



By reading the comments			
(1)Easier to read	(negative,decline)	1-2-3-4-5 (agree,positive)	Referred as Q301 in this paper
(2)More understandable	(negative,decline)	1-2-3-4-5 (agree,positive)	Q302
(3)More enjoyable	(negative,decline)	1-2-3-4-5 (agree,positive)	Q303
(4)Newer interpretation	(negative,decline)	1-2-3-4-5 (agree,positive)	Q304
(5)Faster understanding	(negative,decline)	1-2-3-4-5 (agree,positive)	Q305
(6)Increasing of reading time	(negative,decline)	1-2-3-4-5 (agree,positive)	Q306
(7)Wanted to comment	(negative,decline)	1-2-3-4-5 (agree,positive)	Q307

**Figure 2. Questionnaire (excerpts related to this paper)**  
(translated from original Japanese)

	Q301	Q302	Q303	Q304	Q305	Q306	Q307
Mean	3.91	4.00	3.91	3.73	3.82	3.55	2.82
SD	0.94	0.89	0.70	0.90	0.75	1.04	0.98

**Figure 3. Mean and Standard Deviation**

With that system. Annotations such as comments, underlines, and freehand descriptions can be added and displayed. It is also possible to share them.

As mentioned above, there is research from the functional aspect. However, few studies are discussing how social reading affects readers. In this paper, we will examine users of social reading sharing comments from the affective aspect.

In particular, we constructed an experimental system and used it for subjects, at that time, we conducted a questionnaire and analyzed what kind of impression it had from factor analysis. This paper reports on this result.

## 2. EXPERIMENTAL DESIGN

Figure 1 shows an example of the social reading system we are assuming. The number of reactions is displayed as a line graph on the top. At the lower part, comment contents are indicated by contextual menu. We implemented this lower part and used it as an experimental device. Participants in the experiment are 11 university students who are familiar with how to use computers.

There are three kinds of sharing method in social reading in general[8]. That is, (1.1) sharing before reading, (1.2) sharing during reading, and (1.3) sharing after reading.

Also, in the experiment, we set four points of view in social reading. They are (2.1) What is related to the books themselves, (2.2) what about the information to share, (2.3) about reading related to sharing, and (2.4) writing the comment by themselves.

In this paper, we report on the experimental results on what kind of impression is given to (2.3) and (2.4) in (1.2) (i.e. sharing during reading).

The book used in the experiment is "school of village (true story) (Alphonse Daudet, translated by Miekichi Suzuki)" in Aozora Bunko[13]. We presented the second half of this book to the experiment participants for reading. For this we asked for an assessment with the questionnaire shown in Figure 2. Each question is about questions (1) - (6) concerning (2.3), question (7) concerning (2.4).

## 3. EXPERIMENTAL RESULTS

Figure 3 shows the mean and standard deviation of each question item Q307 ((7)Wanted to comment) has a markedly lower average value than others. That is, for reading while sharing a comment, they have a good impression on reading. However, it seems that they do not have a good impression of writing their own comment.

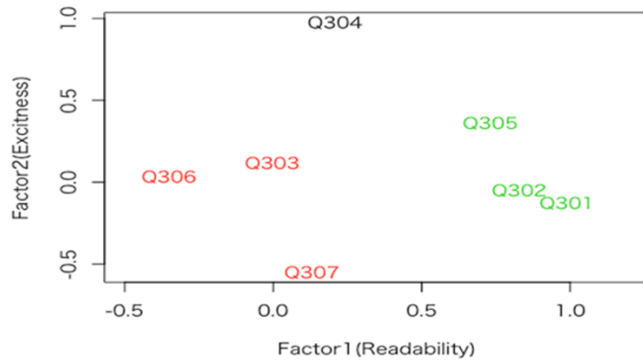
Q303 (I enjoyed reading more) has more responses compared to others (SD = 0.7). Actually, half of the 55% are concentrated in the score 4. That is, while reading the comments of others, we may conclude that there were many people who enjoyed reading more.

	Factor1	Factor2
Q301	0.99	-0.12
Q302	0.83	-0.05
Q303	0.00	0.12
Q304	0.21	0.98
Q305	0.73	0.36
Q306	-0.35	0.03
Q307	0.13	-0.55

	Factor1	Factor2
SS loadings	2.39	1.42
Proportion Var	0.34	0.20
Cumulative Var	0.34	0.54

(a) Loadings



(b) Plot of loadings

Figure 4. Results of factor analysis

#### 4. FACTOR ANALYSIS

We conducted a factor analysis to find out what kind of potential impression the reader has while commenting. Based on the scree plot, multiple factors were rotated with 2 factors. As a result, the cumulative contribution rate did not change around 0.6 for each rotation. Therefore, one with varimax rotation was adopted from the ease of interpretation. The results are shown in Figure 4.

From the result of factor analysis we named the first factor as readability. This is because the factor loadings of Q301, Q302 and Q305 are remarkably high. We named the second factor exciting feeling. This is because the factor loading Q304 is remarkably high and Q305 is also high. From these, it can be concluded that they have these two potential impressions regarding reading while commenting.

From Figure 4 (b), each item can be classified into three clusters. Actually (b) is divided into three clusters by k-means as item colored. One is a cluster consisting of Q 303, Q 306 and Q 307. It is thought that this cluster(red) expresses the impression of reading pleasure.

The other is a cluster(green) consisting of Q301, Q302, and Q305. It seems that this cluster expresses the impression that reading is done efficiently.

The last one is Q304. This exists at a position which is consistent with the two clusters. It is thought that this expresses the impression that another reading was found by reading while watching a comment.

#### 5. CONCLUSION

In this paper, we analyzed the impression of reading

while commenting in social reading. As a result, the following three points were clarified. (1) They are skeptical to write comments while reading. (2) They think with two latent factors of readability and excitement. (3) They have the impression of three clusters of reading fun, reading efficiently, new discovery. As a result, it can be considered that reading while commenting is good. Because it is given excitement and new findings.

We have already completed the experiments (2.1) to (2.4) for (1.1) and (1.2) mentioned in Chapter 1, respectively. It is our future work to add and analyze these.

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