The fluency of spoilers

Why giving away endings improves stories

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Spoilers, despite their name, seem to increase enjoyment of stories. This could be because readers enjoy reading expected endings, because knowing the ending allows them to appreciate aesthetic elements instead of guessing what will happen, or because knowing the ending increases fluency by enabling readers to correctly interpret clues and events. We conducted three experiments to test these hypotheses. Experiment 1 collected ratings at the midpoints of anthologized stories, and determined that readers experience greater pleasure even before reading the end of spoiled stories. This spoiler benefit was mediated by processing fluency, and not by appreciation of aesthetic elements. Experiment 2 found that spoilers similar to those in Experiment 1 do not increase ease of reading — or pleasure — for very-easy-to-read stories. Experiment 3 found, however, that very simple spoilers could increase the pleasure of easy-to-read stories.

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Readers and moviegoers go to considerable lengths to avoid prematurely discovering the ending of a story, believing intuitively that suspense is integral to pleasure. Indeed, research suggests that transportation, the experience of becoming engrossed by a story so that the world falls away (Green, Brock, & Kaufman, 2004), is closely associated with the unfolding plot and interest in how it will be resolved (Tal-Or & Cohen, 2010). However, people are not always accurate at predicting what they will enjoy (Wilson & Gilbert, 2003), and it is not clear that pleasurable suspense is eliminated by knowledge of the ending (Gerrig, 1996). At a minimum, the fact that people enjoy experiencing the same story more than once, together with the fact that stories in certain popular genres effectively come with built-in endings, suggests that suspense derived from the uncertainty of the resolution is not always essential. Consistent with this, we previously demonstrated that spoiler texts that gave away the endings of stories did not make readers like them less.

In fact, for every genre we tested — murder mysteries, tales that end with ironic twists, and more evocative literary stories — spoilers actually enhanced pleasure (Leavitt & Christenfeld, 2011).

Why might spoilers make people like stories better? There are several mechanisms that could underlie this phenomenon. One possibility is that spoilers improve the experience of reading by making stories more fluent, with fluency defined as subjective ease of processing (Reber, Wurtz, & Zimmermann, 2004). When a story begins, people and places are introduced, and a reader who knows what roles they will play by the denouement can make better, more confident inferences regarding their qualities and relevance . When a story ends, its various elements are resolved, and a reader who has made correct inferences along the way — while ignoring red herrings — is better able to comprehend and integrate them. For instance, while the beliefs and expectations of characters might lead a first-time reader astray, a knowing reader can contrast what the characters' believe against the actual outcome in the course of reading. Although there are many aspects of story difficulty, such as vocabulary and lexical complexity, that will not be altered by a spoiler (Hayes-Roth & Thorndyke, 1979), elements of the underlying structure, such as phrases that implicitly refer to other aspects of the story (Templeton, Cain, & Miller, 1981), may be rendered more easily comprehensible. If one of the reader's goals is to construct a coherent representation of story events that accounts for why they are mentioned in the text (Graesser, Singer, & Trabasso, 1994), then the perspective and insight afforded by a spoiler can aid in this goal and thereby make reading more satisfying.

A second possibility is that readers of spoiled stories draw greater enjoyment from aesthetic elements because they are less focused on guessing the outcome. A story may develop characters that have unique perspectives and complex emotional experiences, richly describe sensory experiences, or employ poetic or compelling language. Just as a viewer who is familiar with the plot of *Casablanca* may take greater pleasure in the script and performances, a reader who knows the ending of a story may experience emotional rewards not typically accessible to first-time readers (Yanov, 1996). In this view, reading a spoiled story is analogous to driving to a known destination. The driver may be less concerned about the exact nature of the destination and how to interpret signs along the way, and therefore be more free to enjoy the scenery and other incidental pleasures.

Perhaps the most parsimonious explanation for the benefits of spoilers is that readers take pleasure in stories concluding in the manner they expected, and this adds to the otherwise undiminished joy of reading a story.

To test why spoilers enhance enjoyment, we conducted three experiments. Experiment 1 examines whether spoilers increase enjoyment by increasing fluency, by increasing aesthetic pleasure, or merely by delivering expected endings. We used

a selection of anthologized stories that had been enhanced by spoilers in previous experiments. Experiment 2 tested whether spoiler effects depend on increased fluency utilizing simpler stories that had been published in collections targeted to junior high school students, along with spoilers that were similar in complexity to those in the first experiment. Experiment 3 further examined the relationship between spoiler effects and fluency, using the same simple stories as the second, but spoiling them this time with brief paragraphs that were correspondingly simple.

Experiment 1: Classic stories previously enhanced by spoilers

Experiment 1 tested whether subjects prefer spoiled stories because more fluent comprehension makes the story easier to read, because greater attention to aesthetic elements increases artistic appreciation, or simply because they end as expected. This experiment used stories that had previously been demonstrated to be preferred when spoiled, along with the same short spoiler paragraphs, presented in text immediately prior to reading the story (Leavitt & Christenfeld, 2011). However, instead of rating stories at the end as in previous experiments, subjects rated them half-way through, in order to test whether enjoyment was increased in the course of reading, rather than exclusively at the end. If spoilers increase enjoyment only because stories end as expected, ratings will not be higher at the midpoint. If spoiler enhancement results from greater aesthetic appreciation or greater fluency, we would expect ratings for both liking and aesthetics or fluency to be higher at the midpoint.

Method

Subjects in all three experiments were undergraduates recruited from the UCSD subject pool, and seated at a desk or table in the lab in order to read and rate stories. Subjects in this experiment (140 male, 191 female) rated spoiled and unspoiled versions of classic stories previously demonstrated to be enhanced by spoilers, including two each from the ironic twist, mystery, and literary genres. "Ironic twist" stories ended with a shocking twist, such as a dog being thrown out a window, or a murder weapon being fed to the police. Murder mysteries hinged on murders for which the perpetrator and/or motive were unknown. For our purposes, literary stories were defined not only by the use of evocative language and imagery, but as stories in which there is no concrete event of clear significance at the end. The stories were written by authors such as Roald Dahl, Agatha Christie, and John Updike, and range from 1,381 to 4,220 words.

Each subject read two of the six stories, one spoiled and one unspoiled, randomly selected from two different genres. Stories were presented on paper, with questionnaires (described below) inserted in the middle, on a separate page, directly following a page break at the end of the paragraph closest to the midpoint of the story (as calculated by word count). All analyses were done on midpoint questionnaires, but subjects finished reading stories, as we did not wish to arouse their suspicion, nor to allow unfinished narratives to cloud their experience of subsequent stories. The spoilers described the outcomes of stories, while providing enough context so that the outcomes could be understood. They were of moderate complexity, and described endings seemingly inadvertently, so as not to tap into subjects' assumptions regarding the effects of spoilers.

Subjects rated overall enjoyment from 1 (lowest rating) to 10 (best rating). Other ratings were made on a seven-point scale, with the midpoint (4) representing the rating an average story would receive. Subjects first rated whether the story was unfolding as expected from 1 (not at all as expected) to 7 (exactly as expected), Next, following questionnaire text stating that stories are works of art, they were prompted to rate how "beautiful/evocative" they found each story, compared to stories in general, from 1 (much less than average) to 7 (much more than average). Finally, subjects evaluated how difficult it was to follow what was going on in the story, from 1 ("very easy") to 7 ("very difficult"), with fluency operationalized as the inverse of this rating. Since we are investigating spoilers, subjects were asked at the end of each story (in all three experiments) whether they had read it before, and data for any story for which they answered "yes" was excluded from the analyses. After completing all stories and story questionnaires, subjects filled out a final questionnaire including demographic information, a question on whether they read fiction for fun (described in results), and prompts to rate from 1–10 issues such as how much they like fiction, and whether they generally read stories more for entertainment (low numerical end of scale) or for insight (high numerical end of scale).

Results

We analyzed subjects' responses using ANOVA's, controlling both for order of presentation and for overall differences in how much particular stories are liked. Subjects rating the first halves of stories preferred spoiled stories over unspoiled stories ($F(1,637) = 4.55$, p = .033, Cohen's d = .14), confirming that spoilers increase enjoyment prior to readers reaching the end of a story. (*See Figure 1 for a summary of main outcomes for Experiment 1.*) Spoiled stories were rated at the midpoint as unfolding more as expected, suggesting that knowing the ending was allowing
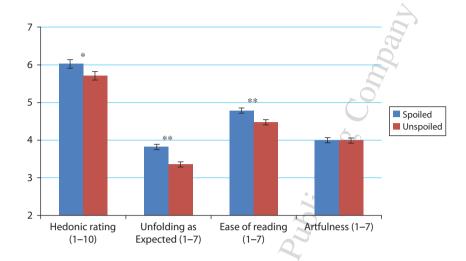
Figure 1. Midpoint ratings for Experiment 1. Error bars represent standard error.
* p < .05; ** p < .005.

subjects to anticipate developments in the first half in the story, $F(1,637) = 23.20$, $p < .001$, $d = .35$. As expected, ratings of aesthetic pleasure were correlated with enjoyment of stories ($r = .447$), $p < .001$, and ratings of how difficult stories were to follow were inversely correlated with enjoyment ($r = -.402$), $p < .001$. Stories proceeding as expected at the midpoint was also associated with enjoying them more, although the magnitude of the correlation was smaller ($r = .205$), $p < .001$. Subjects found spoiled stories easier to follow, $F(1,637) = 9.07$, $p = .003$, $d = .21$, suggesting that greater enjoyment of spoiled stories may be associated with greater fluency, but did not find them more artful, $F(1,637) = 0.01$, $p = .924$, $d = .01$. This supports the notion that readers prefer spoiled stories due to increased fluency, but not that readers derive greater enjoyment from the aesthetic elements of spoiled stories. To demonstrate that fluency mediates the effects of spoilers, we must show that spoilers make stories more enjoyable, that spoilers increase fluency, and that including fluency in the model eliminates the main effect of spoilers. The results above show that spoiling stories increases enjoyment and increases fluency (or, equivalently, lowers difficulty of reading). Consistent with the evidence that spoiler effects are mediated by fluency, when ease of reading is entered into the analysis, ease of reading is significant ($p < .001$), and spoiled stories are no longer significantly preferred, $F(1,524) = 1.38$, $p = .240$. As stated above, although aesthetic appreciation was associated with enjoyment, it was not increased by spoiling stories. Consistent with the evidence that spoiler effects are not mediated by attention to

aesthetic details, when aesthetic enjoyment is entered into the model (and fluency is not), spoiled stories are still preferred, $F(1,535) = 8.34$, $p = .004$.

Post-hoc examination of individual differences in reading revealed no interactions with spoiler condition. Subjects' ratings of how much they enjoy fiction in general did not interact with spoiler condition to predict hedonic ratings $(F(7,499) = 0.32$, $p = .943)$. Subjects who selected that they enjoy reading fiction for fun (56%) versus when assigned or seldom (44%) both rated spoiled stories higher, and there was no interaction with spoiler condition $(F(1,611) = 1.05$, $p = .305)$. Finally, we tested preference for entertainment versus insight using a median split, and found that both groups preferred spoiled stories, and this variable did not interact with spoilers to affect hedonic ratings $(F(1,613) < 0.01$, $p = .995)$.

Experiment 2: Simple stories

Our previous experiments found that spoilers enhanced enjoyment of stories in genres we might expect them to ruin — murder mysteries and stories ending in ironic twists –and stories they seemed unlikely to affect — literary stories with evocative endings. Spoilers, then, seem capable of increasing enjoyment for several traditional genres. However, if the effects of spoilers are based on increases in the ease and fluency of reading, then we would not expect spoilers to have a positive effect on stories that are already experienced as close to ceiling in fluency. In this experiment, subjects read simple stories (in their entirety) to test whether spoilers could enhance story enjoyment under such circumstances. If they did not give higher ratings to spoiled stories, it would further support the hypothesis that spoilers increase enjoyment by increasing fluency. If spoilers instead increase enjoyment of stories by permitting greater attention to aesthetic elements, merely by revealing endings, or through another, unidentified mechanism, we would predict an increase in enjoyment even for spoiled versions of simple stories.

Method

The four simple stories used in Experiments 2 and 3 range from 2,098 to 3,783 words. They were found in anthologies intended for junior high or high school students, were penned by less famous authors than the classic stories, and explore simpler themes. Each story conformed to relatively conventional structure, although each also incorporated elements of irony or mystery. For instance, in "Bread on the Water," the main character winds up learning more about charity after being thrown out of a religious service than he did by attending services. In "The Shoot Out," the character resents his parents forcing him to visit an historic

old west town, but a ghost he encounters there helps him learn to appreciate the value of family. In this experiment, subjects (104 male, 136 female) finished stories before rating them. Furthermore, in addition to spoiled and unspoiled versions of stories, subjects also read, in random order, a version with an "intro spoiler." This was a paragraph similar in length and complexity to the other spoilers we used, but describing only events in the opening paragraphs of stories. If spoilers increase enjoyment by giving away endings, then ones that give away only beginnings will not have the same effect. On the other hand, if intro spoilers do increase enjoyment, it would suggest that increasing fluency at the beginning of a story, without disclosing the ending, will benefit enjoyment.

Results

Spoilers did not increase enjoyment in this experiment ($F(1,680) = .01$, p = .995), with neither traditional spoilers (d = .01) nor intro spoilers (d = .00) significantly enhancing simple stories. (*See Table 1 for a summary of main outcomes in Experiment 2.*) Consistent with our expectations, mean ratings for how difficult these stories were to follow were lower than for the classic stories used in Experiment 1. Neither end spoilers (p = .267, d = −.10) nor intro spoilers (p = .880, d = −.01) had a significant effect on difficulty of reading (overall $F(2,680) = 0.72$, p = .485). It appears that increased fluency of comprehension is driving the positive effect of spoilers. When stories are already easy to digest, it is difficult for spoilers to increase fluency, or pleasure.

Table 1. Means (and standard error) for Experiment 2.

Experiment 2 results		
Spoiler	Hedonic (1–10)	Ease (1–7)
Ending	6.62 (.130)	5.82 (.073)
Intro	6.61 (.130)	5.73 (.072)
None	6.61 (.129)	5.71 (.072)

Experiment 3: Simple stories with simple spoilers

This experiment tested whether spoilers might increase enjoyment of easy-to-read stories, provided the spoilers are direct and obvious enough to further increase fluency. Regular, moderately sophisticated spoilers have been demonstrated to increase fluency and pleasure for moderately sophisticated stories, but had not increased fluency or pleasure in simple stories. Since difficulty ratings for the

unspoiled versions of the simple stories in Experiment 2 were not at floor (mean = 2.25, not 1), it may be possible to increase fluency. If spoiler effects are mediated by fluency, and simple spoilers increase fluency for simple stories, then we would expect them to increase enjoyment as well.

Method

The methods and materials for Experiment 3 were identical to those of Experiment 2, with one exception. Subjects (61 male, 174 female) were presented with the exact same stories in the exact same conditions, but for this experiment, both intro and regular spoilers were rewritten to be simple and direct. Changes that were made to spoilers included simplifying sentence structure, eliminating unnecessary details, and shortening texts by reformulate statements about character's perspectives into more straightforward statements about the facts of the story. (See Appendix 1 for an example.) Compared with spoilers in Experiment 2, spoilers in Experiment 3 averaged 33% fewer words (reduced from 98 to 65), 32% shorter sentences, and 16% fewer words describing cognitive processes (Pennebaker, Booth, & Francis, 2007).

Results

Subjects in this experiment preferred simply spoiled versions of simple stories ($F(2,669) = 17.19$, $p = .003$). (*See Table 2 for a summary of main outcomes in Experiment 3.*) While the effect of intro spoilers was significant ($p = .003$, $d = .25$), and larger than that of traditional spoilers ($p = .063$, $d = .16$), the difference between the two types of spoilers was not significant, $F(1,445) = 1.19$, $p = .276$. The effect did not appear to be driven by stories being easier to follow ($F(2,668) = 0.69$, $p = .565$), based on ratings made at the end of the story, as neither spoilers ($d = -.10$) nor intro spoilers ($d = -.04$) had significantly lower mean difficulty ratings. Nonetheless, the mean difficulty rating was slightly lower in the spoiled conditions, and difficulty of reading was again inversely correlated with liking stories (.137, $p < .001$). Of course, mean difficulty of reading was low (between 2.21 and 2.33 for each of the four stories on a 7-point scale with 4 as the midpoint) in all conditions in this experiment. Even in the unspoiled condition, 27% of subjects rated stories at floor for reading difficulty (1 on a 1–7 scale), and another 38% rated them just 2 out of 7. Perhaps spoilers made stories initially more fluent, and therefore more enjoyable, but the simplicity of all stories made the distinction less salient by the end, and left little room to reflect it in the ratings.

Table 2. Means (and standard error) for Experiment 3.

Experiment 3 results		
Spoiler	Hedonic (1–10)	Ease (1–7)
Ending	6.56 (.130)	5.78 (.073)
Intro	6.76 (.130)	5.72 (.072)
None	6.22 (.129)	**5.67 (.072)**

Discussion

These experiments suggest that spoilers make people like stories better because they increase fluency. The beneficial effects of spoilers cannot be explained by readers merely reaching the end they expected all along, because subjects in Experiment 1 experienced greater enjoyment even at the midpoint. Nor can they be explained by readers who know the ending deriving more pleasure from the purely aesthetic elements of the story, because those same subjects did not rate the purely artistic elements of the stories more pleasing. When spoilers do not reduce fluency — as in Experiment 2, when the stories were very easy to read — they do not make stories more enjoyable. When spoilers are also very easy to read, as in Experiment 3, they again make stories more enjoyable, although we were unable to confirm that they increased ease of reading, possibly due to floor effects.

As with any study, we cannot be certain that these findings will generalize across all subjects and materials. Our subjects were undergraduates enrolled at UCSD, and while very few had formal literary training, they are generally bright and successful students. We also did not investigate individual differences, such as low need for cognition or high tolerance for amgibuity, that might predict liking spoiled stories less. We also did not exhaust every genre, or test all stories within the genres we selected. We selected the two genres (mysteries and ironic twist stories) for which it seemed intuitively most important to conceal the ending, and the genre (evocative literary stories) for which it seemed that knowing the ending would be least telling. Readers may respond differently to spoilers in other genres, or even to some stories within these genres.

The idea that spoiled stories are more enjoyable simply because they are more fluent may appear to cast readers in a dim light, suggesting that we seek the least effortful route to finding out what happens. However, enjoying a story more when it is spoiled is not the same as wanting stories to spill their secrets quickly, in lieu of artfully concealing them. In prior work, when spoilers were presented as if they were part of the stories themselves, they no longer increased enjoyment (Leavitt & Christenfeld, 2011). Readers of fiction do not seek the most straightforward

descriptions of events, or else they would eschew ironic twists, mystery, suspense, and every other genre that deliberately conceals relevant information. In practice, stories are complex stimuli, presenting new information in each sentence. They are inhabited by characters into whom authors breathe life, and include descriptions of locations, physical details, and abstract ideas in the course of presenting temporal developments leading to a denouement that ideally, if perhaps not achievably, weaves a tapestry as rich as life itself. The language of stories is not one of simple declarative statements, but rather one that requires complex inferences, and often defies full comprehension. Instead of these findings pointing to lazy readers, they may indicate curious readers seeking comprehension. In this view, the increased fluency associated with spoiled stories may ultimately lead to deeper comprehension of thematic elements, without altering the artful presentations of stories. Further research will be necessary to explore the relative degrees of comprehension associated with spoilers and fluency.

Increased fluency appears to play a crucial role in the beneficial effects of spoilers. Perhaps secretly informing a person of her surprise party will increase her enjoyment, as she is better able to meaningfully connect the mysterious behavior of others to its secret purpose — and an employee discovering his company's plans to downsize may likewise experience less displeasure, as it becomes easier for him to draw future-relevant meanings from interceding events.

Author note

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Appendix 1

Regular and simplified spoilers for "Bread on the Water,"
one of the stories used in Experiments 2 and 3

Regular spoiler (Experiment 2): "Life lessons often emerge from personal experiences, and it's not always the experiences that one expects to learn from. When Tommy is thrown out of church because of his friend Andy's jokes, it seems like a chance for them to spend a morning free of lessons in kindness and morality. But then Andy helps a hungry homeless man, and Tommy learns a lesson in generosity he may never have picked up from a sermon. It might even be an experience his parents and the church elders could stand to learn something from as well…"

Simple spoiler (Experiment 3): "When Tommy gets thrown out of church because of his friend Andy's jokes, it seems like they'll have a morning free of lessons in morality. Instead, Andy feeds a hungry homeless man, and Tommy learns a lesson in real generosity he might not have learned from a sermon. Sadly, his parents and the church elders seem more focused on teaching kids to behave properly than to do good deeds."

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