

Readers' Construction of Document Models from News Stories: Evidence from Eye Movements

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Abstract. This experiment examined the role of story consistency on readers' text processing and memory for information in brief news reports. It was predicted that stories conveying discrepant information would require a deeper processing and would promote better memory for the sources conveying the messages (i.e., who said what), compared to consistent stories. As predicted, participants recalled more sources from discrepant than consistent stories. Eye movement data indicated that participants also made more fixations on source information when reading discrepant compared to consistent stories. Findings are interpreted with reference to the Documents Model framework of text comprehension.

Keywords: documents model, eye movements, memory, source, text comprehension.

Theoretical framework

It is often heard that there are “two sides to every story.” One can open any newspaper and find numerous everyday examples in which sources present conflicting accounts of a single event. It is the case that readers, when comprehending conflicting accounts, must identify, and at times remember, *who* said *what*. Despite the frequency with which these “real world” reading situations occur, experiments documenting the cognitive processes underlying this type of discrepancy comprehension are surprisingly scant. Instead, text comprehension researchers have primarily used artificially inserted contradictions to assess readers' propensities to update understandings of a single text (e.g., Albrecht & O'Brien, 1993), or situational information across two passages (e.g., Johnson & Seifert, 1999), to name a few.

The Documents Model framework (DM) was proposed to account for the comprehension of multiple, and specifically conflicting, accounts (Britt, Perfetti, Sandak, & Rouet, 1999; Perfetti, Rouet, & Britt, 1999; Rouet, 2006). One main tenet from the DM framework states that, when situational coherence is disrupted, the reader will make connections between content statements and their respective sources, or the *who* stating the *what*. Thus, the DM framework predicts that conflicting accounts, similar to those described above, should instigate a deeper encoding of source information. This should, in turn, result in a greater source presence in the reader's memory representation of the texts (relative to texts presenting consistent messages). In alignment with these predictions, Rouet, Britt, Caroux, Nivet & Le Bigot (2009) demonstrated greater source recognition after reading discrepant compared to consistent versions of brief news stories. The current experiment sought to a) use a recall measure to extend understandings of the enhanced source memory effect and to b) provide insight into the cognitive mechanisms underlying the construction of a DM representation in memory. For the latter focus, we analyzed eye movements that occurred during reading.

Method

Participants

Twenty-four native French-speaking undergraduates participated in the experiment. Each participant was compensated with one hour of Psychology course credit.

Materials and apparatus

Stories. Twenty-two stories described news events (e.g., society, economy) extracted from Internet websites. Each critical story ($n=16$) consisted of two sentences; each sentence consisted of a source and a content statement. Moreover, connectors were used to relate the two sentences.

Example 1

According to the art critic, the public (*booed/hailed*) the new show of the Paris opera. (*Indeed/On the contrary*), the lighting technician claims that half the public went back home before the interval.

Example 1 demonstrates that there were consistent and discrepant versions of each story. The content of the first sentences and the connectors were modified to agree or disagree with the second sentences. Thus, both sources and the content statements in the second sentence were held constant across text versions. Eight discrepant and eight consistent critical stories, as well as six filler stories, were randomly ordered into story sets.

Area of Interest (AOI) specification. The stimuli were presented using a Tobii 1750 Eyetracker. Five AOIs were specified. They included the two sources (e.g., "according to the art critic"; "the lighting technician claims that"), the two content statements, and one connector for each story.

Recall measure. The second sentences from the 16 critical stories (i.e. those unaffected by the manipulation) were used. Blank spaces were provided in place of the sources.

Procedure

Run individually, participants were instructed to read (silently and at their own pace) a series of two-sentence stories and to verbally summarize each story (after advancing to a second identical page). Summaries were to be shorter than the original story (one sentence), while maintaining the essential information. Readers were also instructed to remember information from the stories for later recall. After completing the read/summarize and distractor tasks, participants completed the cued recall test. Instructions were to recall the source associated with each statement using the blanks provided.

Results

Recall test performance

On average, participants made 11.29 ($SD = 3.01$) recall attempts, recalling 8.04 sources accurately, i.e. about 50% ($SD = 3.32$). A one-way Analysis of Variance (ANOVA) using story consistency (consistent, discrepant) as a within-participants variable produced a significant effect for story consistency, $F(1, 23) = 5.97, p < .05, \eta_p^2 = .21$. As predicted by the DM framework, participants recalled more sources from discrepant ($M = 4.75, SD = 2.17$) compared to consistent stories ($M = 3.50, SD = 2.04$). The large effect size suggests a rather robust memory advantage for discrepant stories.

Processing of the Information

Frequency of fixations within the five AOIs were averaged across stories and submitted to ANOVAs, each using story consistency as the within-participants variable. Results generally indicated more fixations in source AOIs for discrepant compared to consistent stories. This effect was present for the first ($M = 26.86, SD = 9.10$ versus $M = 21.10, SD = 6.77$), $F(1, 23) = 32.78, p < .001, \eta_p^2 = .59$ and second sources ($M = 18.92, SD = 7.77$ versus $M = 16.29, SD = 7.91$), $F(1, 23) = 8.87, p < .01, \eta_p^2 = .28$. All other inter-story effects did not reach significance, all $F_s(1, 23) < 4.13, ns$. Thus, although

sources were held constant across story version, readers made more fixations on sources when the content statements presented a discrepancy than when they presented consistent messages.

Discussion

In alignment with the DM framework (Perfetti et al., 1999), text-based discrepancies appeared to produce a deeper encoding of the sources conveying the messages, which enhanced memory for the sources relative to the consistent texts. Thus, we illustrate one reading situation in which reconciliation of a discrepancy is less likely, resulting in a greater need for readers to construct a documents model representation in memory. More specifically, readers use source information as an alternate mechanism to integrate information that cannot be simply incorporated in a simple mental model of the situation.

Additional interrogation of the eye movement data accompanying the reading of discrepant and consistent stories should further support the deeper encoding argument put forth by the DM framework. Additional expected patterns include longer gaze times in source AOIs and more frequent regressions (originating after reading the second, discrepant content statement) into source AOIs when reading discrepant stories, compared to reading patterns for consistent stories. These analyses, which were being conducted at the time of submission, should further explicate the cognitive processes underlying the construction of a documents model while reading.

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