How Memories of Encounters with Users of Tsundoku Books Contribute to Reading Motivation: An Experiment with Borrowed Library Books

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Abstract. This study explores a method to elicit interest in tsundoku books that are left unread after purchase and to enhance reading motivation of them. Our previous work proposed an approach to rekindle interest in a book by presenting memories at the time of purchase from the book itself. In this study, to verify its effectiveness, we conducted an evaluation experiment using borrowed library books to simulate the experience of selecting and keeping books nearby. In the experiment, participants were asked to select books while wearing a camera that captured their field of vision at the time of the encounter (i.e., the time of purchase). Their memory-based information was then generated from their actions recorded in the footage. In contrast with providing reviews of the books, the results suggest that presenting a memory of an encounter with the book helps participants recall the events and reasons behind their selection, fostering a sense of personal connection with the book. Additionally, for participants who rarely read, such memory information might increase their motivation to read.

Keywords: tsundoku, memory-based information, reading motivation, conversational agent, anthropomorphization, media equation

1 Introduction

The phenomenon of purchasing books that remain unread, known as "Tsundoku" in Japan (hereinafter, tsundoku book), is a common experience among readers worldwide. Even when people are initially interested in purchased books, their motivation tends to diminish over time, and they may become less aware of these books themselves, leaving the books unread and accumulating.

To rekindle motivation, our previous work proposed an approach that treats tsundoku books as agents that talk to users and present memories from the time of purchase, when user's engagement is highest [1]. The unconscious perception of objects as social entities is captured by the concepts of Media Equation [2] and Theory of Mind [3]. Psychological research has shown that people often anthropomorphize familiar objects [4], and in the field of human-agent interaction, studies have demonstrated that users tend to feel greater familiarity with daily objects that convey information using anthropomorphic expressions [5]. Building on these findings, presenting memory-based

information through the personification-based approach in [1] may effectively raise users' awareness of tsundoku books, which often lie outside their conscious awareness.

However, the previous study [1] did not confirm an increase in reading motivation through memory-based messages. In the experiment, participants selected books on an online site, explained their reasons in interviews, and received memory-based messages generated from these responses. The limited effect may have been due to participants not recognizing the messages as reflection of their original purchasing experiences and the absence of physical book ownership. Additionally, the study did not examine methods of capturing the context and motivation behind selection to generate memory cues.

In this study, we examine the effectiveness of presenting selection memories in our proposed method within a more realistic "tsundoku" context: participants selected physical books from a library, kept them for about one week, and encountered them again through our system. Furthermore, we used wearable cameras during the book selection process to extract objective, first-person cues and generate memory-based messages from the recorded footage.

2   Experiment

2.1   Outline of the Experiment

The aim of this study was to investigate the impact of narrating memories of encounters with a book, which reflects the core concept of our approach, on the owner's interest in the book and motivation to read it again. We defined the following conditions based on different approaches to re-engaging with tsundoku books:

(a) **Title condition**: Presenting only the book's title.
(b) **Review condition**: Presenting third-party reviews as a message from the book.
(c) **Memory condition**: Presenting the participant's behavior during the book selection process as a message narrated by the book.

Evaluation used Nakaya's variation of Scheffé's pairwise comparison method. Twenty university students (14 males, 6 females) participated in the experiment, which consisted of two sessions about one week apart. In Session 1 (book selection), participants wore eyeglass cameras (Pupil Labs) and selected three books from the library. In Session 2 (evaluation), using an experimental bookshelf with the selected book and 10 dummy books (Fig.1-C), participants compared and evaluated two messages from the three conditions with an AR-based system. When a smartphone camera was pointed at a book, a speech bubble with a message appeared (Fig.1-A). All messages are text only to avoid meida influence such as vocal tone. A control PC (Fig.1-B) updated the smartphone messages and questions according to participant's progress.

2.2   Design of Messages Presented by the Book

All messages were written as if the book was talking to the participants and ended with the sentence: "Thank you for choosing me." In the Title condition, the message was
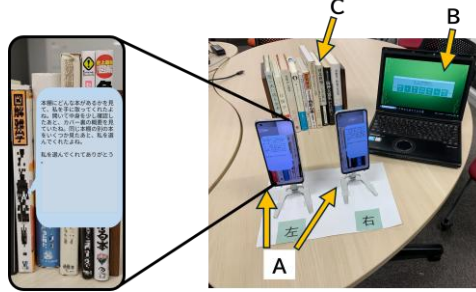
Fig. 1. The evaluation environment and sample screens of the AR-based system

Table 1. Examples of presented information for each condition (The [Book Title] and [Book Review] are replaced the review of the title and the book handled in the experiment).

Condition	Condition Example of displaying information
(a) Title	I'm "[Book title]" Thank you for choosing me.
(b) Review	I was reviewed as [review content] by someone who read me. Thank you for choosing me.
(c) Memories	You picked me up when you saw what books were on the bookshelf. After opening me, you looked at the outline of the back of the cover. You picked me again after looking at several other books on the same shelf. Thank you for choosing me.

Table 2. Questionnaire items for the pairwise comparison.

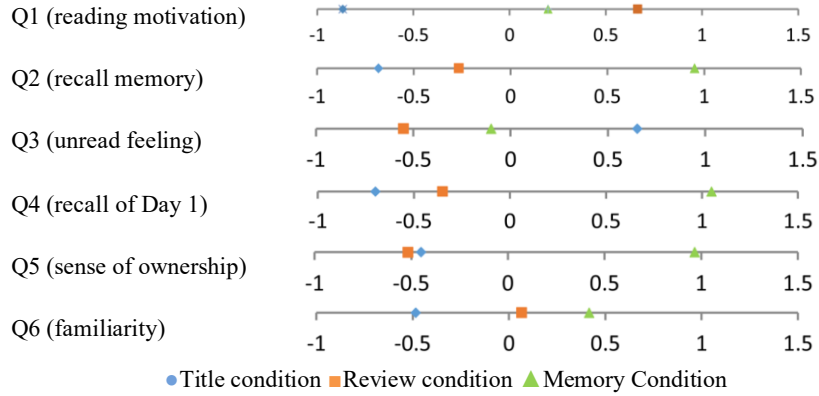| No	Question
Q1	Which text message made you want to read the book more?
Q2	Which text message made you more strongly recall why you selected this book?
Q3	Which text message increased your feeling that you haven't read the book?
Q4	Which text message more strongly reminded you of Day 1?
Q5	Which text message increased your feeling that you were the one who chose this book?
Q6	Which text message made you feel more familiar with the book?

presented in a self-introductory format (Table 1(a)). In the Review condition, we used Amazon reviews rated three stars or higher and presented them from the book's perspective (Table 1(b)). For the Memory condition, we identified observable behaviors from the recorded footage, such as opening the book, viewing specific information, or considering other books, and generated summary message of them in approximately 100 words using ChatGPT, written from the book's perspective (Table 1(c)).

2.3   Evaluation items in pairwise comparisons

Table 2 shows the six question items used in pairwise comparison. Using a 7-point scale, participants evaluated which of the two messages was more appropriate:

Table 3. Questionnaire items for collecting participant attribute regarding reading habits.

No	Question
Q7	Do you like reading?
Q8	Do you read as a hobby?
Q9	Do you read for information?

● Title condition ■ Review condition ▲ Memory Condition

Fig. 2. Average scores for questions in the pairwise comparison questionnaire (N = 20)

Table 4. Differences in average degree of preference between conditions in Q1–Q6 and the yardstick threshold ($Y_{0.05}$)

No	$Y_{0.05}$	Title-Review	Review-Memory	Title-Memory
Q1	0.442	1.533	0.467	1.067
Q2	0.383	0.417	1.217	1.633
Q3	0.393	1.200	0.450	0.750
Q4	0.427	0.350	1.400	1.750
Q5	0.531	0.067	1.483	1.417
Q6	0.363	0.550	0.350	0.900

"Strongly Left"(+3), "Left"(+2), "Slightly Left"(+1), "Neutral"(0), "Slightly Right"(-1), "Right"(-2) and "Strongly Right"(-3). Each selection assigned the corresponding numerical value to the left and right messages, respectively. Additionally, the supplementary questionnaire regarding reading habits (Table 3) was recorded using a 5-point Likert scale, with 5 indicating the most positive response.

3   Results

3.1   Results of Pairwise Comparisons on Impressions of Each Message

Figure 2 shows the average scores in each question. Pairwise comparison analysis revealed that the primary effect of the conditions and individual difference were
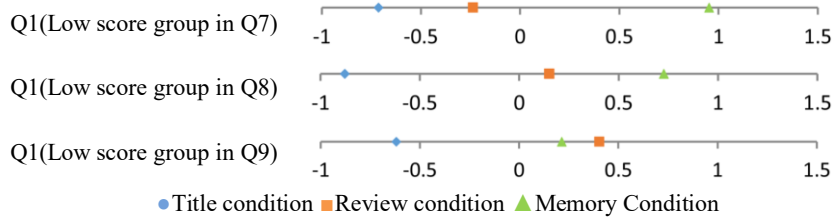
Fig. 3. Answers to Q1 from the participants in the low-score group in Q7–Q9.

Table 5. Differences in average degree of preference between conditions in Q1 for participants classified as low-score group in Q7–Q9, and the Yardstick Threshold ($Y_{0.05}$)..

	$Y_{0.05}$	Title-Review	Review-Memory	Title-Memory
Q1(Low score group in Q7)	0.984	0.476	1.191	1.667
Q1(Low score group in Q8)	0.648	1.030	0.576	1.606
Q1(Low score group in Q9)	0.427	1.024	0.191	0.833

statistically significant at 1% level for all questions. Table 4 shows the results of multiple comparisons using the yard stick method of the 5% significance level, with gray cells representing significant differences.

Regarding reading motivation, in Q1 the order of average scores was Review > Memory > Title condition, with significant differences among all conditions. In Q2, the Memory condition scored significantly higher than the Title and Review conditions. These results indicate that the Memory condition effectively helped participants recall their choice motivation but had limited impact on overall reading motivation.

For the other questions, in Q4-Q6, the Memory condition showed significantly higher scores than the other conditions, indicating that memories enhanced participants' sense of ownership and familiarity with the books. In Q3, the Title condition showed significantly higher scores than the others, suggesting that presenting the title may prompt participants to recognize that the book remains unread.

3.2   Attribute-Based Analysis of Participants' Reading Behavior

Based on the significant main effect of individual differences, we analyzed the correlation between scores of reading habits and the comparison results of the Memory and Review conditions in Q1. In this analysis, "Strongly prefer Review" was scored as +3 and "Strongly prefer Memory" as −3, so lower scores indicated greater preference for Memory. As the results, moderate positive correlations were observed with Q7, Q8, Q9 ($r = 0.504, 0.574, 0.474$). These results indicate that participants with weaker reading habits tended to prefer the Memory condition.

Figure 3 and Table 5 show the Q1 results for participants in the low scoring group on each reading habit question. Participants with low scores on Q7 (n=7) showed significantly higher preferences in the Memory condition than in the other conditions. A

similar trend was observed among participants with low scores on Q8 (n=11). These results suggest that memory-based information may be more effective in improving reading motivation for non-readers.

4   Conclusion

This study examined the effectiveness of a system in which tsundoku books narrate purchase memories to address books left unread. An experiment simulating actual book selection showed that memory-based messages from books effectively helped participants recall the reasons behind their selection and enhanced their sense of ownership. In particular, for participants who do not regularly engage in reading, such messages may be more effective in increasing their motivation to read.

Our proposed concept can be applied not only in the context of Tsundoku books but also as a means to promote awareness of infrequently used items and maintain connections with others. For example, a distant friend's gift may remind the recipient of that relationship in daily life. Therefore, the memory-based interface also has the potential to support communication. However, exploring such applications will require longer-term experiments to more rigorously validate the concept's effectiveness. The one-week interval in this experiment may have allowed participants to remember their selection, potentially influencing the results; a longer interval might change outcomes. Additionally, our future work explores voice-based delivery and optimal timing to better assess and enhance the method's impact.

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