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Searching for Judy: How small mysteries affect narrative processes and memory

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Abstract

Current theories of text processing say little about how author's narrative choices, including the introduction of small mysteries, can affect readers' narrative experiences. Gerrig, Love, and McKoon (2009) provided evidence that one type of small mystery—a character introduced without information linking him or her to the story—affects readers' moment-by-moment processing. For that project, participants read stories that introduced characters by proper name alone (e.g., Judy) or with information connecting the character to the rest of the story (e.g., our principal Judy). In an on-line recognition probe task, responses to the character's name three lines after his or her introduction were faster when the character had *not* been introduced with connecting information, suggesting that the character remained accessible awaiting resolution. In the four experiments in this paper, we extended our theoretical analysis of small mysteries. In Experiments 1 and 2, we found evidence that trait information (e.g., daredevil Judy) is not sufficient to connect a character to a text. In Experiments 3 and 4, we provide evidence that the moment-by-moment processing effects of such small mysteries also affect readers' memory for the stories. We interpret the results in terms of Kintsch's Construction-Integration model (1988) of discourse processing.

Keywords

discourse processing; narrative comprehension; mystery; memory representation

Authors craft their stories with the intention of entertaining the people who read them. There are many ways in which authors accomplish this, but one is undoubtedly the judicious use of mystery. In some stories, the events that unfold are mysterious to the characters in the story: consider Sherlock Holmes' tireless investigation into a rich landowner's death, or a narrator's terrifying visit to the House of Usher. In other stories, including the stories we examine in this paper, the events are mysterious only to the reader.

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Much narrative analysis has focused on the manner in which narrators parcel out information (e.g., Sternberg, 2001; Bordwell, 1985). Often, the information that a narrator chooses *not* to relate is precisely what impels a reader to continue reading. As Iser (1980) noted, “It is only through inevitable omissions that a story gains its dynamism” (p. 55). We argue that readers’ responses to these omissions, or mysteries, must be incorporated into cognitive psychological theories of text processing. Consider the opening paragraph from Mary Robinson’s short story *Coach* (1981, p. 1222):

The August two-a-day practice sessions were sixty-seven days away, Coach calculated. He was drying breakfast dishes. He swabbed a coffee cup and made himself listen to his wife, who was across the kitchen, sponging the stove’s burner coils. “I know I’m no Rembrandt,” Sherry said, “but I have so damn much fun trying, and this little studio—this room—we can afford. I could get out of your way by going there and get you and Daphne out of my way. No offense.”

This paragraph raises large, open-ended questions. For example, why does Coach have to *make* himself listen? But it also introduces a smaller, more immediate mystery. Who is Daphne? Sherry’s use of a proper name indicates that Daphne is well-known to both herself and her listener (Ariel, 1990), but Daphne is not yet known to the reader. Nor is it yet clear how Daphne will function in the narrative world.

To begin incorporating mysteries into theories of text processing, Gerrig, Love, and McKoon (2009) investigated mysteries like that presented by Daphne. This type of mystery, conceptualized as a gap between what the author and characters know and what a reader is allowed to know, is commonplace in ordinary narratives. Gerrig et al. used texts like this one:

Frank was not looking forward to presenting his latest ideas. He gathered his notes and computer and headed toward the meeting room. On the way, his pal Maria gave him a reassuring smile. “I’m certain Judy will admire what you show her,” said Maria.

What happens when Judy—who we will call the *mystery character*—enters the story? Gerrig et al. (2009) provided initial evidence that such characters—who are known to other characters in a story but not to the reader—remain more available through subsequent text than characters for whom there is no mystery. Participants read short stories like the Judy story line-by-line at their own pace. At some point in each story, they performed a probe recognition task (e.g., Gernsbacher, 1989; Holtgraves, 2008; Dopkins & Ngo, 2005): They indicated as quickly and accurately as possible whether a test word had appeared earlier in the story. There were two versions of each story, one without any identifying information for the mystery character (as above for Judy) and one with information that linked the character to the rest of the story. In Judy’s case, she was introduced as “our principal Judy.” For the test word “Judy” presented four lines after her introduction, participants were reliably quicker to indicate that her name had appeared when no identifying information was given. We interpreted this to indicate that “Judy” continued to be highly available when her mystery remained intact.

Gerrig et al.’s (2009) finding can be understood in terms of models of text comprehension that include a memory-based spread of activation that connects elementary units of text. One such model is the Construction-Integration model (Kintsch, 1988; see also, Graesser, Millis, & Zwaan, 1997). According to the model, a text is made up of propositions, and a proposition is made up of a relation and its arguments. Table 1 shows all the propositions of the first four sentences of the Judy story given above. (Presenting, Frank, ideas), for example, has the relation “presenting” and the arguments “Frank” and “ideas.” Propositions may be embedded in one another, as the second proposition (not, 1) in Table 1 is embedded in the first.

To structure a text, propositions are connected to each other via argument overlap. If two propositions share an argument, then they are directly connected. In the Judy story, all the

propositions with Frank as an argument are directly connected to each other. If two propositions do not share an argument, then they are only indirectly connected. For example, (latest, ideas) does not have Frank as an argument, so it is connected to Frank only indirectly, through the proposition (Frank's, ideas).

The Construction-Integration model specifies how a text moves from short-term memory to long-term memory in cycles. On each cycle, propositions from the text enter short-term memory. They are connected to each other by argument overlap and then the resulting representation is copied into long-term memory. Relations and their arguments are encoded with varying strengths, determined by the number of propositions and arguments that connect them. From each cycle to the next, some of the propositions in short-term memory are held over to the next cycle so that they will be available for connecting to newly input propositions.

Propositions in short-term memory evoke information from a reader's long-term memory, including information about the meanings of concepts in the propositions, earlier propositions in the text that have already been encoded into long-term memory, and general knowledge. This process is fast, passive, and unconscious, and everything in short-term memory is matched against everything in long-term memory in parallel (e.g., Murdock, 1982). Information that matches well becomes available to processing. It can be added to the propositions already in short-term memory and it can be used to establish new connections among them. For example, in the text, the propositions (present, Frank, ideas), (gather, Frank, notes), and (gather, Frank, computer) are connected only by Frank, and (meeting, room) is connected to these propositions only indirectly. General knowledge can change this situation. Presenting ideas, using notes, and using computers are all things that can happen at meetings (Schank & Abelson, 1977), and this knowledge can provide multiple additional connections among the propositions. Numerous studies have demonstrated the role of general knowledge in reading (see Cook & Guéraud, 2005, for a review).

Difficulties arise, and processing is disrupted, when newly-input propositions cannot be linked to any of the propositions in short-term memory. The problematic propositions must be carried forward through the next cycles of processing, awaiting information that can link them into the text. With these propositions carried forward, there is less short-term memory capacity for inputting new propositions. Also, to the extent that coherent relations among the propositions are never found, the long-term memory representation of the text will be less cohesive.

The Construction-Integration model has been shown to predict reading times, recall ability, and comprehension for texts (e.g., Kintsch, 1988; Kintsch & van Dijk, 1978). Here we translate the model into predictions the stories from Gerrig et al. (2009) that we use in the current studies. When Judy is introduced without any identifying information, Judy is an argument in only two propositions, 19 and 20, and is connected to the rest of the story only through propositions 18, in which 19 is embedded, and 20, in which "Frank" is an argument (Table 1). Should the processing system fail to encode propositions 18 and 20, then there will be no connections between Judy and the previous propositions, and readers should experience difficulties of the kind we described earlier.

In contrast, when Judy is identified as "our principal Judy," the system is more robust. Judy occurs in three propositions, not two, and more importantly, many additional connections are provided by readers' general knowledge of scenarios in which people meet with and present ideas to other people using notes and computer displays.

Readers' general knowledge about how authors construct stories comes into play as well. For instance, we know from the text processing literature that readers expect characters introduced with proper names to function in important ways in an ongoing plot (e.g., Anderson, Garrod, & Sanford, 1983). Readers may *expect* a character introduced as "Judy" to reappear, an

additional reason for the character to be carried forward. A character introduced with information that places her within the domain of a location (e.g., “principal”) or another character (e.g., someone’s “grandson”) may not generate the same expectations.

Our analysis offers an explanation of Gerrig et al.’s (2009) findings. When introduced as “Judy” alone, there was no information connecting Judy to the rest of the story, and she was carried over through subsequent processing cycles awaiting this information. Thus, response times to “Judy,” presented four lines later as a test word in a probe recognition task, were relatively fast. Importantly, however, recycling Judy in short term memory left diminished resources for the processing of subsequent propositions. This resulted in the weaker encoding of the propositions that immediately follow Judy’s introduction, and slower response times for the information contained in those propositions.

In the explanation we have provided for Gerrig et al.’s (2009) results, “our principal” facilitates processing mainly because of the many connections it provides from Judy to the rest of the story through readers’ general knowledge. An alternative possibility is that Gerrig et al.’s results come from “our principal” adding only the single piece of information that Judy is a principal, and not any information from general knowledge. In Experiments 1 and 2 below, we contrasted “our principal Judy” with “our daredevil Judy.” We know that readers encode and allow character trait information to inform their understanding of a story (Rapp, Gerrig, & Prentice, 2001). Thus, “daredevil” adds a piece of information about Judy that readers will likely attempt to use as the story unfolds (Schneider, 2001), but there is no likely scenario in general knowledge in which daredevils are associated with meetings, presenting ideas, computers, or notes. If “daredevil” is nonetheless sufficient to connect Judy to the story, than Judy will not be carried over through subsequent processing cycles, and responses to “Judy” will be no faster than if she were introduced as “our principal Judy.” Similarly, responses to “admire” will be no slower than if Judy were introduced as “our principal Judy.”

Experiments 1 and 2

Experiments 1 and 2 used the same probe recognition procedure as Gerrig et al. (2009), with probes presented four lines after the mystery character’s introduction. Experiment 1 compared responses to the mystery character’s name when it was introduced as “our principal Judy” or “our daredevil Judy.” We predicted that, because the additional information contained in “daredevil” does not connect Judy to the rest of the story, Judy would be held accessible in short-term memory, and responses to her name as a test word would be relatively fast. In Experiment 2, we used the same two conditions as Experiment 1, but the test word was a word that followed the introduction of the mystery character. For the sentence “I’m certain that our (daredevil Judy/principal Judy) will admire what you show her,” the test word was “admire.” If Judy is indeed held in short-term memory through further processing cycles, then this should occur at the expense of processing for subsequent information. Responses to “admire” when Judy was introduced as a “daredevil” should be slower than when she is introduced as a “principal.”

Method

Materials—There were 24 13-line stories, each with two versions. In one version, the mystery character was introduced in the fifth line with a personality trait that did not otherwise relate to the story (e.g., “our daredevil Judy,” “that martyr Rachel,” “that lifesaver Randy”). In the other, the character was introduced via his or her professional, familial, or social relationship to another character in the story (e.g., “our principal Judy,” “my aunt Rachel,” “my neighbor Randy”). The complete Judy story is shown in Table 2. In Experiment 1, the test word was the mystery character’s name and in Experiment 2 it was a “downstream” word, a word that followed the character’s name in the fifth line (e.g., “admire” in the story about Judy). There

were also 26 filler stories (with test probes) ranging in length from 8 to 13 lines. For both the filler stories and the stories of interest, there was one true/false test sentence. The true/false test sentences were used to check that participants were comprehending the stories at least sufficiently to make correct responses on the true/false tests.

Procedure—For all of the experiments reported in this article, stories and test items were presented on a PC monitor. Participants were instructed to read each story line-by-line at a regular reading pace, pressing the space bar to advance to each next line. For some lines, pressing the space bar led to a test word. Test words appeared one line below the previous story line, in all capital letters and marked with three asterisks. Upon seeing a test word, participants were instructed to respond as quickly and accurately as possible, “yes” if the test word had appeared previously in the story and “no” if it had not. Participants made their responses by pressing keys on the keyboard, the “?” key for “yes” and the “zZ” key for “no.” Correct responses were followed by a 100 ms pause and incorrect responses were followed by the word ERROR presented for 1500 ms and then a 100 ms pause.

There were 13 blocks of stories, two filler stories for the first, practice, block, and two experimental and two filler stories for each of the remaining 12 blocks. Participants began each block by pressing the space bar. The stories for each block were followed by a set of true/false test sentences, one for each of the stories.

Participants and Design—The participants in all four experiments received credit in an introductory psychology class at Ohio State University. We tested 34 participants in Experiment 1 and 20 in Experiment 2. For each experiment, the two conditions (“daredevil Judy” or “principal Judy”) were combined with the participants and the 24 experimental stories in a Latin-square design.

Results and Discussion

To ensure that participants’ reading of the stories wasn’t overly disturbed by the probe word procedure, we examined their average reading times. Reading times for the three lines of text that preceded the test words were within the range of normal reading (Reichle, Pollatsek, Fisher, & Rayner, 1998), averaging 275 ms per word in Experiment 1 and 261 ms per word in Experiment 2. Data from the true/false comprehension test sentences and filler test words are shown in Table 3.

For the test words of interest in Experiments 1 and 2, mean response times for correct responses, accuracy, and the results of ANOVAs are shown in Table 4. Experiments 1 and 2 replicated the findings from Gerrig et al. (2009; Experiments 1A and 3). Responses to mystery characters were significantly faster when they were introduced without information connecting them to the story (“Judy” in Gerrig et al.’s experiments, “daredevil Judy” in Experiment 1) than when there was such information (“principal Judy”). The difference was 57 ms in Gerrig et al.’s data and 33 ms in Experiment 1. In contrast, responses to the downstream word (“admire”) were significantly slower when the mystery character was introduced without connecting information, by 29 ms in Gerrig et al.’s data and by 44 ms in Experiment 2.

This pattern of data is just what would be expected if the absence of identifying information results in the mystery character being carried forward through subsequent text. Responses to the characters are fast because they are retained in short-term memory. Retention in short-term memory means there is less capacity for processing the downstream word (“admire”) and so responses to the downstream word are slow. We stress that two different mechanisms are responsible for the recycling and encoding of propositional information.

This first pair of experiments has focused on a particular small mystery. The experiments demonstrate that a specific type of information is required to alleviate the consequences of this mystery on readers actively constructing a representation of the story in memory. We turn now to more lasting consequences.

Experiments 3 and 4

We ask in Experiments 3 and 4 whether long-term memory for the stories is affected by disruptions that result when texts introduce characters without connecting them to the rest of the story. We used a recognition memory paradigm. Participants read blocks of three stories for thirty seconds each (controlled by the experimenter). A block of stories was followed by a list of single words for which they were to respond “yes” if it had appeared in a story and “no” if it had not. Both experiments compared memory for the story when the mystery character was introduced with connecting information (“our principal Judy”) to when the character was introduced without that information (“Judy” in Experiment 3 and “our daredevil Judy” in Experiment 4).

From our analyses about how comprehension proceeds through the stories, we made two predictions: First, if the mystery character is introduced without connecting information, readers will be less likely to encode words downstream from the mystery character’s introduction into long-term memory, or they will encode them more weakly. This should result in slower and possibly less accurate recognition for these words than if connecting information had been available. Second, words from the beginning of the story (e.g., “ideas”) should not be affected by the manipulation, because these words should already have been encoded into long-term memory before the mystery character’s introduction.

Method

Materials—The stories for Experiments 3 and 4 were slightly different from the stories for Experiments 1 and 2. The endings of the stories for Experiments 1 and 2 explained how the mystery character functioned in the story. For Experiments 3 and 4, as well as some of the experiments in Gerrig et al. (2009), the endings did not address the mystery character at all. Our use of these stories rules out the possibility that our results are contingent on readers’ expectations of eventual resolutions for the mystery character. In all other respects, the stories were the same as in Experiments 1 and 2. The mystery character was introduced with or without connecting information: “our principal Judy” versus “Judy” in Experiment 3, and “our principal Judy” versus “our daredevil Judy” in Experiment 4. There were also 15 filler stories, taken randomly from those used in Experiments 1 and 2.

Procedure—Stories were presented in blocks. There were two practice blocks, the first with one filler story and 12 test words, and the second with two filler stories and 24 test words. These were followed by 12 blocks, each with two experimental stories and one filler. The filler was always the last story presented. Participants began each block by pressing the space bar key. The stories were presented in their entirety at once, for 30 seconds per story. Participants were instructed to read the stories carefully so as to do well on the test words, but were explicitly instructed not to try to memorize the stories. For each test word, participants were instructed to indicate as quickly and accurately as possible whether the word had appeared in a studied story. Participants made their responses in the same way as in Experiments 1 and 2. Correct responses were followed by a 100 ms pause, and incorrect responses were followed by the word ERROR presented for 2000 ms and then a 100 ms pause.

For each experimental block, test lists were made up of: the two test words of interest for each experimental story (e.g., “ideas,” “admire”), two other words from each experimental story, six words from the filler story, and 14 words that had not appeared in any story. Words in the

test lists were presented in random order except that the target words were immediately preceded in the test list by a word that had not occurred in any story.

Design and Participants—There were 20 participants in both Experiments 3 and 4. For both experiments, the two experimental conditions were combined with participants and stories in a Latin-square design.

Results and Discussion

Table 6 presents the data for filler test words. The results of interest are displayed in Table 7. Experiment 2 showed that the mystery of how Judy connects to the rest of the story disrupts processing for words that appear after the introduction of the mystery. Experiments 3 and 4 show that the mystery also hurts memory for these words.

The mystery character was introduced with connecting information (“our principal Judy”) or without (“Judy” in Experiment 3 and “our daredevil Judy” in Experiment 4). We tested words both preceding and following the mystery character’s introduction (e.g., “ideas” and “admire,” respectively). In both experiments, the disruption in processing resulting from the on-going mystery affected memory for the downstream target word, but not the upstream word (Table 7). Responses to the downstream word were a significant 56 ms slower when participants read “Judy” compared to “our principal Judy” (Experiment 3), and a significant 72 ms slower when participants read “our daredevil Judy” compared to “our principal Judy” (Experiment 4). Memory for the upstream word, however, was not affected by story version in either Experiment 3 or 4. This indicates that, while memory for the story as a whole was not affected by the disruption caused by the mystery, memory for information closely following the mystery was reduced.

We gave our participants explicit instructions not to memorize the stories. Still, it is possible that, in our procedure, participants may have allocated effort toward memorizing individual words. We argue that use of such a strategy was limited, for two reasons. First, the overall presentation time in Experiments 3 and 4 was 30 seconds per story, around 200 ms per word on average. This is faster than the reading times participants set for themselves in Experiments 1 and 2. Second, use of a memorization strategy cannot explain the significant differences that we found between conditions. Any strategic effort toward memorizing individual words would, in fact, only make our recognition test *less* sensitive, as memorization would come at the expense of the processes we posit responsible for Judy being carried forward through subsequent processing cycles. We find it compelling that the effect of introducing a mystery character emerges for a task that is very different from the task used in Experiments 1 and 2.

Control Experiments—In a pair of control experiments, we further tested memory for information downstream from the mystery character’s introduction, this time providing access to the story context at retrieval. The effects of context on retrieval have been thoroughly studied (e.g., Tulving & Thomson, 1973), and some aspects of textual memory representations can only be observed in retrieval environments that have already provided access to memory of the text (McKoon & Ratcliff, 1986). To rule out the possibility that a stronger retrieval context would mitigate impairment to the downstream word we replicated Experiments 3 and 4, directly preceding the downstream word in the test list with another word from the story (e.g., “ideas”). These control experiments yielded the same pattern of results as for Experiments 3 and 4 (i.e., the same effects remained reliable) indicating that memory for “admire” was still impaired.

General Discussion

When a character is introduced without information connecting him or her to the rest of the story, that character remains relatively more accessible even as new information accumulates.

Experiments 1 and 2 indicate that trait information—however much it ordinarily structures text comprehension—is not sufficient for comprehension processes to proceed as if there were no mystery. As Experiments 3 and 4 demonstrate, readers respond to small mysteries not only when reading the stories, but also when remembering them. In the absence of connecting information, readers' memory for information that followed the mystery character's introduction was relatively poor.

When Maria mentions Judy to Frank using her proper name alone, she signals to readers that Judy is well-known to both characters. Readers, we suggest, are sensitive to discrepancies between their own knowledge and the knowledge of characters in a story. This extends earlier claims that readers are sensitive to information relevant to specific characters (e.g., Greene, Gerrig, McKoon, & Ratcliff, 1994; Lea, Mason, Albrecht, Birch, & Myers, 1998). Greene et al. presented participants with stories that described the separation and later reunion of two characters (e.g., Jane leaves her roommate Gloria to have dinner with her cousin, and later returns). Greene et al. found that Jane's return to Gloria made information relevant to Jane more accessible than it had been just before her return.

Often, when there is a discrepancy between the information a reader is given explicitly and what is needed for comprehension, readers must infer the difference. Most of the inferences researchers have studied have been "backward inferences" (Haviland & Clark, 1974; Keenan, Baillet, & Brown, 1984). For example, Keenan et al. found that it is easier to comprehend a sentence like *The next day his body was covered with bruises* when its causal relationship to preceding text is easily inferred (e.g., it is preceded by *Joey's big brother punched him again and again* rather than *Joey went to a neighbor's house to play*). But mysteries, by definition, are forward-looking. There are no details of Judy's relationship to Frank available for a reader to review. Prior to our work on mysteries, there was some evidence that readers do project limited amounts of information forward. We know, for instance, that when readers are presented with an event for which an outcome can be predicted using general knowledge (e.g., an actress falling from the 14th floor of a building), the outcome ("death") is understood under certain task-dependent circumstances (McKoon & Ratcliff, 1986; Murray, Klin, & Myers, 1993).

The experiments presented here and in Gerrig et al. (2009) look at readers' responses to a different uncertainty. Our data show that when readers are presented with a character they cannot immediately connect to the story, there is an impact both on the moment-by-moment narrative experience as well as what the reader later remembers. We suggest that examination of such mysteries should play an important role as researchers apply models of text processing to an increasingly diverse range of phenomena.

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Table 1

Propositions contained in sample experimental text

1 (looking forward, 2, Frank)
2 (not, 1)
3 (to, 1, 4)
4 (presenting, Frank, ideas)
5 (Frank's, ideas)
6 (latest, ideas)
7 (gather, Frank, notes)
8 (Frank's, notes)
9 (gather, Frank, computer)
10 (head, Frank, 11)
11 (toward, Frank, 12)
12 (meeting, room)
13 (on the way, 14)
14 (give, Frank, Maria, smile)
15 (pal, Maria, Frank)
16 (reassuring, smile)
17 (say to, Maria, Frank)
18 (certain, Maria, 19)
19 (admire, Judy, 20)
20 (show, Frank, Judy, what)
*21 (Frank and Maria's, principal)
*22 (principal, Judy)

* Propositions added when character is introduced with connecting information, "principal"

Table 2

Sample story from Experiments 1 and 2

Sample Story

Frank was not looking forward to presenting his latest ideas.

He gathered his notes and computer
and headed toward the meeting room.

On the way, his pal Maria gave him a reassuring smile.

“I’m certain our (daredevil Judy / principal Judy) will admire what you show her,” said
Maria.

“I hope so,” said Frank, “but I’m not so sure.”

Frank stopped to fill his mug with hot coffee.

He couldn’t find any cream so he had to use plain milk.

When the coffee had cooled down enough, he took a gulp. <TEST>

Frank set up his posterboard and waited for Judy to arrive.

He hoped his ideas would be radical enough to keep his principal happy.

Judy was well known for turning failing schools into success stories.

One year she’d promised to ride a motorcycle if every student graduated!

Test word

JUDY (Experiment 1) / ADMIRE (Experiment 2)

Table 3

Mean response times (RT) for correct responses and accuracy (probability correct) for filler test words, and mean accuracy for true/false test sentences for Experiments 1 and 2

Filler ¹ Test Words			True / False ² Comprehension	
Experiment 1	RT (ms)	Probability correct	RT (ms)	Probability correct
Positive	1033	.90	2258	.88
Negative	1032	.91	2350	.85
Experiment 2				
Positive	979	.90	2471	.86
Negative	1018	.90	2580	.87

Notes.

¹ Filler stories included two, three, or four characters and each had one, two, or three test words. Test words were placed at a variety of positions in the stories. There were a total of 11 positive test words and 52 negative test words (17 of which were proper names).

² All but two of the true/false test sentences for filler stories directly tested knowledge about a character, and all but one of the true/false test sentences for experimental stories tested knowledge about a character (including four true/false test sentences that directly tested knowledge about the mystery character).

Mean response times (RT), accuracy (probability correct), standard error of the mean correct RTs, and ANOVA test statistics for correct responses for Experiments 1A and 3 from Gerrig et al. (2009) and Experiments 1 and 2

Table 4

Expt.	Story Version	Test Word	Test Word RT/ (ms)	Test Word Probability Correct	Standard Error (Mean RTs)	ANOVA Test Statistics (RTs)
1A	Judy	Judy	917	.87	9 ms	F1(1,19)=18.0*
	principal Judy	Judy	974	.89		F2(1,23)=10.7*
3	Judy	admire	1001	.79	9 ms	F1(1,63)=9.1*
	principal Judy	admire	972	.76		F2(1,23)=5.1*
1	daredevil Judy	Judy	925	.85	8 ms	F1(1,33)=6.1*
	principal Judy	Judy	958	.83		F2(1,23)=10.5*
2	daredevil Judy	admire	1026	.79	8 ms	F1(1,19)=6.8*
	principal Judy	admire	982	.81		F2(1,23)=5.8*

Notes.

/ Responses more than 3.5 standard deviations above the mean and more than 1.5 standard deviations below the mean were excluded, totaling about 3% of the data.

* p < .05

Table 5

Sample story from Experiments 3 and 4

Experiments 3 and 4

Frank was not looking forward to presenting his latest ideas.

He gathered his notes and computer and headed toward the meeting room.

On the way, his pal Maria gave him a reassuring smile.

Experiment 3

"I'm certain (Judy / our principal Judy) will admire what you show her," said Maria.

Experiment 4

"I'm certain our (daredevil Judy / principal Judy) will admire what you show her," said Maria.

Experiments 3 and 4

"I hope so," said Frank, "but I'm not so sure."

Frank stopped to fill his mug with hot coffee.

He couldn't find any cream so he had to use plain milk.

When the coffee had cooled down enough, he took a gulp.

The coffee had a wonderful vanilla flavor.

Frank had gotten a 12-pack of flavored coffees for his birthday.

For a couple of months, he'd been doing a flavor a week.

It was possible that this vanilla coffee was the best one so far.

Test words

IDEAS, ADMIRE

Table 6

Mean response times (RT) for correct responses and accuracy (probability correct) from filler test words for Experiments 3 and 4

Filler Test Words		
Experiment 3	RT (ms)	Probability correct
Positive	783	.78
Negative	843	.82
Experiment 4		
Positive	827	.83
Negative	923	.83

Mean response times (RT) for correct responses, accuracy (probability correct), standard error of the mean correct RTs, and ANOVA test statistics from Experiments 3 and 4

Table 7

Expt.	Story Version	Test Word	Test Word RT ¹ (ms)	Test Word Probability Correct	Standard Error (Mean RTs)	ANOVA Test Statistics (RTs)
3	Judy principal Judy	ideas	796	.59	15 ms	F's < 1.0
		ideas	806	.60		
	Judy principal Judy	admire	852	.61	18 ms	F1(1,19)=4.6* F2(1,23)=5.5*
		admire	796	.63		
4	daredevil Judy principal Judy	ideas	822	.69	12 ms	F's < 1.0
		ideas	808	.70		
	daredevil Judy principal Judy	admire	862	.64	16 ms	F1(1,19)=10.2* F2(1,23)=7.5*
		admire	790	.66		

Notes.

¹ Responses more than 3.5 standard deviations above the mean and more than 1.5 standard deviations below the mean were excluded, totaling about 2% of the data.

* p < .05