A sixth sense: Narrative experiences of stories with twist endings

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Abstract

Stories with twist endings are popular, but little research has examined how readers experience them. To begin developing such an account, we examined the affective responses that emerge during stories with twist endings. In Experiment 1, 28 Japanese participants read a story with a twist ending. Greater empathy and stronger expectations were associated with slower reading times during participants' first reading of the story. However, on participants' second reading, greater empathy and stronger expectations were associated with faster reading times. In Experiment 2, we tested the generality of these effects by asking 36 English-speaking participants to read four stories with twist endings. The results were similar to Experiment 1. Readers' initial and recurring responses to stories with twist endings reflect changes in surprise and empathy. These feelings underlie engagement with and interest in unexpected and often incoherent contents, which are characteristics of stories with twist endings.

Keywords: Discourse comprehension, Narrative comprehension, Empathy, Emotion, Rereading, Twist Endings

Acknowledgments

We thank Naoko Takahashi, Asuka Hayashi, Yuka Takahashi, Moe Fujitani, and Kiyoshi Watanabe for their diligent assistance with data collection. We also thank three anonymous reviewers for their helpful advice in the development of the manuscript. This research was funded, in part, by a Grant-in-Aid for Scientific Research from the Japan Society for the Promotion of Science (16H01507), and by a Pfizer Health Research Foundation, both awarded to the first author.

A sixth sense: Narrative experiences of stories with twist endings

Stories with twist endings are popular forms of entertainment. Movies like *The Crying Game* and *Psycho*, television programs like *The Twilight Zone* and *Black Mirror*, and stories like "The Gift of the Magi" by O. Henry and "Fight Club" by Chuck Palahniuk are enjoyed for their unexpected conclusions. They may also be appreciated upon second viewings and readings, affording the opportunity for people to look for clues or signs they might have missed that portended the surprising endings. For example (and we apologize for spoiling the movie), when people watch *The Sixth Sense* (1999) for the first time, they are likely shocked to learn that the protagonist has been interacting with a psychologist who is in actuality a ghost. This revelation is provided at the end of the story. Upon a second viewing, people may try to determine if there were any clues as to the psychologist's deceased status or whether there were signs that mischaracterized the psychologist as alive. These activities exemplify the kinds of responses that individuals might exhibit as they experience stories with twist endings. The current study offers an initial examination of people's responses to and judgments of text contents as they read and reread such materials.

Examinations of stories with twist endings can inform contemporary accounts of text comprehension in at least two important ways. First, few studies have focused on the processes and products that emerge from experiences with narrative texts that contain surprising conclusions. Certainly, researchers have examined the types of expectations that readers infer as they read texts and, as such, have used inconsistent story endings to evaluate the strength of those expectations (e.g., Albrecht & O'Brien, 1993; Gerrig, Bagelmann, & Mumper, 2016; Pettijohn & Radvansky, 2016). In these studies, expectations constitute beliefs about whether future events should occur given plot-based and knowledge-based understandings of time, space, people, events, and goals

(Zwaan & Radvansky, 1998). The kinds of expectations that readers generate are also influenced by their affective responses to story events (Gerrig, 1993). Beliefs about the likelihood of story outcomes are informed by the hopes, wishes, positive feelings, and negative attitudes that readers establish for story characters and plot (Mensink & Rapp, 2011). For example, participants slow down when reading story outcomes inconsistent with what they hope will happen, even when those outcomes fit the logic of an unfolding narrative (Rapp & Gerrig, 2002, 2006).

There are several critical reasons to distinguish twist stories from the materials in experiments in which outcomes are either consistent or inconsistent with what readers expect should happen. First, the kinds of outcomes presented in those materials are often problematic for comprehension as they can include events that are incoherent with previous descriptions, cannot be easily resolved by updating prior understandings, and do not represent an intriguing and/or alternative interpretation for the unfolding plot. In contrast, while twist endings certainly are unexpected, upon further reflection they can make sense, providing both a capstone and novel interpretative framework for previous plot descriptions. Second, accounts of narrative comprehension have tended to focus on the types of causal connections that readers build in the service of constructing coherent understandings of texts (McNamara & Kintsch, 1996; van den Broek, & Kendeou, in press). Twist endings can create problems for such accounts precisely because they do not emerge directly out of clear causal sequences. For example, *The Sixth Sense* could as easily have ended with no twist, to be encoded in a linear causal sequence of events. However, the surprising twist can encourage a restructuring of the causal connections established earlier in the text experience based on information provided after the reveal, as well as the construction of new causal considerations upon further reflection (e.g., “No wonder Bruce Willis’ character never touched anything!”). Third, twist endings often encourage and even necessitate

multiple readings and viewings (Komeda, Nihei, & Kusumi, 2005; Miall, 1989). This motivates the need for specifically studying the rereading behaviors that might arise as individuals engage and reengage with twist stories.

Reading and Rereading

When readers encounter twists, they may opt to reread sections of texts to check for clues or information that they missed and that might relate to why they failed to construct particular inferences or expectations (e.g., “How did I miss that he was a ghost?”). Rereading affords the opportunity to reflect upon possible points of inference and reinterpretation. Rereading is of course also supportive of comprehension in general, as it can improve readers’ understanding of and memory for text. As one empirical demonstration, Dunlosky and Rawson (2005) tasked participants with reading a text once, reading a text once and immediately rereading the material, or reading a text once and rereading the material after a one-week delay. Participants were most successful answering comprehension questions about story content following immediate rereadings. Rereading fosters such benefits by allowing readers to differentially focus on particular processes and strategies that can support comprehension. For example, Millis, Simon, and tenBroek (1998) reported that participants focused more of their cognitive resources on integrating text content and less on understanding particular propositions, as they moved from a first to a second reading of scientific texts. This integration process can support the construction of global inferences and help readers derive text themes, both of which are important for building broader understandings of texts (Zwaan & Rapp, 2006).

In general, readers have different experiences of texts when they read them for the first time and when they reread those texts a second time, whether that occurs immediately or even years later (Miall, 1989). Stories with twist endings provide an important subject for these

empirically driven considerations given that readers' experiences between a first and second reading can be dramatically different, as informed by their reading goals and what they know or expect will happen (Komeda, Nihei, & Kusumi, 2005). For example, in the case of a first reading, a reader might engage with the story as if they are personally experiencing the events, with the goal of understanding the unfolding plot descriptions. Consider that readers often adopt a protagonist's perspective during reading (Horton & Rapp, 2003; Miall & Kuiken, 2001, 2002; Oatley, 1994, 2002). Upon a second reading, the reader might adopt other perspectives to reflect on events and situations in more depth. The point is that readers can have different reasons for initiating a reread of events and may adopt different strategies and goals for those rereadings.

With specific respect to stories with twist endings, one reason that readers opt to reread may be associated with their lack of familiarity or feelings about how strange the story content might be. When the story unfolds and ends in a surprisingly unpredictable way, those strange feelings may be partially resolved by the outcome. Still, rereading would allow for considering more deeply why those feelings of strangeness were experienced, for supporting attempts to re-experience those feelings as a means of explaining and resolving incoherent elements of the text, and even for contemplating other issues within the text. Each of these responses necessarily involves allocating resources to different comprehension strategies and text elements, which would be reflected in the moment-by-moment by changes in a comprehender's reading activities (and potentially reflected in measures such as reading times).

Readers' Responses

Readers can generate a variety of responses to texts, including increased focus to particular facts (McCrudden, Schraw, & Kambe, 2005) and affectively motivated interpretations of what is being read. Affective responses to text content have received modest attention in the

extant literature (e.g., Bohn-Gettler & Rapp, 2014; Zwaan, 1999a) but have direct influences on comprehension, as part and parcel of the reading (and rereading) activities that people enact (Bohn-Gettler & Rapp, 2011; Komeda & Kusumi, 2006). As examples, empathy (Miall & Kuiken, 1995; 2002), anticipation (Miall, 1989), and suspense-based arousal (Cupchik, Leonard, Axelrad, & Kalin, 1998) routinely arise during reading, particularly the reading of narratives. Empathy is related to readers' understandings of story characters and is a component of emotional involvement with the text (Brewer, 1996; Zillmann, 1994). With respect to anticipation, readers' understandings during moment-by-moment reading may be provisional, as they delay interpretations during their reading of a story, but, in other cases, readers can anticipate and/or build anticipation for what will occur next as they consider the likelihood of future events (Miall, 2002). When suspense is described in a story, readers often exhibit interest in resolving the events, which has been associated with faster readings as a function of searching for resolution (Brewer, 1996). Sentences that evoke suspense or describe the suspenseful experiences of characters are associated with increased arousal and are thus read more quickly, suggesting an important relationship between arousal and reading speed (Cupchik et al., 1998).

Investigations that have considered readers' affective responses have proven informative for understanding the nature of narrative experience. For example, Miall (1989) asked participants to rate the affective intensity or importance of each sentence in a short story by Virginia Woolf. Participants showed shifts in their judgments of the relative importance of story phrases between their first and second readings of the story. Additionally, the content of readers' written comments about the story indicated attempts to create narrative schemas that were associated with affective responses. Based on these findings, Miall (1989) proposed that reader affect can have three important consequences for the understanding of literary narratives.

First, reading can reduce self-referential considerations as readers affectively identify with story characters and with the situation being described in the plot. This is associated most closely with empathy, which as mentioned above, involves understanding narrative events from a character's frame of reference, vicariously experiencing the character's feelings, perceptions, and thoughts. Second, anticipation is a part of reader affect, as readers build expectations for the meaning of or events in a story, as well as beliefs about how a story will unfold or even how they might *prefer* it to unfold. These affectively laden expectations are closely related to participatory responses[1] (Allbritton & Gerrig, 1991; Gerrig, 1993; Polichak & Gerrig, 2002; Rapp & Gerrig, 2002, 2006), which are mental representations of the content of readers' preferences and thoughts as text events are processed, such as "Don't die!" or "Don't be shy!" Third, affective investments in narrative events can lead readers to encode multiple interpretations, sometimes moving from one interpretation to another in search of a preferred resolution. Readers often find stories odd or strange when they encounter situations that could be interpreted in a variety of ways, as ambiguous situations can make it difficult to build a causal understanding of text events. These various consequences, which represent only a handful of examples, indicate that affective responses play an important role in our everyday attempts at comprehending what we read.

While accounts like those briefly reviewed here have argued that affective responses influence everyday reading experiences, few accounts have examined how responses might change over rereadings. This consideration, in concert with readers' unusual but regularly experienced interactions with stories that conclude with a twist, motivated our project. The goal of this work is to begin developing an account of how readers experience narratives with surprising and incongruous endings, which should not only inform the issues raised previously, but may help explain the popularity of twist stories as reflected on bestseller and highest grossing movie lists.

The current study addresses whether and how readers' affective responses are related to reading times and if readers' emotions might change in the course of rereading stories with twist endings[2].

The Current Study

The primary purpose of this study was to begin outlining experiences people exhibit when they read and reread stories with twist endings. Our analyses examined readers' affective and emotional responses to the text. In the two experiments to be described, readers' affective responses were measured in terms of empathy, expectations, and feelings that the story content was strange (heretofore referred to as sense of strangeness) for the story events, in line with consequences identified in previous accounts (e.g., Miall, 1989). Readers' emotional responses were measured in terms of basic emotions including anger, disgust, anxiety, happiness, sadness, fear, and surprise, all of which regularly emerge during narrative comprehension (Oatley & Johnson-Laird, 1987; Ortony & Turner, 1990).

In Experiment 1, we examined the effect of Japanese readers' responses during their reading and rereading of a single story with a twist ending. We also used a multiple regression methodology, as commonly employed in discourse-processing research, to predict reading times for the texts based on predictor variables (Komeda & Kusumi, 2006; Magliano, Skowronski, Britt, Guss, & Forsythe, 2008; Magliano, et al., 2005; Millis, et al., 1998; Zwaan, Magliano, & Graesser, 1995; Zwaan, Radvansky, Hilliard, & Curiel, 1998). We also examined how readers' emotional experiences might change after a second reading, which is particularly informative for stories with twist endings given their unusual conclusions are presumably no longer surprising during subsequent readings.

In Experiment 2, we extended our analysis to English-speaking American readers' experiences with multiple stories containing twist endings. This provided an opportunity to

determine whether any effects would replicate with a different group of participants and for a different set of texts. Taken together, the results of the two experiments provide a useful exploratory analysis of whether and how affective responses influence reading pace (e.g., Bohn-Gettler & Rapp, 2011; Scrimin & Mason, 2015) and the types of responses that can emerge during experiences with stories that include surprising resolutions.

Experiment 1

This experiment examined relationships between readers' experiences with a single story with a twist ending and affective (empathy, expectations, and a sense of strangeness from readers' responses) and emotional responses (anger, disgust, anxiety, happiness, sadness, fear, and surprise from basic emotion) that develop over the course of reading the story a first and a second time.

Method

Participants. Twenty-eight native Japanese undergraduate and graduate students (14 females and 14 males) from a Japanese university participated for financial compensation (200 yen, or roughly $2 US). We recruited the participants using an online bulletin board posting.[3]

Materials. A Japanese short story entitled "Aibiki" (translated as "Secret Date" in English) (Ishikawa, 1992) was used in the experiment. (The full story is available online at: https://www.dropbox.com/sh/ttnzvvaj7f6w2u4/AABchJrYtSOwwYMU6IzpmTnBa?dl=0.) The story has a twist ending, and we identified the sentence revealing this ending as the "twist sentence" ("Age at death was seventeen, that's sad." in the 92nd sentence). A sentence earlier in the story implies this twist ending ("My elder sister, who recently turned 2 years old, was sleeping innocently next to me" in the 13th sentence), which we identified as "the foreshadowing sentence."

None of the participants reported, when asked after completing the experiment, having

read the story before. The story was 95 sentences long, written in Japanese kanji, hiragana, and katakana characters, in line with the participants' native language. The first half of the story introduced a protagonist and his girlfriend. Halfway through this section, an antagonist was introduced who left with the girlfriend. The second half of the story documented the protagonist's worries about his new, lonely situation. The antagonist and girlfriend eventually return, as the story ends in a surprising way revealing that the protagonist is actually a ghost in a cemetery. The story has actually detailed how the ghost's life has sadly moved on without him. It turns out that the protagonist's grave was the sole setting for the story, likely only realized by readers as relevant to the protagonist's condition after the twist ending has been revealed and understood.

Before running the experiment, we conducted a norming study to determine predictor variables for conducting multiple regression analyses with respect to participants' affective experiences with the story. We asked thirty-six participants, none of whom participated in the experiment, to rate their affective responses to all of the story sentences, reading through the story twice. The participants were asked to rate each story sentence on a 5-point scale from 1 to 5 with respect to empathy (1: absolutely could not empathize, 2: mostly could not empathize, 3: unsure, 4:mostly could empathize, 5: absolutely could empathize), expectations (1: absolutely not important, 2: probably not important, 3: unsure, 4: probably important, 5: absolutely important), or sense-of-strangeness (1: absolutely normal, 2: mostly normal, 3: unsure, 4: mostly strange, 5: absolutely strange). Empathy participants (n = 12) were asked to consider their empathy by answering the question, "How well could you empathize with the situation in the story?[4]" Expectation participants (n = 12) were asked to consider their expectations by answering the question, "To what extent do you expect this sentence will be important for subsequent plot developments?" Sense-of-strangeness participants (n = 12) were asked to answer the question,

"How strange does this feel, based on how much it deviates from your knowledge about the world?" All norming participants were asked to keep the standards by which they made their ratings across their first and second readings of the text constant.

Correlations between consecutive sentence pairs (e.g., 1st sentence and 2nd sentence, 2nd sentence and 3rd sentence, etc.) were calculated to secure the assumption of independence of measures for evaluating multiple, sequential sentences. Percentages of significant correlations between consecutive sentence pairs were 53.7% for the first reading for Empathy and 77.4% for the second reading for Empathy, 31.2% for the first reading for Expectation and 36.6% for the second reading for Expectation, and 20.4% for the first reading for Sense-of-strangeness and 30.1% for the second reading for Sense-of-strangeness. Save for the empathy ratings, the percentages of significant correlations fell below 50%, which suggests that the rating of each sentence was not strongly influenced by the adjacent sentences. Given that empathy is most likely to emerge from the accumulation of multiple sentences over time rather than from a single sentence, these findings could be argued to reflect natural reading processes. Outside of empathy, based on these data, the assumption of independence of measures was not violated, so item-to-item analyses derived from these norming studies were deemed appropriate.

A two-way ANOVA (affective responses: Empathy vs. Expectation vs. Strangeness; reading stages: first reading vs. second reading) revealed a significant interaction (F_1 (2, 33) = 11.99, MS_e = 0.14, $p < .001$; F_2 (2, 282) = 31.36, MS_e = 7.99, $p < .001$). (For this and all-subsequent post-hoc comparisons throughout the paper, we used Shaffer's Modified Sequentially Rejective Bonferroni Procedure.) Participants' self-reported empathy was rated as higher during their second reading (M = 2.79, SD = 0.65) than during their first reading (M = 2.62, SD = 0.51) of the story (F_1 (1, 11) = 8.96, MS_e = 0.16, $p < .001$; F_2 (1, 94) = 3.23, MS_e = 0.42, $p < .10$); self-reported

expectation was rated higher during their second reading (M = 3.11, SD = 0.36) than during their first reading (M = 2.95, SD = 0.66) in the item analysis only (F_1 (1, 11) = 1.48, MS_e = 0.11, $p > .05$; F_2 (1, 94) = 5.28, MS_e = 0.22, $p < .05$); and sense of strangeness was rated lower during their second reading (M = 1.76, SD = 0.59) than during their first reading (M = 2.31, SD = 0.89) of the story (F_1 (1, 11) = 13.10, MS_e = 0.01, $p < .001$; F_2 (1, 94) = 113.05, MS_e = 0.13, $p < .001$). These data indicate that participants exhibited greater empathy and expectations, but a reduced sense of strangeness for the story during their second as compared to their first reading. To examine the relationship between these affective responses and reading times for each sentence in the actual experiment, we used the empathy, expectation, and strangeness data as independent variables and sentence reading times as the dependent variables in our subsequent multiple regression analyses.

We also examined other independent variables including the number of Japanese characters and serial position of the described events as text-based characteristics in the analysis. The number of characters was used to indicate the length of the Japanese-language sentences (Komeda & Kusumi, 2006). Sentence length and the serial positions of sentences have been treated similarly as text-based variables in previous studies (e.g., Zwaan et al., 1995).

For the actual experiment, we also examined readers' emotional experiences after each reading stage (after reading the first half of the story, after reading the second half of the story, and after rereading the entire story). Their emotional responses were measured in terms of basic emotions including anger, disgust, anxiety, happiness, sadness, fear, and surprise (Oatley & Johnson-Laird, 1987; Ortony & Turner, 1990). This emulated the procedure of Miall (1989), with participants interrupted to be queried halfway through their first reading of the story and after the story was completed. The first interruption allowed for evaluating participants' initial experiences of the unfolding story prior to any twist, and the queries measured after reading the second half

were used to evaluate the consequences of the twist after the story was completed. The participants were not interrupted during their second reading of the story given no additional surprise information was provided[5].

Procedure. Participants in the experiment were instructed to read the stories as if they were normally reading a novel. Before reading the experimental story, participants read a short practice story to familiarize themselves with the procedure. The practice and experimental story were presented one sentence at a time on a computer screen. Each sentence remained on the screen until the participants pressed the spacebar, which replaced that sentence with the subsequent sentence in the story. The computer recorded the reading times for each sentence as the time between keypresses.

Participants began by reading the first half of the story at their own pace. After reading all of the sentences in the first half, participants rated their emotions on a 7-point Likert scale (1: absolutely not feeling – 7: absolutely feeling). Without taking a break, participants then read the second half of the story and, at the end, again rated their emotions using the same scale. Immediately after this second rating, participants were instructed to reread the entire story. However, we did not discuss or offer any task or goal-based instructions for the reading to avoid biasing their interpretations or strategies, and simply asked them to reread the story. After this second reading, participants rated their emotions a final time. The experiment lasted approximately 20 minutes.

Results and Discussion

First reading. We performed multiple regression analyses on reading times to assess the impact of number of characters, serial position, empathy, expectations, and sense of strangeness on reading times for the first reading of the text. These variables were simultaneously force entered

into the regression models. Table 1 presents the average of the *beta* weights in Experiment 1. Single-sample *t*-tests on the *beta* weights were used to examine whether these significantly differed from zero (Komeda & Kusumi, 2006; Lorch & Myers, 1990; Magliano, et al., 2005; Millis, et al., 1998; Zwaan et al., 1995; Zwaan et al., 1998).

(Please place Table 1 about here)

Consistent with the results of previous studies, the number of characters in a sentence was associated with slower reading times for participants' first reading of the text (e.g., Komeda & Kusumi, 2006; Zwaan et al., 1995; Zwaan et al., 1998). The effect of serial position was not significant ($p > .10$), which might not be surprising given the surprising conclusion to the story.

For the affective variables, empathy and expectations were associated with faster sentence reading times (*Beta* = -.09). Previous work has shown that reader empathy as a function of similarities between readers and characters can facilitate judgments of story outcomes (Komeda, Tsunemi, Inohara, Kusumi, & Rapp, 2013) and influences the inferences that readers make about story characters' emotions (Komeda, Kawasaki, Tsunemi, & Kusumi, 2009). Reader empathy has thus been linked to text comprehension, as faster reading times are taken as a marker of better comprehension of text materials. Expectations were also associated with faster sentence reading times (*Beta* = -.10), indicating that anticipation for what would happen next similarly facilitated reading of the unfolding story.

In contrast to these faster reading times, readers' feelings of strangeness were associated with slower reading times (*Beta* = .14). When readers felt the story was different from their understandings or construals of the world, their reading of the story was slowed. This also aligns with previous work demonstrating that reading slowdowns are often associated with processing difficulty or discrepancy resolution (e.g., Jacovina, Hinze, & Rapp, 2014; O'Brien et al., 1998;

Rapp, Gerrig, & Prentice, 2001). Strange events can encourage attempts at understanding their causes or resolving incoherent descriptions, which would align with an expected slowdown in processing latencies.

Second reading. For the second reading, the number of characters was again associated with slower sentence reading times, but this time, serial position was associated with faster reading times (e.g., Komeda & Kusumi, 2006; Zwaan et al., 1995; Zwaan et al., 1998). Serial position is tied directly to the content and structure of the text itself rather than to the mental representation of the narrative situations being constructed by the reader (Radvansky, Zwaan, Curiel, & Copeland, 2001). Thus these data might suggest that readers were more likely to construct text-based representations during their second readings of the story than during the first readings.

With respect to the affective variables, the patterns observed for the second reading differed from the first reading. Greater empathy was now associated with longer reading times (*Beta* = .07). When readers empathized with the characters, they seemed to devote more time to considering the unfolding events and how or why they were occurring. Expectations were also associated with slower sentence reading times for second readings (*Beta* = .03). Given explicit knowledge of how the story would unfold, participants now took longer to read the text when they empathized with characters and had expectations for story events. During a first reading, readers can also exhibit interest in resolving uncertain events, which has been associated with faster readings and linked to attempts to resolve suspense (Brewer, 1996; Cupchik et al., 1998). In contrast, during a second reading, readers are aware of the outcome and the situations to be described. Consistent with the findings for first readings, feelings of strangeness during second readings continued to be associated with slower reading times (*Beta* = .06). Again, this might reflect the detection of causal inconsistencies, as well as continued attempts at reconciling

discrepancies and logical gaps (e.g., Komeda & Kusumi, 2006; Zwaan, et al., 1995; Zwaan, et al., 1998).

Residual reading times. Given the different lengths of the various sentences in the story, we calculated residuals for participants' reading times in our analysis, as in previous work (e.g., Rapp, 2008). This involved subtracting each participants' actual reading times from their reading times predicted by a regression equation based on the length of each target sentence of the story (Gillioz, Gygax, & Tapiero, 2012; Gygax, Tapiero, & Carruzzo, 2007). We conducted a two-way ANOVA with the type of sentence (the twist sentence, the foreshadowing sentence) and reading (the first reading, the second reading) as within-participant variables (see Figure 1). The main effect of sentence type (F (1, 27) = 57.42, MS_e = 5998358.4, $p < .001$) and main effect of reading were significant (F (1, 27) = 9.78, MS_e = 7964670.3, $p < .001$). Because negative residual times indicate that reading times are longer than expected (Gygax et al., 2007), the first reading of the twist sentence and foreshadowing sentences could be interpreted as reflecting increased processing.

(Please place Figure 1 about here)

Readers' Emotions

We also assessed the emotions that participants self-reported experiencing during their readings (see Figure 2). We conducted a two-way ANOVA with the stage of the experiment (the first half, the second half, and rereading) and emotional states (anger, disgust, anxiety, happiness, sadness, fear, and surprise) as within-participant variables. The interaction between stage of the experiment and emotional state was significant (F (12, 324) = 7.18, MS_e = 1.61, $p < .001$). Readers' anger increased between the first half of the story and rereading stages (t (27) = 2.87, $p < .01$) and between the second of the story and rereading (t (27) = 2.26, $p < .05$). However, overall

anger across the readings did not exceed the midpoint of the 7-point scale. Readers' sadness also increased between the first and second half of the story (t (27) = 5.79, $p < .001$) and between the first reading and rereading (t (27) = 7.39, $p < .001$). These results with respect to anger and sadness might indicate that participants' emotional ratings simply increased over time. However, while readers' surprise increased between the first and second half of the text (t (27) = 3.55, $p < .005$), it actually decreased between the second half and rereading (t (27) = 7.03, $p < .001$). No significant effects emerged for readers' disgust, anxiety, happiness, or fear ($ps > .10$).

(Please place Figure 2 about here)

Also interestingly, readers' feelings of sadness increased after knowing the ending of the story, whereas their feelings of surprise decreased, presumably given knowledge for how the narrative ends. This suggests that as participants read the story a second time, their emotions potentially changed. Specifically, sadness was persistent and increased while surprise was experienced only upon first reading of the twist endings. Readers' anger towards the antagonist also increased during rereading although anger across the readings did not exceed the midpoint of the 7-point scale.

In Experiment 1, the effects of readers' affective responses were examined as a function of rereading a story with a surprising twist ending. However, it is unclear whether the results obtained are specific to the story used or whether those results might generalize to other stories with twist endings. Additionally, the observed effects might be specific to the population from which we sampled; that is, the observed affective responses during rereading might be localized to the Japanese culture and/or the effects associated with that specific language, readership, and experience with such a story. To address these considerations, in Experiment 2 we examined responses to multiple stories (including the story from Experiment 1) with English-speaking

participants from an American university.

Experiment 2

The purpose of the second experiment was to examine whether the previously described effects would similarly emerge outside of the Japanese culture and language. We predicted, given the popularity of the twist story genre and familiarity of such works cross-culturally[6], that the findings would not be specific to the particular culture tested or to the particular story used. An alternative prediction might suggest that different cultural expectations, norms, and behaviors associated with beliefs in what might be appropriate or expected during reading would result in effects that differ as a function of varying stories and readerships. To evaluate these predictions, in Experiment 2 we presented English-speaking participants with four twist-ending stories, employing the same methods as in Experiment 1.

Method

Participants. Thirty-eight English-speaking undergraduates (23 females and 15 males) from a midwestern university in the United States participated in the experiment for course credit. We recruited the participants from undergraduate subject pools[7]. Two participants were excluded for not following directions resulting in data from thirty-six participants (22 females and 14 males) for the analyses.

Materials. Four stories were used in the experiment, all originally written by popular Japanese authors: “The Dweller in the Dilapidated House,” “A New President,” “Whispers,” and “Aibiki.” Three of the stories were selected from an available English translation of the texts (Hoshi, 1985), and “Aibiki,” which was used in the previous experiment, was translated by the first and second authors. The stories contained between 93 and 99 sentences, each ending with a twist. For example, in one of the stories, the protagonist turns out to be a robot rather than a human being,

which is only revealed as a surprise in the second half of the story. (All of the stories are available online at:

https://www.dropbox.com/sh/ttnzvvaj7f6w2u4/AABchJrYtSOwwYMU6IzpmTnBa?dl=0).

As in Experiment 1, we first conducted a norming study to provide predictor variables for the multiple regression analyses. Forty-two participants, none of whom participated in the actual experiment, rated their affective responses to all of the sentences. Fourteen participants were randomly assigned to the empathy group, fourteen to the expectations group, and the remaining fourteen to the sense-of-strangeness group. Correlations between consecutive sentence pairs were calculated to consider the assumption of independence of measures. Percentages of significant correlations between consecutive sentence pairs were 63.5% for the first reading for Empathy and 68.3% for the second reading for Empathy, 38.4% for the first reading for Expectation and 50.6% for the second reading for Expectation, and 40.2% for the first reading for Sense-of-strangeness and 52.7% for the second reading for Sense-of-strangeness. As in Experiment 1, we interpreted these correlations to suggest that item-to-item analyses for the norming studies are appropriate.

A two-way ANOVA (affective responses: Empathy vs. Expectation vs. Strangeness; reading stages: first reading vs. second reading) revealed a significant interaction (F_1 (2, 39) = 3.79, MS_e = 0.14, $p < .05$; F_2 (2, 1143) = 50.83, MS_e = 3.78, $p < .001$): Participants' self-reported empathy was rated higher during their second reading (M =3.26, SD = 0.51) than during their first reading (M = 3.19, SD = 0.54) in the item analysis only (F_1 (1, 13) = 0.95, MS_e = 0.03, $p > .05$; F_2 (1, 381) = 13.37, MS_e = 0.96, $p < .001$); self-reported expectation did not change significantly from the first (M = 3.11, SD = 0.63) to second reading (M = 3.08, SD = 0.49) (F_1 (1, 13) = 0.15, MS_e = 0.71, $p > .05$; F_2 (1, 381) = 1.93, MS_e = 0.17, $p > .05$); and sense of strangeness was rated higher during second (M = 4.10, SD = 0.51) than first reading (M = 3.81, SD = 0.44) of the story (F_1 (1,

13) = 14.60, MS_e = 0.59, $p < .01$; F_2 (1, 381) = 189.22, MS_e = 15.94, $p < .001$)[8]. To examine the relationship between these affective responses and reading times for each sentence in the actual experiment, we used the empathy, expectation, and strangeness data as the independent variables and sentence reading times as the dependent variables in multiple regression analyses.

Procedure. The procedure was identical to Experiment 1, with an increase in the number of stories from one to four, a change in the language of the presented stories, and a change in the cultural and geographical background of the participants. The experiment lasted approximately 40 minutes.

Results and Discussion

First reading. The four stories were collapsed into one regression model per participant[9]. Overall, the results of Experiment 1 were replicated in Experiment 2 (see Table 2). For the first reading, the number of words[10] was associated with slower reading times while the effect of serial position was not significant. For the affect analyses, empathy and expectations were associated with faster sentence reading times (*Beta* = -.02, -.02), and feelings of strangeness were associated with slower reading times (*Beta* = .13).

Second reading. For the second reading, the number of words, empathy, expectations, and feelings of strangeness were all associated with slower sentence reading times (*Beta* = .07, .03, .06) while serial position was associated with faster reading times, again consistent with Experiment 1. Thus the earlier reported effects appeared to generalize to other stories with twist endings.

(Please place Table 2 about here)

Residual Reading Times

We conducted a two-way ANOVA with the type of sentence (the twist sentence, the

foreshadowing sentence) and reading (the first reading, the second reading) as within-participant variables. The main effect of sentence type (F (1, 35) = 14.20, MS_e = 71560320.7, p < .001) and main effect of reading were significant (F (1, 35) = 27.20 MS_e = 6098379.4, p < .001) (see Figure 3a). We also conducted a two-way ANOVA with type of sentence and reading as within-participant variables. The main effect of sentence type (F (1, 35) = 17.65, MS_e = 61418567.6, p < .001) and main effect of reading were significant (F (1, 35) = 79.78 MS_e = 4742035.2, p < .001) (see Figure 3b). We additionally conducted a two-way ANOVA with the type of sentence and reading as within-participant variables, revealing both a main effect of sentence type (F (1, 35) = 4.87, MS_e = 7487592.9, p < .001) and of reading (F (1, 35) = 21.37 MS_e = 8334930.4, p < .001) (see Figure 3c). Finally, a two-way ANOVA with sentence type and reading as within-participant variables obtained main effects of sentence type (F (1, 35) = 36.68, MS_e = 8657093.8, p < .001) and reading (F (1, 35) = 6.22 MS_e = 13170295.4, p < .001) (see Figure 3d). Given that negative residual times indicate reading times are longer than expected (Gygax et al., 2007), the first reading of the twist sentence and foreshadowing sentences could be interpreted as reflecting increased processing in all four stories, consistent with the findings in Experiment 1.

(Please place Figures 3a, 3b, 3c, & 3d about here)

Readers' Emotions

Readers' reported emotions after reading each of the four stories were collapsed, and mean data for each emotion were used as dependent variables for the analysis. We conducted a two-way ANOVA with the stage of the experiment and emotional states as within-participant variables (see Figure 4).

(Please place Figure 4 about here)

The interaction between stage of the experiment and emotional state was significant (F

(12, 420) = 15.21, MS_e = 0.36, p < .001). Readers' sadness increased between the first and second half of the texts (t (35) = 2.74, p < .01) and between the first half and rereading (t (35) = 4.12, p < .001). Readers' fear increased between the first and second halves of the texts (t (35) = 3.81, p < .005) but decreased between the second half and rereading (t (35) = 3.11, p < .005). Readers' surprise increased between the first and second halves of the texts (t (35) = 9.67, p < .001) and between the first half of the texts and rereading (t (35) = 5.97, p < .001) but decreased between the second half of the texts and rereading (t (35) = 5.46, p < .001). No significant effects emerged for readers' anger, disgust, anxiety, and happiness (All ps > .10).

With respect to sadness, the differences between the first half and second half of the texts replicated the results of the single text in Experiment 1. However, sadness during all readings did not exceed the midpoint of the 7-point scale. The pattern for reported surprise was also consistent with that from Experiment 1: Surprise did not arise during reading the first half of the stories; however, when readers encountered the twist endings during their reading of the second half of the stories, their self-reported surprise increased. Familiarity with the twist endings decreased readers' surprise for what would happen during their rereading of the texts. Surprise is a malleable emotion during moment-by-moment text experiences, varying due to a variety of factors including the congruency between readers' knowledge and story outcomes (e.g., Egidi & Gerrig, 2009). These results indicate surprise can wax and wane as a function of prior knowledge and unfolding story events.

Although readers' fear increased between the first and second halves of the texts and decreased between the second half and rereading, the mean scores were below the mid-points, indicating fear was unlikely to have been strongly instantiated in the texts. Thus we avoid any additional discussion based on the results.

In sum, the results of Experiment 2 were consistent with Experiment 1. The observed effects of affective responses and emotional changes emerging from the unfolding twist story did not appear dependent upon a reader's specific language and culture, and were observed across multiple texts beyond the single text previously used.

General Discussion

The current study investigated readers' responses to stories that concluded with a surprise twist. Participants' enjoyment of these stories might arise from the emotional responses that are engendered by the surprise endings, as well as by the different kinds of analyses they might apply to stories when they have no idea what will happen as compared to when they have full knowledge about what will happen. In two experiments, we investigated reader responses to these stories, specifically affective responses including empathy and emotional responses including surprise. The results from these experiments highlight some of the experiential effects of first and second readings of twist ending stories. In both experiments, empathy and expectations were associated with faster reading times on a first reading whereas empathy, expectations, and a sense of strangeness were associated with slower reading times on a second reading. Participants also exhibited greater surprise for story content on their first as compared to their second reading. The types of responses that readers exhibited regarding the stories changed as a function of knowledge about the stories' contents.

The results of both Experiments 1 and 2, including both norming studies, suggest readers' empathy changed during their moment-by-moment experience with the text. Empathy involves readers relating to and seemingly experiencing a character's feelings and thoughts as their own. Empathic responses of this type have important implications for text comprehension and can serve a variety of functions although they have often gone ignored in empirical work (Komeda et al.,

2013). For the current project, at least two empathic functions are worth considering: facilitation and immersion. Facilitation is related to fast development of mental representations for story situations and is associated with faster reading times. Immersion is related to more detailed mental representations for story situations, which can include readers' previous experiences, impressions, and knowledge about stories, and is associated with slower reading times. A *facilitation* effect might have enhanced the likelihood that readers would contemplate the plights of story characters to carefully consider the likelihood of future events or, alternatively, speed through the texts to see how things turned out. One way this could occur is that readers might mentally simulate the types of events described by characters with whom they empathize. This notion aligns with accounts suggesting that readers process story information as if they were involved in the events (e.g., Gerrig, 1993; Horton & Rapp, 2003; Zwaan, 1999b). Similarly, readers may have become *immersed* in the events described in the narrative, reflecting their engagement with and consideration of those events (Mar & Oatley, 2008). Immersion of this type has been described as a type of transportation into a text, during which readers are intensely focused on story content, ignoring the outside world, and after which they are affected by the events they have read (e.g., Gerrig, 1993; Green & Brock, 2000). Both possibilities, facilitation and immersion, might reflect the contingencies of everyday reading with characters for whom readers become familiar with and care about.

These readings, though, can become even more engaging or frustrating when events that are unexpected occur, but what models or theories are informative with respect to the causes of surprise? Structural-affect theory explains particular responses in the reader as emerging based on the structural features of narratives (Brewer, 1996; Brewer & Lichtenstein, 1982). According to this view, surprise arises from a discourse structure in which important information is omitted

from the beginning of the story and only provided in the conclusion. Twist stories have precisely this structure. Thus the emergence of surprise in these texts was not just a function of the particular events that were described (e.g., the protagonist was a ghost or a robot) but also a function of how and when those descriptions were provided to the reader. Future investigations of surprise experiences during narrative comprehension may utilize this structural template as a means of considering how and why particular affective and emotional responses drive interest in text content.

The current project also examined how surprise might be experienced across multiple readings of text. As the data showed, surprise for the twist endings clearly decreased during rereadings of the stories. In general, multiple readings enhance comprehension of texts (e.g., Dunlosky & Rawson, 2005), at least in part because readers can determine exactly what to focus on during their rereadings. Because readers have information about what the text contains, second readings are also associated with reduced cognitive load as compared to first readings (e.g., Raney, Therriault, & Minkoff, 2000; Zwaan et al., 1995). To date, theorizing about rereading has tended to focus more on learning and comprehension than on the types of reader responses that can emerge during those rereadings. One important consideration is that affective and emotional experiences provide motivation to read texts multiple times. Thus the current findings extend the scope of considerations for rereading work by highlighting some of the reasons why readers might potentially undertake multiple readings of texts.

Analyses of those second as compared to first readings also showed that readers' responses can change with experience. We considered such changes with respect to existing discussions of literary processing—specifically, Miall's (1989) description of affective responses based on self-referential, anticipatory, and cross-domain effects. For the current project, during a

first reading, self-referential and anticipatory responses likely sped up participants' readings of the text; those responses were examined with empathy and expectation-based judgments. The cross-domain effect, which involves generating interpretations of events to derive and inform narrative resolutions, may have been responsible for reading slowdowns (and potentially associated with a sense-of-strangeness, as that construct is no doubt a component of interpreting story situations). One important conceptual link for this work involves identifying how readers' responses, affective and otherwise, influence the pace of reading as well as reader focus on particular elements of texts including the rereading of sections of material. Future work should consider how moment-by-moment processing of texts is influenced by such responses, in ways that mirror previous work demonstrating that instructional guidance and explicit text content similarly guide reading decisions (e.g., McCrudden, et al., 2005; Peshkam, Mensink, Putnam, & Rapp, 2011) and the strategies readers adopt to enact their comprehension strategies and achieve their reading goals (Albrecht & O'Brien, 1993; Carretti et al., 2005; van den Broek et al., 1999).

It is also important to mention that the experiments queried participants' subjective considerations as, for example, their reported feelings of empathy. While participants may have self-reported that they empathized, they might not truly have empathized during their reading. Additional measurements, including physiological recordings, as well as in-depth interviews during and after reading is completed, can provide more clarity with respect to whether and when participants experienced particular responses, affective or otherwise.

The goal of this work was to present an exploratory examination of readers' experiences with twist stories and to connect that work to other projects so as to begin building an account of responses to stories with unexpected endings. These stories are interesting not just because their contents are surprising to readers but also because they often motivate rethinking about earlier

encoded plots. We specifically highlighted the role of readers' emotional and affective responses on reading experiences in this project. The data here hopefully encourage additional theoretical and empirical discussions about the relationships between reader responses and experiences with the kinds of stories they enjoy reading and being surprised by (Rapp, Komeda, & Hinze, 2011). Twist stories are but one example of everyday materials that, when they are the objects of study, can prove informative for explicating how and why readers interact with and understand narrative fiction. Those interactions need not be focused specifically or solely on cognitive responses, but they can also focus on emerging affective considerations that are part and parcel of reading experiences, as we have done here.

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Footnotes

[1] It can be a challenge to conceptually distinguish between anticipation and expectation (as evidenced by the lack of empirical literature attempting to do just that); for the current project, we consider anticipation as involving hopes and preferences, potentially emotionally informed, while expectations are based on the logic of unfolding events (e.g., Rapp & Gerrig, 2006).

[2] We consider "affect" here as broadly construed to include experiences of empathy and feelings that an unfolding story might be strange. This can be distinguished from more basic emotional responses, like feeling happy or sad. For the current project, we examine both affect and emotion influences on reading experiences.

[3] We were unable to collect demographic data from participants with respect to their language proficiency, age, or major.

[4] Because participants were aware of the surprise ending during rereading, realizing that the protagonist is not a human being but a ghost, we asked them to "empathize with the situation" rather than "empathize with the character."

[5] In future work, it might be informative to include the same interruption during a participant's second reading, although it is unclear what predictions we might generate with respect to how or why ratings might change when interrupted halfway through and at the end of that rereading.

[6] We used United States and Japanese samples in these experiments for two reasons. First, these were convenience samples based on the populations with which members of our research team work. Second, the texts in Experiment 2 were available in English and Japanese. Future studies should test participants in the other languages and countries.

[7] As with Experiment 1, we were unable to collect demographic data from participants with

respect to their language proficiency, age, or major. Relatedly, one might argue that both schools in Experiments 1 and 2 are elite, selective universities and as such, that the students might score high on measures of skill, reading propensities, and potentially even background knowledge, suggesting the results are appropriate only to a special set of readers. We avoid any further discussion along these lines given we do not have those data that speak to these issues for our participants.

[8] This result is not consistent with Japanese sample in Experiment 1. The stories might have been unfamiliar to the participants from the United States, for example in terms of structure or logic, given they represented examples of Japanese literature. Future research should test materials from Japan and the U.S. to clarify any potential cultural differences.

[9] There were no significant differences with respect to the order of the presented stories. For all variables, there were no significant differences between the four stories.

[10] Because the stories were written in English, we analyzed them as a function of the number of words rather than the number of characters, in line with previous analyses (see Kintsch & Keenan, 1973; Kintsch, Kozminsky, Streby, McKoon & Keenan, 1975; Wallot, Hollis, & van Rooij, 2013).

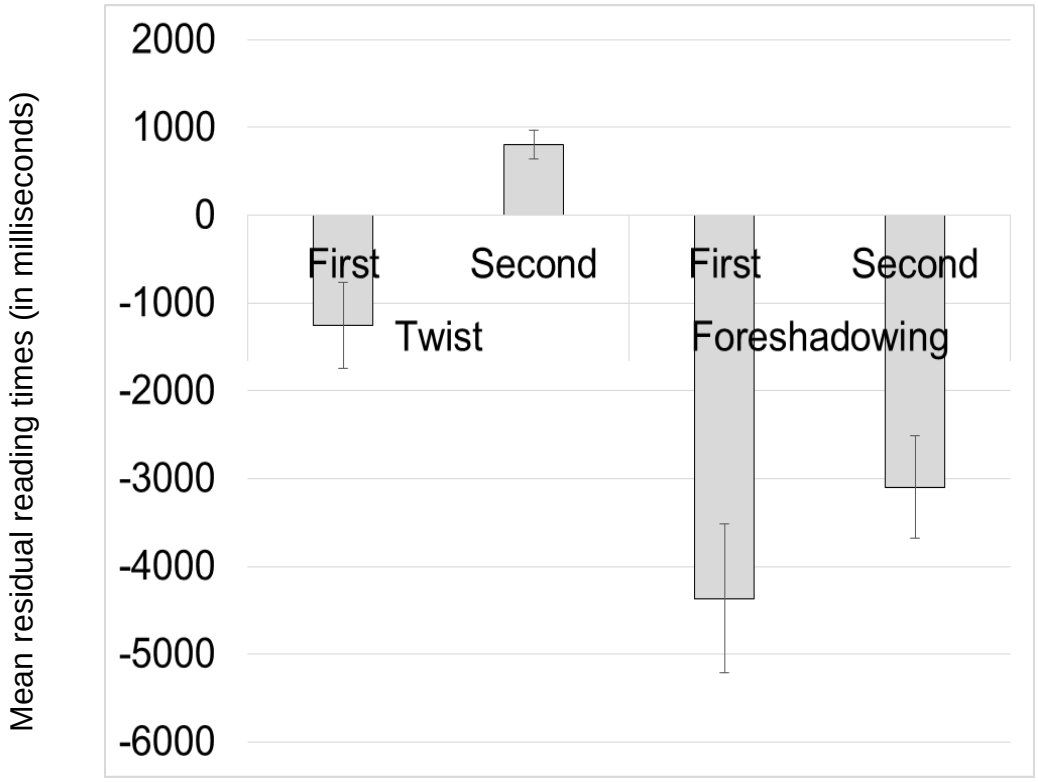

Figure 1. Mean residual reading times in Experiment 1.

Negative residual times mean slower times.

Twist sentence: “Age at death was seventeen, that’s sad” (92nd sentence)

The foreshadowing sentence: “My elder sister, who recently turned 2 years old, was sleeping innocently next to me” (13th sentence)

Error bars represent 95% confidence intervals.

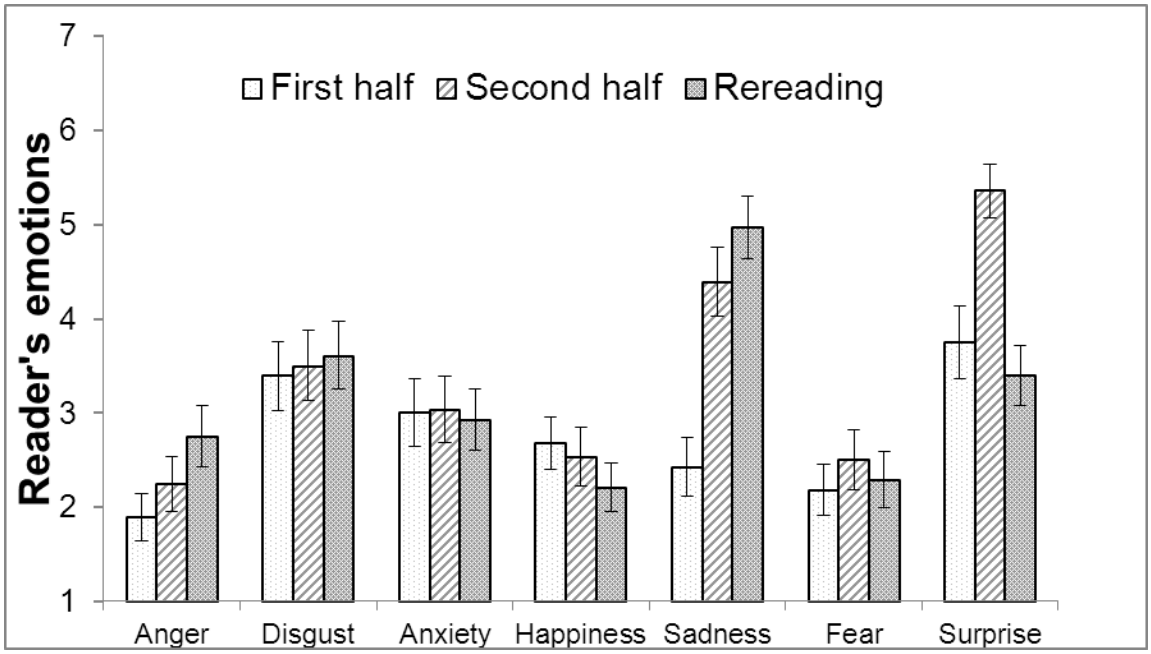

Figure 2. Means of readers' emotional responses by stage of reading the story in Experiment 1 (rating scale from 1, absolutely not feeling, to 7, absolutely feeling).

Error bars represent 95% confidence intervals.

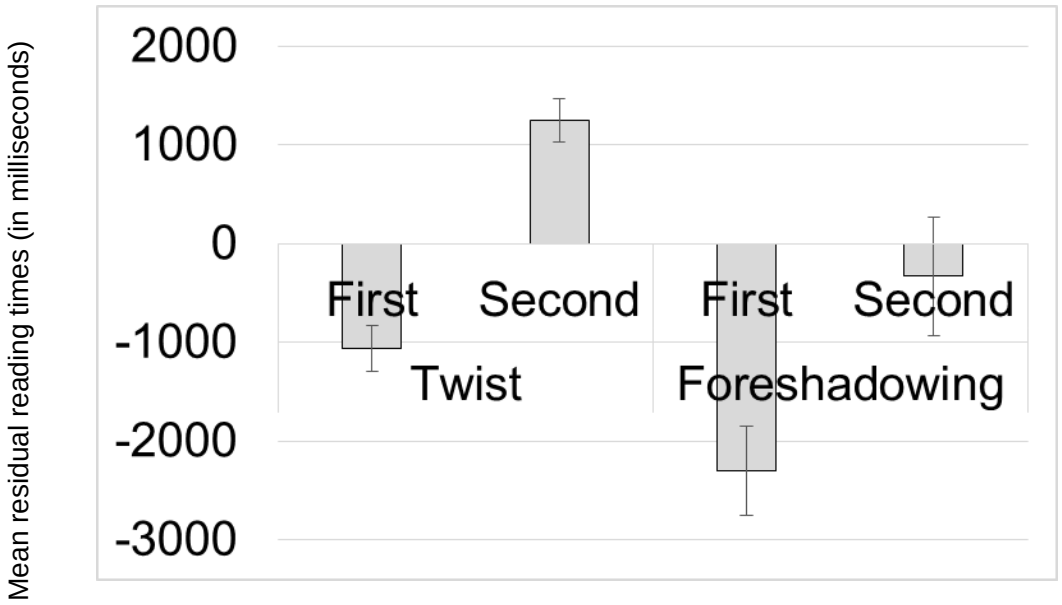

Figure 3a. Mean residual reading times in "The dweller in the dilapidated house."

Twist sentence: "Out of compassion for others, I've been hiding myself away from the eyes of the world in this place." (86th sentence)

Foreshadowing sentence: "The viewers were lost in thought as they felt the poverty that they had forgotten, and they deeply appreciated their present happiness once more." (65th sentence)

Error bars represent 95% confidence intervals.

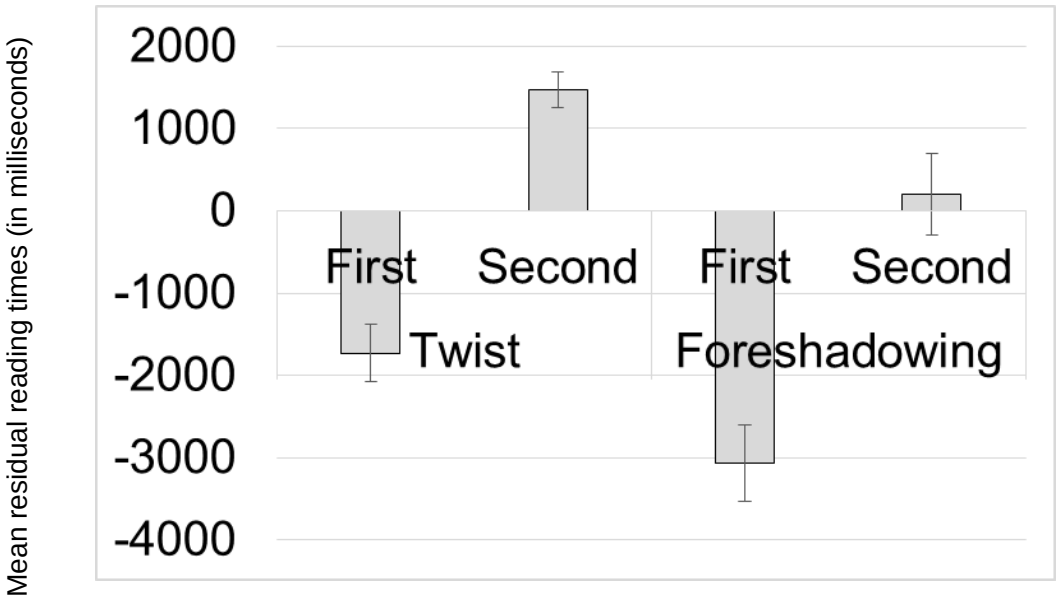

Figure 3b. Mean residual reading times in “A new president.”

Twist sentence: “They functioned so that once something, no matter how trivial, had entered the memory, it was never forgotten.” (85th sentence)

Foreshadowing sentence: “If he were to refuse, the president would remember, and someday when he had forgotten about it, the president would remind him while complaining bitterly about something or another.” (65th sentence)

Error bars represent 95% confidence intervals.

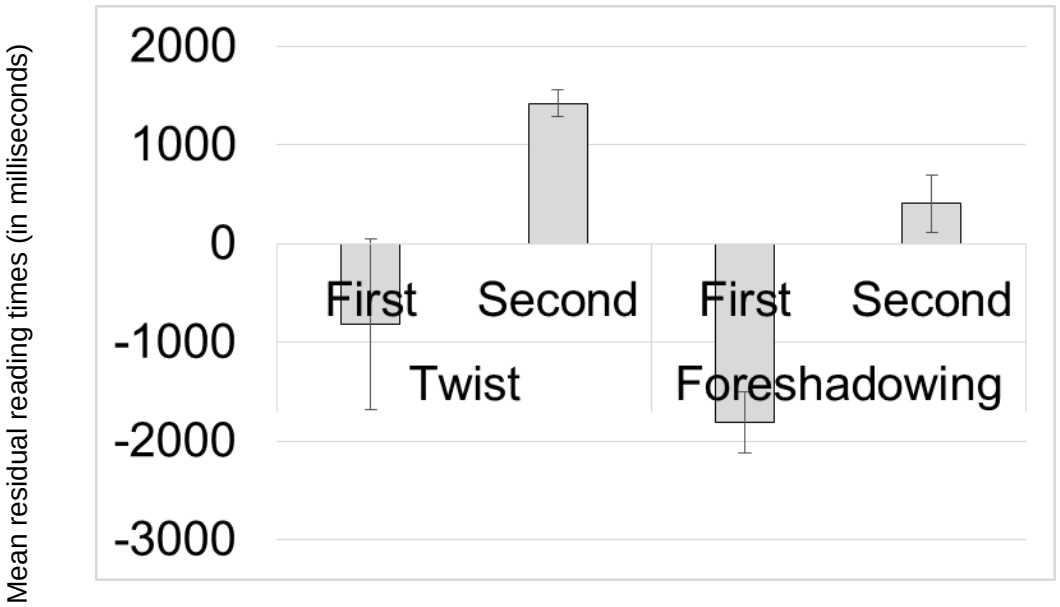

Figure 3c. Mean residual reading times in “Whispers.”

Twist sentence: “That’s only a multi-track recording tape.” (85th sentence)

Foreshadowing sentence: “Even though I had been on Mars, I hadn’t heard this story before and when I told it to my friends, everyone laughed and laughed.” (59th sentence)

Error bars represent 95% confidence intervals.

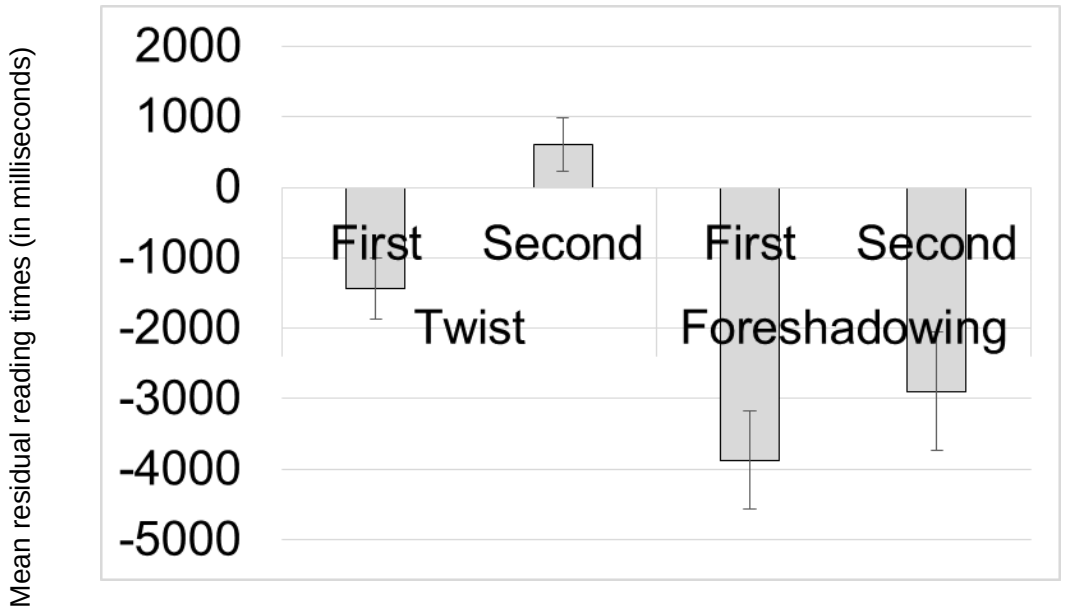

Figure 3d. Mean residual reading times in “Aibiki”.

Twist sentence: “Age at death was seventeen, that’s sad.” (92nd sentence)

Foreshadowing sentence: “My elder sister, who recently turned 2 years old, was sleeping innocently next to me.” (13th sentence)

Error bars represent 95% confidence intervals.

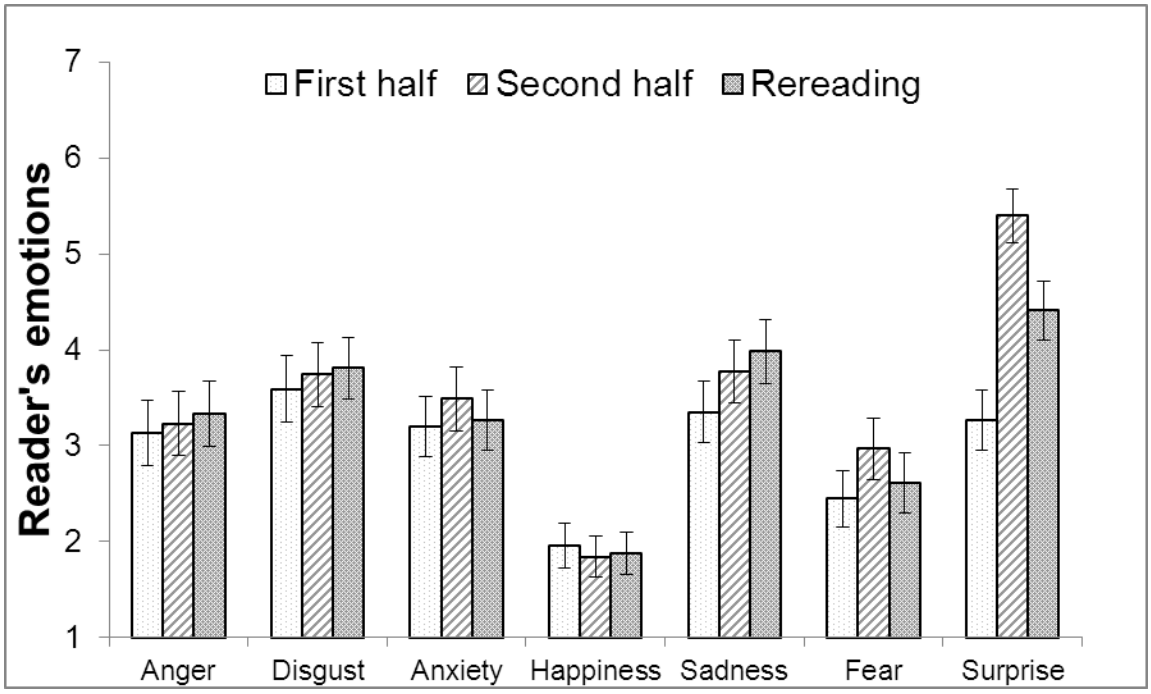

Figure 4. Means of readers' emotional responses by stage of reading the stories in Experiment 2 (rating scale from 1, absolutely not feeling, to 7, absolutely feeling).

Error bars represent 95% confidence intervals.

Table 1

Mean standardized regression coefficients (beta weights) from the regression analyses of reading times in first and second readings for "Aibiki" in Experiment 1

Reading	First reading				Second reading			
Variables	*Beta*	95% CI	*t*	*p*	*Beta*	95% CI	*t*	*p*
Number of characters	.63	[0.60, 0.67]	36.90	.000	.48	[0.52, 0.63]	22.70	.000
Serial position	.04	[-0.01, 0.08]	1.66	.109	.11	[-0.90, -0.00]	-2.11	.044
Empathy	-.09	[-0.10, -0.07]	-10.71	.000	.07	[0.05, 0.10]	5.38	.000
Expectations	-.10	[-0.12, -0.08]	-10.72	.000	.03	[0.02, 0.07]	4.21	.000
Strangeness	.14	[0.10, 0.17]	7.91	.000	.06	[0.11, 0.19]	7.44	.000

Note. R^2 = .65 (N = 28, p < .001) for First reading. R^2 = .69 (N = 28, p < .001) for Second reading. CI = confidence interval for *t*.

Table 2

Standardized regression coefficients (beta weights) from the regression analyses of reading times in first and second readings in the four stories in Experiment 2

Reading	First reading				Second reading			
Variables	*Beta*	95% CI	*t*	*p*	*Beta*	95% CI	*t*	*p*
Number of words	.68	[0.64, 0.71]	41.40	.000	.48	[0.41, 0.55]	14.03	.000
Serial position	-.00	[-0.21, 0.12]	-0.55	.586	-.05	[-0.78, -0.21]	-3.49	.001
Empathy	-.02	[-0.38, -0.00]	-2.29	.028	.07	[0.03, 0.11]	3.67	.001
Expectations	-.02	[-0.35, -0.00]	-2.08	.045	.03	[0.01, 0.05]	3.12	.004
Strangeness	.13	[0.11, 0.15]	14.03	.000	.06	[0.03, 0.09]	4.00	.000

Note. R^2 = .78 (N = 36, p < .001) for First reading. R^2 = .69 (N = 36, p < .001) for Second reading.

CI = confidence interval for *t*.