal, $F(1, 82) = 6.46, p = .08, \eta^2 = .08$. Students reading the textbook-plus-story recalled more than those reading the textbook excerpts but not more than those reading the story alone. The story alone produced similar recall to the textbook, regardless of textbook version.

Table 3. Recall Rates as a Function of Text Genre and Time

Time	Textbook plus story	Story	Textbook typed	Textbook photocopied
After reading	11.45 (3.32)	8.94 (3.55)	7.69 (3.52)	7.50 (2.70)
After 3 weeks	6.14 (2.65)	5.31 (2.54)	4.39 (2.73)	4.46 (1.99)

Questionnaire data. A one- way ANOVA conducted on NQ total scores revealed that transportation scores varied as a function of text genre, $F(3, 82) = 5.40, p = .002, \eta^2 = .17$. Tukey post hoc comparisons revealed that, consistent with our prediction, students reading the textbook-plus-story were transported into the discourse to a greater extent ($M = 60, SD = 8.34$) than those reading the story alone ($M = 54.71, SD = 6.79$). The story alone produced greater transportation than either the typed ($M = 50.83, SD = 9.33$) or photocopied textbook ($M = 51.96, SD = 7.58$). There were no differences between textbook versions.

To determine the potential mediating impact of transportation, 4 (text genre: story/ textbook-photocopied/ textbook-plus-story/ textbook-typed) X 2 (time assessed: immediately following the reading/ three weeks after the reading) ANCOVAs were performed on both the quiz and recall scores. See Table 2 for descriptive statistics. Generally, transportation into the story did not change the impact of text genre on quiz scores, $F(3, 81) = 7.22, p = .001, \eta^2 = .21$, or recall scores, $F(3, 81) = 2.64, p = .06, \eta^2 = .09$. Transportation did appear to mediate the impact of text genre on long term retention: quiz scores, $F(3, 81) = 1.19, p = .28, \eta^2 = .02$, and recall scores, $F(1, 81) = .41, p = .28, \eta^2 = .01$. Scores at Time 1 (quiz, $M = 14.94, SE = .26$; recall, $M = 8.91, SE = .35$) were not different from scores at Time 2 (quiz, $M = 13.38, SE = .26$; recall, $M = 5.08, SE = .26$). These findings suggest that transportation again accounted for the retention of material over time but not for the impact of text genre.

Discussion

Our findings are consistent with educators' long-held belief that storied narratives are a valid, efficacious instructional genre, at times more beneficial to students than expository texts. Students who read the story consistently outperformed students who read the textbook. Further, students who read the textbook and story in combination outperformed those who read the story alone. The advantage of having read the story was evident immediately after reading and up to 3 weeks later. Both memory tasks—the quiz and the recall task—were dealt with more successfully as a result of having read the story. Our moderate to large effect sizes represent differences between reading conditions that are not only significant, but meaningful to those in search of effective strategies to enhance their curricula.

Although story readers reported greater transportation into the story world than did textbook readers, our results suggest that transportation did not account for the initial difference in test performance. However, transportation did account for the difference in test performance between time 1 and time 2, across reading conditions. Thus, memory retention over a period of weeks might be a function of how transported the reader felt

during encoding. This returns us to the idea that effortful evaluation of discourse is not essential for accurate long term retention of information. By default, information we read that remains unevaluated—perhaps because we are deeply engrossed—tends to be tagged as true (Gilbert, Krull, & Malone, 1990; Grice, 1975; Spinoza, 1982/1677). Therefore, upon retrieval of such information, readers might believe it is true semantic information from a valid source—when in actuality they read it in a fictional story. Although this misattribution has been identified as one of the seven sins of memory (Schacter, 1999), our findings suggest that such sin may be forgivable under certain circumstances.

Our findings might generalize to real-world instructional settings, in that our research design was intended to emulate a college test-taking situation. Students participated in their regular classrooms during their regular class periods, under exam-like conditions. Having the experimenter return to the classroom weeks later emulated a pop-quiz scenario in which the students were unaware that they would be retested on what they had read.

Although we conclude that narrative texts, when carefully selected or constructed, can outperform expository texts, we acknowledge the limitations of our findings. One alternate explanation for our findings is that the story was longer than the textbook, thus exposing students to more discourse for a longer time period. However, the twenty target propositions that represented the information presented in the textbook were inserted into our story in virtually identical form. Therefore, students read the same target information in both conditions. If anything, the textbook presented more disorder-related information than the story, in that the textbook propositions appeared among supporting statements. Yet, the story was a more effective learning tool. We considered equalizing the reading conditions by asking students to reread the textbook excerpt or by assigning additional excerpts from other textbooks. We reasoned, however, that this would not be ecologically valid, and that it would introduce a confound—exposing textbook readers to more target information than story readers. Further, there is evidence that narrative texts and expository texts are encoded into memory at different rates. Zwaan (1994) found that readers took longer to read a text when told it was a story than when told it was a news article. Thus, equalizing the length of the two texts in the present study would not necessarily have equalized reading time or depth of memory encoding.

Our findings are promising, but are limited in the sense that we tested only one story in one discipline. We predict that future research will expose the versatility of the storied narrative in any number of learning contexts—including those disciplines that do not readily lend themselves to fiction. Gerrig and Prentice (1991) and Janit and Millis (2004) found that *context-free assertions* (i.e., propositions embedded within a story that are independent of the situation model) were subject to incorporation into semantic memory. Thus, a story could center around an evening of socializing among college students, while protagonists and other characters could make unrelated utterances about mathematics, physics, economics, or another discipline. Provided readers identify with story characters and are suitably engrossed in the story, these propositions have the potential to be tagged as facts and encoded into semantic memory. Anything that can be spoken can be embedded in a story. Therefore, educators from various disciplines might be able to write and/or adapt stories to help students learn historical information, scientific formulas, theories, laws, and procedures.

Variables such as individual differences in learning style, reading ability, and affinity toward storied narratives were not examined in the present research. In order to confidently adopt stories into curricula, we should assure that stories do not impede the learning of a subset

of students who would otherwise learn more effectively. Fernald (1987, 1989) found that students generally prefer reading and being tested on stories than on textbooks. Future research should collect data such as Fernald's in combination with data such as ours, to assess whether students' preferred reading and learning modalities are correlated with their test performance in those modalities. Future research should also correlate student's trait absorption (Tellegen & Atkinson, 1974) with their test performance, to assess whether those who more easily become absorbed in discourse are more likely to incorporate story information into semantic memory. The results of these proposed studies might assist educators tailor their individual students' learning more effectively.

Before instructors adopt narrative texts into their curricula, such texts should be systematically tested to assure that they outperform and/or increment what is learned from expository texts. Potential text adoptions should be carefully assessed in terms of the content and the literary elements necessary for effective learning. For those who set curricula and select texts for adoption, and for would-be writers of educational texts, we list the literary elements we incorporated into our story: discourse that transports readers into the story world (Gerrig, 1993; Green & Brock, 2000); story characters who are psychologically realistic (Oatley, 1999) and with whom readers identify (Janit & Millis, 2004); content that evokes strong emotion (Zillmann, 1991) and promotes the mental simulation of social situations (Mar & Oatley, 2008); discourse that promotes curiosity, surprise, and suspense by adjusting the temporal sequence in which events are presented, by strategically introducing critical information, and by postponing resolution to the very end (Brewer & Lichtenstein, 1982); and themes of love and conflict (Hogan, 2003).

We foresee some fruitful collaboration between creative writing faculty and faculty from other disciplines. Faculty could work together on the creation of each short story, and on how the desired target information is embedded for optimal learning. There might be some relatively simple ways faculty could adapt these short stories to their curricula on an ongoing basis, in that the interests and utterances of story characters could be rewritten to accomplish desired learning goals.

In conclusion, our age-old storytelling tradition appears to be an important avenue of learning that should be harnessed to help meet the challenges of contemporary teaching. Stories appear to increase student motivation, enthusiasm, and involvement, while decreasing resistance and suppressing the kind of evaluation that leads students to reject the information they read. Our results suggest that stories facilitate test performance in an abnormal psychology course, and hint at their potential for use in similar college and high school courses.

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