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Learning from Fictional Sources

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This story begins with my (EJM) convincing Roddy to take me on as a postdoctoral fellow at Washington University, based on my dissertation on the Deese–Roediger–McDermott (DRM) memory illusion (Deese, 1959; Roediger & McDermott, 1995). As all memory researchers now know, the DRM illusion involves presenting people with a list of associated words (e.g., *bed*, *rest*, *awake*, *tired*, . . .) and examining false recall and false recognition of a critical lure (e.g., *sleep*) that is associated to all of the studied items (see McDermott, chapter 18, this volume). In my dissertation, I argued that a reality monitoring error (Johnson, Hashtroudi, & Lindsay, 1993) played a role in the illusion (Marsh & Bower, 2004). Although my dissertation experiments on DRM were what helped convince Roddy to take me on, I only conducted one experiment on the DRM illusion during my time in St Louis, on the role of testing in creating the illusion (Marsh, McDermott, & Roediger, 2004). Rather, almost as soon as I arrived in St Louis, I began a new line of research that combined my interests in source memory (e.g., Marsh & Bower, 1999) with my personal love of literature. Always willing to try new things, Roddy agreed I could stray from DRM to create a paradigm for studying learning from fiction.

WHY STUDY FICTION?

There are two answers to this question: one for cognitive psychologists, and one for everyone else in the world. We begin with the answer that one's seatmate on an airplane would prefer to hear. That is, people learn about the world from many different sources, including other people, newspapers, textbooks, classes, museums, and so on. While encyclopedias, nonfiction books, documentaries, and other such sources are designed to teach, learning may also result from exposure to noneducational sources that happen to contain information about the world. Fictional sources such as television sitcoms, movies, novels, short stories, and even comic strips often occur in familiar political, geographical, historical, and other contexts. As such, fiction is potentially a source of information about the world, something that educators often take advantage of as they try to motivate students

to learn. In areas as varied as the Holocaust (Short, 1997), disabilities and diversity (Stark, 1986), alcoholism (Cellucci & Larsen, 1995), biology (Dubeck, Moshier, & Boss, 2004), physics (Storey, 1982), and history (Roser & Keehn, 2002), suggestions have been to made to integrate stories, poems, and songs into the classroom. Interest in these types of materials has moved from individual teachers to the level of state agencies. For example, in the fall of 2004, Maryland introduced comic books into its public school curricula to help engage students in grades K-12 (Mui, 2004). In North Carolina, state-approved texts for social studies include both a traditional textbook (*Social Studies Alive!*, 2003) and an anthology that allegedly covers the same material, albeit via biographies, stories, folk tales, tall tales, nonfiction selections, plays, poems, and songs (*Read-Aloud Anthology*, 2002).

However, fiction is not required to be accurate, and as such is also a source of *misinformation* about the world. Regardless of what you see in the movies, it is difficult to ignite gasoline with a dropped cigarette, jumping through a window should cause major lacerations, and there is no sound in space. The transcontinental railroad pulled a disappearing act in Larry McMurty's classic western novel *Lonesome Dove*, and Apple computers and boom boxes appeared in fictional time prior to their actual existence in John Updike's novel *Memories of the Ford Administration.* Such examples lead to questions about whether readers are aware of inaccuracies in fiction, how much (and when) readers rely on fiction for information about the world, and their awareness of any reliance on fiction.

In short, one's seatmate on an airplane is likely to agree that watching movies and reading novels is fun, and that such sources contain both correct and incorrect information about the world. Unless one is seated next to a psychologist, the conversation will likely soon end.

One major concern (from the point of view of a cognitive psychologist) is that there has been little formal evaluation of learning from fictional sources in educational settings. Instead of assessing long-term retention of facts, a number of studies have measured student enjoyment of the materials (Smith, 1993). However, even if students like watching movies and reading novels in school, it does not guarantee that they are good teaching tools. And the great variety of fictional materials available means that conclusions about one set of sources will not necessarily generalize to a different set of materials.

Comparisons of learning from fiction versus more traditional sources began as early as 1927, when Schaffer published data showing that children learned as much about the Industrial Revolution from a passage in standard textbook form as from an episodic narrative (e.g., a day in the life of a worker during the industrial revolution). The results of such studies are varied, in part because there are often many differences between the traditional and nontraditional materials, such as specific content, modality, and instructional technique. For example, consider a recent study that found students who had read historical fiction learned more than did members of a classroom who read a traditional textbook (Smith, 1993). Students in the historical fiction classroom not only read the materials, but also discussed them and integrated them with other activities such as role-playing, and

consequently spent more time on the material than did students in the classroom using the text.

Two differences (among many) between fictional sources and more traditional materials will be considered here. First, sources such as movies, novels, and short stories tend to be in narrative form, whereas textbooks are normally expository. Second, movies, novels, and short stories are explicitly labeled fictional (although oftentimes they represent a mix of fact and fiction), whereas textbooks are explicitly labeled veridical. Both of these differences are of interest to the cognitive psychologist, and will be discussed below.

We begin with the argument that any consequences of learning from nontraditional materials versus textbooks may have nothing to do with the fact–fiction dimension, but rather the type of processing afforded by the style of the materials. This idea derives from the Material-Appropriate Processing framework (McDaniel & Einstein, 1989). That is, materials differ naturally in what kinds of processing they encourage. Expository texts (e.g., traditional textbooks) encourage item-specific processing; that is, processing propositions separately without relating them to one another. In contrast, narratives (e.g., fairy tales) encourage relational processing; that is, processing that connects propositions rather than focusing on individual items. Several elegant experiments have shown that the most effective study strategies are ones that encourage the reader to engage in a form of processing not naturally afforded by the text. For example, unscrambling randomized sentences requires subjects to connect sentences to one another; accordingly, this strategy boosts memory for expository passages, but not fairy tales, which are already encoded in a relational fashion (Einstein, McDaniel, Owen, & Coté, 1990). Thus, one answer to the question "why study fiction" is to further our understanding of the kinds of processing fiction naturally affords, with implications for study strategies to improve learning from fiction.

Second, from the perspective of a cognitive psychologist, there are theoretically interesting questions that are unique to the domain of fiction. Consider an idea dating back to Samuel Taylor Coleridge (1817/1906), who argued that reading poetry about the supernatural requires a "willing suspension of disbelief" (p. 161). That is, "poetic faith" is required to accept implausible characters, events, and ideas for the sake of enjoying a text (p. 161). Although Coleridge was a poet and not an experimental psychologist, his idea remains an interesting and controversial one that will be revisited later in this chapter. Another related concept specific to the domain of fiction is *transportation*, or involvement in a text (and is not a reference to *Star Trek*, as Roddy suggested upon first hearing the term). Typically measured by self-report, the term follows from the idea that a deeply engaged reader is mentally transported to the story world (Gerrig, 1993). Transported readers endorse scale items such as "I wanted to learn how the story ended" and "The story affected me emotionally" but *not* items like "I found my mind wandering while reading the story" (Green & Brock, 2000). The concept of transportation is clearly related to attention; the transported reader has devoted all of his or her attention to the story and none to current reality. But ideally transportation goes beyond attention, and is more similar in flavor to Tulving's notion of mental time travel (Tulving, 2002). Current research is just beginning to tackle this issue.

Both the concept "willing suspension of disbelief" and the idea of transportation exemplify a key theme: What is the relationship between the story world and the real world? Again, cheering for Han Solo or the ghostbusters might seem to require an immersion in the fictional world to the exclusion of reality. Yet there is often an overlap between the two: *Gone with the Wind* depicts the infamous war of the states, and the dictators were all too real in historical novels such as Lily Tuck's *The News from Paraguay* and Julia Alvarez's *In the Time of the Butterflies.* On the one hand, it seems the fictional world is *compartmentalized* or otherwise kept separate from reality; but an argument can also be made for *integration* between the two (see Potts & Peterson, 1985). This issue is key when studying the representation of facts learned from fiction. Integrating facts from fiction would mean they were linked to pre-existing world knowledge. In its strongest form, integrated "fictional" facts would be represented in the same form as any other world knowledge, without any link to the fictional source. On the other hand, perhaps due the low credibility of the fictional source, compartmentalized "fictional" facts would be represented in memory apart from other world knowledge. These distinctions about the ways people represent, think about, and use fictional knowledge form the background for our laboratory investigations.

HOW TO STUDY LEARNING FROM FICTION IN THE LAB

To create a laboratory analog of learning from fiction, we embedded true and false facts in stories read for a reading comprehension task in a larger study on reasoning abilities; the last experimental task was a general knowledge test. Of interest was whether students would use information from the fictional stories to answer general knowledge questions, even though they were warned against guessing on that test.

The largest challenge in this endeavor was to create fictional stories in which to embed the critical facts. Nine stories were created dealing with a wide range of topics such as a hunting trip in Alaska, an art thief, and a student's first day of medical school. The stories were each two to three single spaced pages and contained characters, dialogue, and plot. Embedded within each story were references to items from the Nelson and Narens (1980) norms. Half of the items referred to easy questions (on average 70% of the students in Nelson & Naren's study answered these questions correctly) and half referred to hard questions (15% of students in the norming study answered them correctly). The reason for manipulating fact familiarity was to see if suggestibility was limited to cases where subjects were unlikely to know enough to detect the misinformation.

In each story, the correct answer was given for a third of hard and easy critical items, an incorrect answer was given for another third and the rest of the sentences remained neutral. This structure also allowed us to counterbalance each fact so that across subjects it was read equally often in correct, neutral, and misleading formats—something impossible to do when using real novels or films. For example, a story about a school science fair contains a reference to the only breed of cat that has blue eyes. The neutral sentence states, "It also didn't help when

Billy's mother painted the contraption the same blue as their cat's eyes." The sentence is neutral because it does not imply a particular breed of cat. In contrast, the correct version of the sentence reads ". . . the same blue as their Siamese cat's eyes" and the misleading version reads ". . . the same blue as their Angora cat's eyes." In all cases, of interest would be performance on the final cued recall question, "Which breed of cat has blue eyes?" The final test contained both critical items (questions that referred to information presented in the stories) and filler questions. Participants were warned not to guess and were able to skip any questions for which they did not know the answer. A fuller description of these materials can be found in Marsh (2004) and an additional sample is included in the Appendix of this chapter.

Performance on the final general knowledge test was affected by story reading, even though participants were warned against guessing and had the option to skip questions (Marsh, Meade, & Roediger, 2003). When participants had read the correct answer to a question in one of the stories, they were more likely to answer the question correctly (e.g., *Siamese*) than participants who had read a neutral version of the same fact. When participants read misinformation, they were less likely to answer the question correctly than if they had read a neutral frame (see Figure 22.1). Put another way, subjects who read "*Angora*" in the story about the science fair were less likely to answer "Which breed of cat has blue eyes?" with "*Siamese*" than were subjects who read a neutral reference to a cat. Because misled subjects performed worse than baseline, we can conclude that in at least some instances, subjects changed their correct beliefs to match the

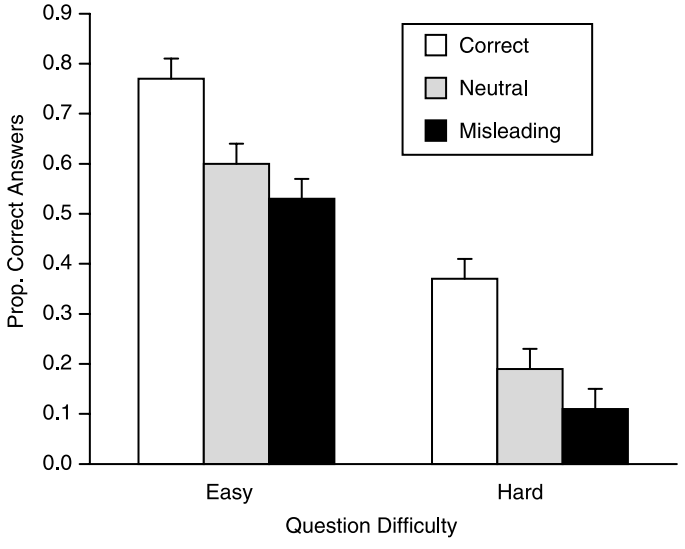

FIGURE 22.1 The effect of reading correct, neutral, and misleading facts on proportion of questions correctly answered on the final general knowledge test (cued recall format). Easy questions are on the left and hard questions are on the right (data from Marsh et al., 2003, Exp. 2).

misinformation. Effects of misinformation were not isolated to instances where subjects did not know the correct answer.

A robust misinformation effect occurred on the final test: When people had read the misinformation in the stories, they were likely to use that misinformation to answer questions on the final test. These data are shown in Figure 22.2. Misinformation production was defined as producing the specific incorrect answer (e.g.,) that was presented in the story, and this dependent measure did *not* include production of other wrong answers (e.g., *Persian*). Because the misinformation lures were plausible answers, subjects who had read the correct or neutral versions of a fact did occasionally produce the misinformation answer at test (as indicated by the white and striped bars in Figure 22.2). This baseline production of the misinformation was low, and increased dramatically when subjects read misinformation in the stories (as indicated by the black bars in Figure 22.2). The misinformation effect was robust even when the errors contradicted better-known facts about the world, a surprising finding since blatantly contradictory misinformation in the Loftus eyewitness paradigm reduces suggestibility (Loftus, 1979). Furthermore, the misinformation effect *increased* when subjects had read the stories twice rather than once, even though a second story reading allowed readers a second chance to catch the errors (Marsh et al., 2003). The end result was a suggestibility effect much larger than is often observed in misinformation paradigms. Intriguing as this may be to the cognitive psychologist, it is also interesting to the layperson—a good thing, since the second author of this

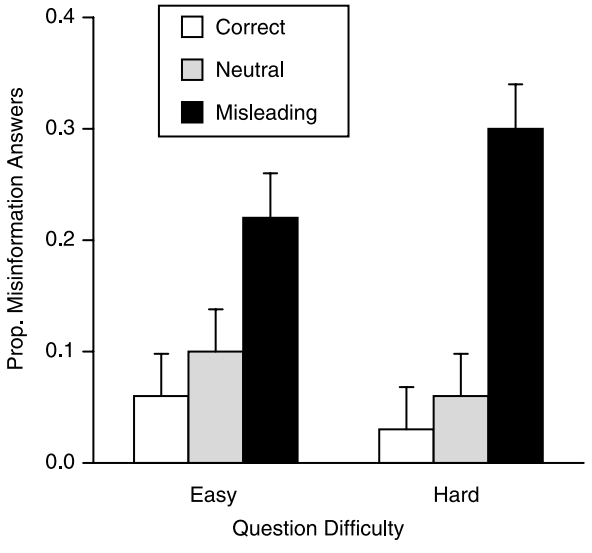

FIGURE 22.2 The effect of reading correct, neutral, and misleading facts on proportion of questions answered with target misinformation on the final general knowledge test (cued recall format). Note that misinformation is defined as the specific wrong answer presented in the text, rather than any wrong answer. Easy questions are on the left and hard questions are on the right (data from Marsh et al., 2003, Exp. 2).

chapter (LKF) happened to participate in one of the original experiments when she was a freshman at Washington University. These puzzling results motivated her interest in cognitive psychology and led her to work in the Roediger lab before going on to graduate school at Duke University.

CAN THE ILLUSION BE AVOIDED?

During our time in the Roediger lab, one common theme was to attempt to reduce memory errors via warnings. For example, Dave Gallo showed that a warning given *before* a DRM list reduced false memory, although it was much less effective when given after study (Gallo, Roediger, & McDermott, 2001). In her dissertation, Michelle Meade examined if warnings could reduce the negative effects of forced recall and collaboration (Meade & Roediger, 2006; see also Meade & Roediger, 2002, for another warning study done in this time-frame). In this context, a fiction study was run in which suggestibility in two experimental groups was compared to a control; one experimental group was warned against fiction's errors *before* story-reading and the other was warned *after* reading and immediately before the final general knowledge test.

Surprisingly, warnings did nothing to reduce reproduction of fiction's errors, even when given prior to story reading. In addition to differing from Dave Gallo and Michelle Meade's work, this contrasts with work on other memory errors, such as the eyewitness misinformation paradigm (e.g., Greene, Flynn, & Loftus, 1982) and the false fame effect (Multhaup, 1995). We did find a main effect of warning: Subjects were more conservative when they had been warned, producing fewer errors overall, but they weren't able to selectively edit out reproduction of the story's errors (Marsh & Fazio, in press).

EXPLAINING THE ILLUSION: PROBLEMS WITH CRITICAL READING

Why would warnings given before study aid participants in the DRM and eyewitness paradigms, but not when they were learning from fiction? A major difference is that the errors in the fiction paradigm contradict pre-experimental knowledge about the world, rather than a recently experienced episode. When we turn instead to the literature on semantic illusions, the data are more similar to that observed in the fiction paradigm (and less like the effects observed in other false memory paradigms). For example, readers have great difficulty in noticing the problem with the sentence "*Moses took two animals of each kind on the Ark*" (Erickson & Mattson, 1981).

The partial matching hypothesis has been proposed to explain why readers fail to notice the error in the text (it was Noah, not Moses, who boarded the ark). The idea is that if error in the text is semantically related to the correct answer, then the system may not notice the error (Kamas, Reder, & Ayers, 1996; Reder & Kusbit, 1991). It is not an encoding failure; the entire sentence is encoded into memory. It

is also not a retrieval failure; all of the relevant information is retrieved from semantic memory. The failure comes when the person compares what they read to what they retrieved from semantic memory. He or she fails to notice the discrepancy between the encoded sentence and the recalled information.

Almost 90 years ago, Edward Thorndike discussed a similar comprehension failure (1917). In his paper "Reading as Reasoning: A study of mistakes in paragraph reading," Thorndike proposed that reading is not a simple passive action, but rather is a complex and active process similar to reasoning. Thorndike suggested that people may experience difficulties comprehending because of a "failure to treat the ideas produced by the reading as provisional, and so to inspect and welcome or reject them as they appear" (p. 327). That is, people may accept what they read as the truth without comparing it to their knowledge about the world.

The illusion can also be related to an idea originally proposed by the philosopher Spinoza (1677/1982). Spinoza believed that any statement had to be accepted as true before it could be evaluated and proven false. So when reading the Appendix sentence "*And the winner of that contest will get to go the international science fair in St Petersburg, the capital of Russia!*" as part of the comprehension process, you would first believe St Petersburg to be the capital of Russia. Only once you understood the sentence would you evaluate it and decide that it was false. Recent experimental support for Spinoza's ideas has come from Gilbert and colleagues (Gilbert, 1991; Gilbert, Tafarodi, & Malone, 1993), who showed that people under cognitive load were biased to regard statements as true.

Evaluating information as false may be even more difficult for the story-reader. An active reader must devote cognitive resources to applying schemas to story characters and building and updating situation models of the story (e.g., Bower & Morrow, 1990; Johnson-Laird, 1983), meaning fewer resources can be allocated to evaluating and disbelieving background information. Another potential problem is Coleridge's (1817/1906) hypothesis of a "willing suspension of disbelief" (p. 6), suggesting that readers process fiction differently so that implausible events and ideas do not diminish enjoyment of a text. Although the idea of a "special mode" for fiction processing is less popular today (see Gerrig, 1993) several studies do suggest that one's general knowledge is less accessible during story reading. That is, even if disbelief is not *willingly* suspended, reading a fictional narrative may interfere with retrieval of facts from semantic memory. For example, readers were slower to verify the well-known fact that Abraham Lincoln was assassinated when reading a narrative that suggested Lincoln was late to the theater on the fatal night (Gerrig, 1989). Similarly, more involved readers (as measured on a self-report transportation scale) were less likely to indicate that parts of a narrative "rung false" to them (Green & Brock, 2000).

In our own research, we have found detecting errors in stories to be much more difficult than we expected (Marsh & Fazio, in press). In one study, participants read short stories one sentence at a time on the computer; stories contained both correct and incorrect facts. Participants in the detect condition were told to press an "error" key whenever there were one or more errors in a sentence. For sentences that contained factual inaccuracies, participants pressed the "error" key only 32% of the time. While 32% is above the rate of keypresses to sentences that

did *not* contain errors (a false alarm rate of 26%), it is hardly an impressive error detection rate. Based on the Nelson and Narens (1980) norms, participants should be able to answer 65% of the questions correctly in *cued recall* format—and likely more on a recognition test. Thus, the 32% detection rate is much lower than what subjects should be able to recognize.

In summary, we believe difficulties during story reading play an important role in learning false facts from fiction. Readers have no trouble learning information from the stories—but they appear to have a problem in evaluating the veridicality of the information they are learning.

EXPLAINING THE ILLUSION: THE ROLE OF SOURCE MONITORING

Source monitoring problems have been implicated in a number of memory errors. That is, when making old/new recognition judgments or recalling events, subjects have a tendency to call items "old" without necessarily discriminating among old items from different sources. This is problematic when the goal is to remember what one actually saw or heard—things imagined, or seen or heard later, are not functionally the same kind of old items.

Some memory errors are caused by *source amnesia*—that is, subjects simply do not remember the source of their memories (Schacter, Harbluck, & McLachlan, 1984). Source amnesia appears to play an important role when information comes from a low credibility source, because if subjects remembered the low credibility source they would be likely to avoid relying on it. For example, in variants of the eyewitness postevent information procedure, participants are less suggestible when the misinformation comes from a less credible source such as a naïve interviewer (Smith & Ellsworth, 1987) or a defense lawyer (Dodd & Bradshaw, 1980). Reliance on low credibility sources often comes after a delay, when the source is no longer remembered, as in the classic sleeper effect (Hovland, Janis, & Kelley, 1953; Hovland, Lumsdaine, & Sheffield, 1949). That is, communications from a low credibility source have little impact on participants' attitudes initially, but under the right conditions this pattern reverses over time as the source is forgotten (Gillig & Greenwald, 1974). A similar effect happens in the eyewitness postevent information paradigm: Misinformation from low credibility sources is ignored at short delays, but after a delay it affects the subjects' memories (Underwood & Pezdek, 1998).

However, source amnesia cannot explain the data observed in the fiction paradigm. When subjects were queried about whether or not their answers had appeared in the stories, they were excellent at knowing they had read the answers in the story. In addition, delay reduced the illusion rather than increasing it, even though the delay likely reduced source memory (Marsh et al., 2003).

Nor is suggestibility in the fiction paradigm reduced by instructions to monitor source at test, even though source monitoring tests have reduced memory errors in other paradigms. Source monitoring instructions lead to less suggestibility in the eyewitness postevent information paradigm (e.g., Lindsay & Johnson, 1989), in

laboratory simulations of unconscious plagiarism (Marsh, Landau, & Hicks, 1997), in situations where the familiarity of a name is inappropriately attributed to fame (Multhaup, 1995), and in the DRM paradigm (Multhaup & Conner, 2002). We manipulated the timing of source monitoring instructions (before or after producing answers to the general knowledge questions), with no consequences for behavior (Marsh et al., 2003, Exp. 2). If drawing attention to source were key, we would have expected that online monitoring of source would have reduced suggestibility compared to a condition in which subjects went back through their tests and made post hoc source decisions. This was not the case.

Examinations of aging effects also highlight the differences between the fiction paradigm and other false memory paradigms. As shown in Figure 22.3, reading stories like the one in the Appendix yielded the largest misinformation effects in young adults, followed by healthy older adults, then older adults with early stage dementia (Marsh et al., 2005). Suggestibility in this paradigm *decreases* with age—the exact opposite of what is typically observed in the eyewitness misinformation paradigm (Multhaup, de Leonardis, & Johnson, 1999), the DRM paradigm (Balota et al., 1999; Kensinger & Schacter, 1999; Norman & Schacter, 1997), and the false fame paradigm (Dywan & Jacoby, 1990). In these paradigms, older adults' problems are linked to their difficulties with source monitoring (Ferguson, Hashtroudi, & Johnson, 1992), likely because of age-related declines in frontal functioning (Glisky, Rubin, & Davidson, 2001). Marsh et al. (2005) did observe standard age differences in source memory—when asked whether or not the facts

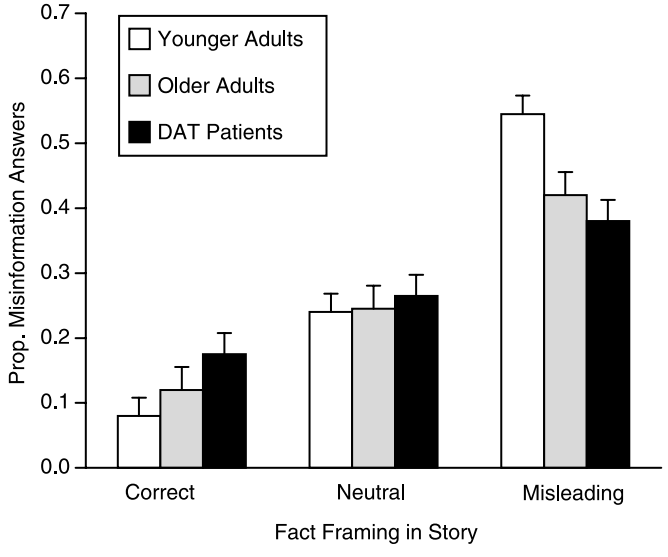

FIGURE 22.3 The effect of reading correct, neutral, and misleading facts on proportion of general knowledge questions answered with misinformation answers, for younger adults, older adults, and early stage dementia patients (DAT = dementia of Alzheimer's type). Note that misinformation is defined as the specific wrong answer presented in the text, rather than any wrong answer (data from Marsh, Balota, & Roediger, 2005, Exp. 2).

had been read in the stories, performance was best in the young adult group, then the healthy older adults, then the early-stage DAT patients—but what is critical is that source monitoring abilities in this study were opposite to suggestibility, meaning that a source monitoring deficit was not responsible for suggestibility.

Data from a second source judgment (made by college students in another experiment) provided an important insight into subjects' suggestibility: Key was subjects' reports of whether or not each answer was part of one's general knowledge (with general knowledge carefully defined as pre-experimental knowledge, things known at least a day before the experiment). After answering a question on the general world knowledge test, subjects made two judgments: First, they marked whether or not the answer was one that they had read in the story, and second they indicated whether or not they had known the answer prior to the experiment. It is important to note that each question was answered separately; that is, subjects could answer both questions affirmatively (meaning they remembered reading the answer in the story *and* believed that they had known the fact prior to the experimental session). We noted earlier in the chapter that subjects were good at knowing that they had read the answers in the stories. What is important here is that subjects tended to say that they knew the answers before entering the experiment, even the misinformation answers (Marsh et al., 2003). Figure 22.4 shows that when subjects read the misinformation in the stories, they produced those wrong answers on the final test *and* stated that they had known the incorrect answers before coming in for the experiment. The subjects also knew many of these facts had been embedded in the stories, but attributed their initial learning to outside of the experiment. While prior knowledge is a possible explanation for correct answers, it is highly unlikely for the misinformation answers (base-rate production of target misinformation in the neutral condition was low across experiments). Reading errors in short stories led to a false belief that one knew the errors prior to entering the experiment, similar to hindsight biases (Fischoff, 1977), false fame effects, illusory confidence (Kelley & Lindsay, 1993), and illusory truth effects (Begg, Robertson, Gruppusop, Anas, & Needham, 1996; Hasher, Goldstein, & Toppine, 1977). In these other paradigms, subjects also fail to correctly attribute recently acquired familiarity to an experimental source (see Jacoby, Kelley, & Dywan, 1989, for a description of the attributional account of memory). With a hindsight bias, subjects misattribute recent feedback about an answer to their own prior knowledge; in the false fame paradigm, experimentally-induced familiarity (in the absence of recollection) is misinterpreted as fame; in the illusory confidence paradigm, recent (isolated) exposure to answers speeds later retrieval of and judged confidence in those answers; in the illusory truth effect, the familiarity of a previously presented fact is interpreted as increased truthfulness. Similarly, our readers misattributed the familiarity of the misinformation to their previous knowledge, while acknowledging they had also read it in the stories.

In summary, source monitoring does play a role in learning from fiction. However, the problem is not in remembering the story source. Rather, the problem is that story reading boosts the familiarity of facts (true or false), and this familiarity is misattributed to prior knowledge.

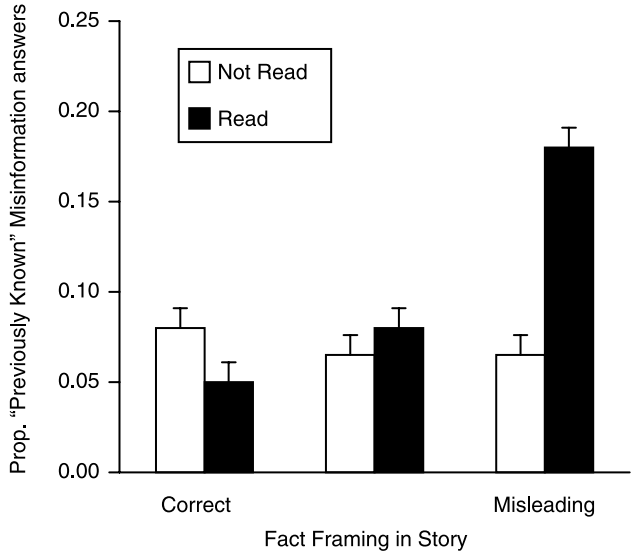

FIGURE 22.4 The effect of reading correct, neutral, and misleading facts on proportion of questions that were answered with misinformation and the misinformation answer was said to be known before the experiment. Note that misinformation is defined as the specific wrong answer presented in the text, rather than any wrong answer (data from Marsh et al., 2003, Exp. 2).

CONCLUSIONS

Like many laboratory tasks that model complex real-world behaviors, performance in the fiction paradigm is not driven by a single mechanism. First, during story reading, multiple problems may to lead to the learning of false facts. The reader may *not* have information stored in long-term memory to contradict a false fact, or transportation ("mental travel") into the story may reduce access to the knowledge needed to contradict the error. Even if the correct information is retrieved, the reader may fail to note the discrepancy between what they just read and what they already know—especially if the correct and incorrect information are conceptually related (as they are in our paradigm). An additional problem can arise during general knowledge testing. While suggestibility in this paradigm is not driven by source amnesia, a different kind of source error is involved: Subjects misattribute the familiarity of false facts to prior knowledge.

While the fiction paradigm appears related to the eyewitness misinformation paradigm, the similarities are procedural rather than in mechanisms of suggestibility. While it is true that both paradigms measure the effects of misinformation exposure on later test performance, it is important to note that standard manipulations have different effects on suggestibility in the two paradigms. Pre-encoding warnings reduce suggestibility in the eyewitness (Greene et al., 1982) but not the fiction paradigm (Marsh & Fazio, in press). Forgetting of the misinformation

source appears more important for eyewitness suggestibility (Underwood & Pezdek, 1998) than in learning false facts from fiction (Marsh et al., 2003). Similarly, instructions to monitor source reduce errors in the eyewitness misinformation paradigm (Lindsay & Johnson, 1989), but not in the fiction paradigm (Marsh et al., 2003). Finally, age is positively associated with suggestibility in the eyewitness paradigm (Multhaup et al., 1999), but negatively associated with learning false facts from stories (Marsh et al., 2005).

While we are slowly unraveling the various factors involved in learning falsehoods from fiction, many questions remain. Because fictional and expository texts naturally differ in many ways, it has been difficult to disentangle the key factors. Put another way, are fiction readers suggestible because fiction tends to be in a narrative form and is transporting—two characteristics that may also describe certain kinds of nonfiction texts (albeit less frequently than fiction)? Or is there something special about fiction, whereby knowing that a story is fictional increases transportation and reduces monitoring and access to related world knowledge? Definitive answers to these questions require further research, but we now have the tools to further our investigations—in large part due to Roddy's thoughtful advice to begin with a simple and controlled study and build upon it. One of Roddy's many talents is creating easy-to-manipulate controlled paradigms that capture real-world behaviors, such as false memories (Roediger & McDermott, 1995) and imagination inflation (Goff & Roediger, 1998), and we are grateful to have had the chance to learn from him.

APPENDIX

Excerpt from "The Inventor" and the corresponding questions on the final general knowledge test. In this sample, critical facts appear in italics, with the first reference being correct, the second neutral, and the third misleading. *xxxxx* is a placeholder and means no words need be added to create the neutral version.

> It was a crisp fall day, Billy was ten years old and in Ms. Pringle's fifth grade class. The day began as a normal Friday—everyone was talking about their weekend plans, and planning their costumes for the upcoming Halloween parties. But everything changed for Billy when Ms. Pringle made her announcement:
>
> "Boys and girls! Your attention please! I have exciting news." She paused, waiting for the students' full attention. "I'm happy to announce that this year's science fair will be held just three short weeks from today." She held up her hand to stop the groans from the children. "Now class, you know this can be fun. To help motivate you, we have a special prize this year—the winner of the science fair will win a trip to the national contest, which will be held in *Dover / xxxxx / Wilmington*, the capital of Delaware. And the winner of that contest will get to go the international science fair in *Moscow / xxxxx / St Petersburg*, the capital of Russia!"

Sample General Knowledge Questions:

What is the capital of Delaware?
What is the capital of Russia?

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