Topic congruence and topic interest: How do they affect second language reading comprehension?

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Abstract

Because human memory is largely reconstructive, people tend to reorganize and reevaluate an event in a way that is coherent to the truth values held in their belief system. This study investigated the role of topic congruence (defined as whether the reading content corresponds with readers' prior beliefs towards a contentious topic) in second language (L2) reading comprehension. In addition to the main variable, topic congruence, the role of topic interest was also explored. Sixty Korean native readers in the US and Korea read two argumentative passages in English, one discussing the pros of voluntary euthanasia, the other presenting the cons. Quality analysis of immediate recall protocols, defined as relative amount of higher and lower levels of information units correctly remembered, was performed by a repeated-measures multivariate analysis of variance. The results showed that topic congruence and topic interest affected the L2 readers' recall of lower-level textual information in complex ways.

Keywords: topic congruence, topic interest, L2 reading, reader belief, reader attitude, Korean EFL or ESL learners

Reading is considered a complex cognitive and social process. Researchers have noted that second language (L2) readers' knowledge of linguistic features, formal conventions, and rhetorical structures may interact with their prior knowledge of the world, and of cultural as well as social establishments (Alderson, 2000; Bernhardt, 1991; Grabe & Stoller, 2002; Hudson, 2007; Koda, 2005; Pulido, 2007; Roebuck, 1998). Our current understanding of the nature of L2 reading is further complicated by many intervening variables, such as various reading abilities, reading purposes, and reading strategies, to name a few, that may affect the quantity and quality of comprehension.

This study set out to investigate the extent to which L2 readers' prior beliefs towards a contentious topic would affect their reading comprehension. This issue has been investigated, but only scarcely, by first language (L1) reading researchers (Henk & Holmes, 1988; Read & Rosson, 1982; Reutzel & Hollingsworth, 1991), and it has attracted even less attention in the L2 reading literature. However, it is not uncommon, both in their daily lives and in many educational contexts, for L2 readers to encounter situations where they are asked to take a stance with regard

to a certain position expressed in a reading on some issue, for example, to either agree or disagree and explain why. Sometimes, the issue is a contentious one, where authors may state a strong position that itself can be also controversial, and L2 readers may hold concrete, strong prior beliefs towards that position. In this situation, would the congruence between the position stated in the text and readers' personal position that stems from their prior beliefs on that topic affect reading performance? Specifically, would it facilitate or hinder comprehension in some way? Indeed, some L1 researchers have hypothesized that readers may show differential comprehension patterns when they read two contrasting reading contents: One corresponds with what their belief systems would dictate, and the other does not. The present study investigates these questions in the context of L2 reading.

Readers' Prior Beliefs and Topic Congruence

Because human memory is largely reconstructive, people tend to reorganize and reevaluate an event in a way that is coherent to the truth values held in their belief system (Bartlett, 1932; Spiro, 1980). The question then arises as to whether readers' prior beliefs about a topic would affect how they comprehend, remember, and learn factual information given in a text, for example, by introducing nontextual information that is more compatible with the readers' preexisting beliefs. This possibility has been extensively researched in the field of social psychology with regard to its effects on memory (e.g., Bartlett, 1932; Clark, 1940; Gilbert, 1938; Giner-Sorolla & Chaiken, 1994; Lipson, 1983; Mathewson, 1979, 1985; Zuwerink & Devine, 1996). An early meta-analysis by Roberts (1985) based on 38 published empirical studies showed that the average magnitude of impact of prior beliefs on memory is small (overall point-biserial correlation coefficient was .18, which is equivalent to the mean unweighted d of 0.36), and a more recent meta-analysis by Eagly, Chen, Chaiken, and Shaw-Barnes (1999) conducted on 65 published studies found a comparable mean effect ($d = 0.23$, weighted; the mean unweighted $d = 0.33$). Thus, prior beliefs and attitudes towards a specific topic affect memory for text to a modest but statistically trustworthy degree. By comparison, effects on comprehension have been less frequently investigated in the reading literature (Downing & Leong, 1982; Henk & Holmes, 1988; Reutzel & Hollingsworth, 1991). As Henk and Holmes (1988) put it, the topic is important because

> It concerns not only psychologists, but also educators, sociologists, journalists, and political strategists alike. Yet despite the apparent breadth of this knowledge base and its interdisciplinary appeal, the actual effect of topical attitude on learners' concept acquisition and recollection, particularly in reading, remains largely unknown. (p. 206)

In the L1 reading literature, Read and Rosson (1982) tested the hypothesis that L1 readers' prior beliefs would distort factual information given in a text and introduce nontextual information more compatible with the readers' preexisting beliefs. After being surveyed on their beliefs towards the nuclear power industry, 190 undergraduate English native readers read a story about a fire at a nuclear power station. The participants were then presented with 30 recognition sentences, which included 20 sentences whose contents were biased to be either pro-nuclear or anti-nuclear, and they were asked to decide whether the idea expressed by each sentence was consistent with an original idea in the reading passage. The significant distorting effects of prior

beliefs on the L1 readers' recall were evidenced on both 1-week and 2-week delayed recognition measures. Readers in support of nuclear power were found to more willingly accept false information consistent with their view than readers who opposed nuclear power. Similarly, readers who were not in favor of nuclear power were also found to mistakenly recognize information consistent with their view. These findings illustrate that, over time, readers have a tendency to adjust the textual information to what they believe is true.

Reutzel and Hollingsworth (1991) reported comparable findings in a study that involved child L1 English readers. Fifty-eight sixth-graders were assigned to groups with one of three conditions: favorable, unfavorable, and neutral in attitude. For 5 days, each group was exposed to classroom lessons about a fictitious country, Titubia. The series of lessons were experimentally designed to create positive, negative, or neutral beliefs towards Titubia for each group. It was then expected that the comprehension and retention of the young readers would be influenced not by their initial knowledge of a topic before intervention, but only by the artificially induced topic-related beliefs. After the five instructional sessions, each of the three groups was provided with two passages that contained either favorable or unfavorable content towards Titubia. Comprehension was measured via a recall task and multiple-choice questions. Results showed that the influence of the induced topic-related attitudes was not strong enough to interfere with the readers' initial comprehension of textual information, nor was any facilitative effect of attitude-compatible passages observed on the immediate posttest. However, it was found that on the delayed posttest administered 3 weeks later, readers who had a positive belief recalled significantly fewer ideas on the negative passage than the negative belief group, and readers who had a negative belief recalled fewer ideas on the positive passage than the positive belief group. Paralleling the findings by Read and Rosson (1982), topic-related attitudes appeared to have a delayed influence on the readers' reconstruction of memories.

Conflicting results have also been reported, however, in a third study by Henk and Holmes (1988), who designed a study similar to that of Read and Rosson (1982) but obtained dissimilar results. They investigated whether 44 undergraduate L1 English readers' preexisting beliefs on nuclear power would color the comprehension and retention of factual information described in a pro-nuclear expository text. Through two dependent measures, a free recall task and a set of 20 multiple-choice questions, they found that pro-nuclear and anti-nuclear groups differed in their performance neither on immediate comprehension nor on delayed recall 2 weeks later. This finding suggests that the assumption that readers selectively attend and encode messages to the congeniality of textual information might be unsubstantiated. Henk and Holmes concluded that "selective encoding and recall processes simply do not come to bear in any significant fashion when content-related attitude is at issue" (p. 217; see also Jones & Kohler, 1958). It may be that the negative clash between reader beliefs and text content resulted in a more intense processing of the text, compensating for any debilitating role of the disagreeable information in text comprehension.

No studies, to the best of my knowledge, have involved L2 readers as research participants. Our under-explored knowledge about the role of reader beliefs in L2 reading comprehension, coupled with the inconclusive findings from the L1 reading literature to date, warrants further systematic investigation. The understanding of the role of prior beliefs in L2 reading comprehension is indeed important, as L2 readers are more readily exposed to emotional reactions, whether

positive or negative, when culturally based clashes arise between their specific position on an issue and the position taken in texts. It is also possible that L2 readers are more susceptible than L1 readers to being overloaded cognitively by the attitude-incompatible reading and may therefore experience less than optimal automatic decoding of texts as a result.

Extant studies have typically utilized a single passage to address the effects of beliefs on reading comprehension and retention, where the content of the passage was randomly chosen to have either a positive or a negative stance on an issue (cf. Reutzel & Hollingsworth, 1991). In the present study, however, all participants were exposed to two passages with contrasting voices, one with positive dispositions and the other with negative dispositions. The main issue of interest was whether the reading content, congruent or incongruent with L2 readers' prior beliefs (i.e., the variable of topic congruence), would affect comprehension.

Topic Interest

The role of topic congruence, while a reader cognitive variable, may be interrelated with variables of reader affect. Of many potential factors of significance, topic interest, or whether a reading material is interesting enough for readers to focus their attention and make efforts to read the material for comprehension, could be an important one. In reading comprehension, it is often hard to separate cognitive aspects (such as topic congruence and topic knowledge) from affective aspects (such as topic interest and reader motivation). With regard to topic congruence and topic interest, for example, it is difficult to determine which causes which in the first place. A reader may harbor certain intense attitudes because he or she has a special personal interest in the topic. It is also possible that the reader's high interest will cause the very intense attitude towards the topic. Albeit complex, the interrelationship (or the lack thereof) of these two aspects of reading comprehension is of theoretical importance.

Studies on the effects of topic interest on reading comprehension have shown inconsistent results across different reading contexts. Whereas L1 reading research has usually shown that interest in the topic is an important factor affecting the processes and products of L1 reading comprehension (Alderson, 2000; Asher, Hymel, & Wigfield, 1978; Belloni & Jongsma, 1978; Bernstein, 1955; Stevens, 1980), L2 reading research has generally not found any such effects. For example, Carrell and Wise (1998) attempted to separate the effects of topic interest from prior knowledge and concluded that topic interest (as well as prior knowledge) may not be a significant variable in L2 reading comprehension. Interestingly, they report that the two main variables were not correlated with each other for the 104 English as a second language (ESL) study participants. This suggests, counter-intuitively, that L2 readers who know more about a certain topic may not be more interested in the topic, nor may they know better about things in which they are more interested. Joh (2006) also found that two English as a foreign language (EFL) groups with high and low topic interest did not significantly differ from each other in terms of their immediate free recall task scores. She also argued that topic interest may be a factor quite independent from L2 readers' knowledge of the topic. Topic interest, then, could be a factor that also exists separately from other cognitive aspects of reading, such as the issue of topic congruence in this study.[1]

Measuring Reading Comprehension: Informational Quantity or Informational Value?

All the studies reviewed in the two previous sections were largely interested in the effects of topic congruence or topic interest as they pertain to overall text comprehension of readers, that is, the sheer quantity of accurate idea units included in free recall protocols or the number of multiple-choice items accurately answered. In either case, the assumption is that informational quantity is a good reflection of global reading comprehension. However, it is widely recognized that different reading conditions may have qualitatively varied effects on readers' comprehension (see Bernhardt, 1991; Carrell, 1987). Likewise, prior beliefs, topic interest, or both may affect different qualitative levels of L2 reading comprehension. Thus, I take the position in this study that informational value, rather than informational quantity, offers a more revealing window into the quality of reading comprehension. Rather than simply counting the number of multiple-choice items correctly answered, or quantity of ideas or propositions, the analyst can consider the relative content value of each information unit and give differential weights to each.

In addition, I argue that immediate postreading free recall tasks are preferable to multiple-choice questions for the assessment of L2 reading comprehension. It has been claimed that the recall protocol analysis is a powerful measure for tracking a reader's psychological processes while minimizing researcher bias (Bernhardt, 1983, 1991; Hayes, 1989; Hayes & Flower, 1980; Johnston, 1983; Lee, 2007). It has also been claimed that compared to multiple-choice questions, free recall tasks produce richer evidence helpful for understanding a reader-based constructivist model of reading processes (Bernhardt, 1991; Heinz, 2004; Roebuck, 1998). As Bernhardt (1991) noted, "a free recall measure provides a purer measure of comprehension, uncomplicated by linguistic performance and tester interference" (p. 200).

The outputs of free recall lend themselves particularly well to analyses of informational value. This can be done by recognizing the inherently hierarchical structure of the information units. Meyer's (1975) well-known scoring system did this with idea units, and Johnson (1970) proposed a similar procedure with pausal units, in what has been called *weighted propositional analysis*.

In sum, I argue that informational value, measured via a weighted analysis of recall data, captures the structural characteristics of a passage as reflected in the recall and helps tap comprehension of textual information with differential content values in a nuanced fashion. Such an approach would offer an enhanced understanding of the qualitative features of L2 readers' comprehension and how they may be affected by cognitive and affective variables like topic congruence and topic interest.

Research Question and Hypotheses

The guiding research question of the present study was: How do topic congruence and topic interest affect the quality of reading comprehension of Korean English L2 readers, as measured by an immediate postreading free recall task? Several hypotheses were set prior to conducting the study. First, based on the pattern of conflicting findings for topic congruence in previous L1

studies, I expected that L2 readers in this study would achieve comparable scores in their recall for textual information with higher content value in both the topic congruent and incongruent reading conditions (Hypothesis 1). Second, based on the null findings for topic interest in previous L2 studies, these L2 readers were also expected to achieve comparable scores in their recall for textual information with higher content value both when they had high and low levels of topic interest (Hypothesis 2). By contrast, effects were expected to emerge on the lower value information units. Specifically, I expected that L2 readers in this study would achieve better scores in their recall for textual information with lower content value when they read passages whose content was congruent with their prior beliefs (Hypothesis 3) and also when they had a higher level of topic interest (Hypothesis 4). These hypotheses are based on an assumption and a claim. The assumption is that a possible reason for the pattern of conflicting and null findings in past L1 and L2 studies is their measurement focus on overall quantity of comprehension. The claim is that reading about content that is congruent with the readers' prior beliefs and that provokes their strong interest should play a significant beneficial role in comprehension of L2 texts. That is, passages that contain congruent content and are interesting to readers should lead to a better retention of the information with lower content value, because congruence and interest should aid L2 readers to pay closer attention to the smaller details in the passages.

Method

Participants

Sixty-eight Korean English L2 readers enrolled in diverse undergraduate and graduate programs in universities in the US and Korea were recruited and compensated. They participated in the current project as individuals or in small groups, depending on their personal schedules. The number of participants of the largest group was 13. Eight students were excluded from the final analysis, either because they did not provide sufficient background information or because they did not complete all parts of the entire task. Therefore, the results are drawn from the sample of 60 students (19 males and 41 females). Thirty-six were US-based L2 readers with an average length of residence in the US of 2.3 years ($SD = 2.09$), and 24 participants were EFL readers. The participants were asked to report recent standardized English test scores. The reported scores were then converted to TOEFL scores for comparison. Based on this self-reported data, the 60 participants were judged to be upper-intermediate to advanced-level English users, as their TOEFL scores ranged from 500 to 667, with an average score of 592.1 ($SD = 38.17$). Their age ranged from 18 to 36, with a mean age of 23.82 years ($SD = 5.05$). On average, participants had studied English for 11.96 years ($SD = 5.44$) from the age of 10.96 ($SD = 2.71$).

Reading Passages

Particular care was taken to select an appropriate reading topic. The main concern was to choose passages that were controversial enough to create opposing views among participants, but not so sensitive that they would cause discomfort to readers. After consulting with several experienced ESL teachers, the issue of whether patients with incurable diseases should be allowed to be euthanized upon their agreement was taken as the topic. Two argumentative passages delivering contrasting views on the legalization of voluntary euthanasia were chosen and adapted from an

Internet site dedicated to debate topics (http://www.idebate.org/about/index.php).

The comparability of the two reading passages was cross-validated through several steps. First, I asked four experienced ESL teachers (two English native-speaking and two English nonnative-speaking teachers) to exercise their professional judgments in assessing the reading difficulty of the two passages, in terms of the passages' vocabulary, syntactic structures, and organization. Overall, every teacher agreed that the two passages had comparable reading levels and would be suitable for the participants. Second, using Flesch-Kincaid readability measures, both texts were judged equivalent and appropriate for the 9th graders in American school systems. Table 1 shows the descriptive information of the two experimental passages, where Passage A contains favorable voices and Passage B unfavorable voices on the topic (see Appendix A for the two passages).

Table 1. *Descriptive information of two experimental passages*

Category	Passage A	Passage B
Number of words	356	369
Number of paragraphs	4	4
Number of sentences	16	17
Number of sentences per paragraph	4	4.2
Number of words per sentence	22.2	21.7
Flesch reading ease	60.5	59.4
Flesch-Kincaid grade level	9.7	9.3

Procedure

As individuals or in small groups, the participants read and signed a consent form and completed a background survey. The background questionnaire included questions addressing participants' prior beliefs and their degree of interest in the practice of voluntary euthanasia, the reading topic of this study. Prior beliefs of the participants were determined by means of a free writing task, completed before the reading tasks. The instructions given in English were as follows:

> One of the controversial issues in many societies is whether voluntary euthanasia, or assisted suicide, should be allowed by law. The key debate is whether others could assist patients with terminal illness who wish to end their life. I would like to hear your position on this issue. You can write in English or in your native language, whichever is more comfortable.

Written responses of the participants were then scrutinized by two raters to determine whether each participant's prior beliefs were positive or negative towards the issue of the legalization of voluntary euthanasia. The two raters agreed 100 percent that 38 and 22 participants were for and against the issue, respectively.[2] Topic interest was initially measured by asking participants to respond to a 4-point Likert scale, ranging from 1 (*not interested at all*) to 4 (*very interested*). Then, the data were reduced into a categorical variable to make it comparable to the variable of prior beliefs. That is, participants who marked either 1 or 2 from the scale were categorized into a low-interest group, and those who marked either 3 or 4 into a high-interest group. By this method, 34 participants were deemed to have high interest (mean ranking = 3.21), whereas 26 participants to have low topic interest (mean ranking = 1.65) in the reading topic. The z value calculated based on the Mann-Whitney U test was -6.98, which exceeded the critical point at an

alpha level of $p < .01$ ($z_{crit} = 2.57$). Therefore, it can be said with reasonable confidence that the two levels of topic interest group differed from each other in the extent to which they were interested in the topic of this study.

Each participant read the two experimental passages. In order to minimize any possible carryover effects, about one half of the participants read the favorable passage first (Passage A) and then the unfavorable passage (Passage B), and the other half read in the opposite order. No time limit was imposed for either passage. While reading, participants were required to circle any words that were unfamiliar to them. This was done to double-check later that the two reading passages did not contain a substantially different number of words unknown to the participants. Prior to testing, they were told that their primary goal was to understand the overall content of the readings and that a recall task would follow each passage to gauge their comprehension. After reading the first passage at their own pace, participants were asked to write all they could remember from the reading without referring back to the passage. The same procedure was repeated for the second reading. The instructions of the free recall task performance were given in English:

> Write down as many ideas as you can remember from the passage that you have just read. Try to recall every idea that you remember, from general ideas to smaller details. Please do not add any nontextual information. You may write in Korean or English, whichever is more comfortable. DO NOT LOOK BACK AT THE PASSAGE WHILE DOING THIS TASK!

The entire task, including the background questionnaire and free writing about the topic as well as the reading and recall of each passage, took about an hour and a half.

Scoring of the Free Recall Protocols

The current study specifically adopted the weighted propositional analysis scheme proposed by Johnson (1970), which involves the segmentation of the recalls into pausal units and further assigns them a differential weight according to informational value. As argued earlier, a weighted scheme lends itself to a more qualitative interpretation of the information recalled by readers than a simple tally of informational quantity accurately recalled (see Alderson, 2000, pp. 230–232; Bernhardt, 1991, pp. 201–218, for detailed discussions on different scoring systems).

The pausal unit was chosen as the basis for the scoring of free recall data in this study. Pausal units are generally defined as breath units that can stand alone, having natural pauses both at their beginning and end (Bernhardt, 1991; Chang, 2006). That is, they are bounded at each end by the juncture at which native readers usually place a pause during normal-speed reading conditions. The choice of pausal unit was motivated in response to several reservations raised about the more widely used idea unit in past research. Although widely used, inconsistencies arise when identifying idea units. Every word or phrase that has content value can be treated as an independent idea unit; broader units, such as main, subordinate, relative, and adverbial clauses, may be alternatively identified as separate ideas (e.g., Carrell, 1985). In the end, and as Alderson (2000) aptly put it, "an idea unit is somewhat difficult to define . . . and this is rarely adequately addressed in the literature" (p. 230). Several authors feel, therefore, that pausal units can be more consistently coded in free recall data (e.g., Brantmeier, 2006; Chang, 2006).

In order to identify reliable pausal units for the reading passages of this study, four English native readers were first asked to read each passage silently and indicate where their natural pauses occurred. Then, I marked all pauses while each reader was reading aloud at a normal pace. When conflicts arose across readers or across reports from silent reading as compared to reading aloud, smaller pausal units were preferred to larger ones. Each text was analyzed in this way and was found to contain 75 and 72 pausal units, respectively.

Each pausal unit was assigned into high-, mid-, or low-level pausal units according to its informational value. The importance of each pausal unit was judged by three experienced ESL teachers, who participated in a 30-minute conference on the evaluation criteria for units. I asked them to primarily consider the extent to which each unit would contribute to English L2 readers' comprehension of the entire passage. The correlation coefficients across the three raters' judgments ranged from 0.52 to 0.79 for Passage A, and from 0.32 to 0.66 for Passage B. In order to ensure more rigorous analyses, final decisions on the informational value of each unit were made only on the information units on which all three raters agreed. Accordingly, the units for which the raters disagreed were discarded and not considered in the subsequent analyses. The three raters agreed on the relative informational value of each pausal unit for 34 out of 75 units for Passage A (45%), and 28 out of 72 units for Passage B (39%). Of the 34 units for Passage A, 15 units were categorized into high-level and 15 into low-level units. The remaining four were judged mid-level units. Of the 28 units for Passage B, 12 were high-level units, two mid-level, and 14 were low-level units.

It should be noted that L2 readers in this study were able to choose whether to free recall in the L2 or in their native language. This is because, as has been suggested in the literature (e.g., Lee, 1986; Shohamy, 1984; Wolf, 1993), there might be a substantial difference in the amount of recall when readers are required to write what they can remember in the target language versus their native language. Recall in the target language may be constrained by the readers' target language writing ability, obscuring the true characteristics of reading comprehension. Each unit was thus translated into a Korean equivalent in advance for the analysis of data that would be written in Korean.

Recall protocols of the participants were scored for presence or absence of each pre-analyzed pausal unit. The final quality analysis was done with only the recall of high-level and low-level information units, because this would enable more careful judgments regarding the effects of topic congruence and topic interest on differential levels of comprehension. Moreover, there were only four and two mid-level units for each text, which may not have been sufficient for statistical consideration. In an effort to maximize rating consistency, two outside raters were invited to score the recall data. I scored one quarter of the data with the first outsider rater and another quarter with the second outsider rater. Interrater reliabilities of each pair of raters were .91 and .86, indicating good consistency. I thus analyzed the remaining 50% of the data independently. The number of correctly recalled units was converted to percentage values (see Appendix B for high-level and low-level units used for the recall protocol analysis).

Results

This study investigated the quality of comprehension of 60 Korean English L2 readers, which

was measured by recall scores of high-level information units and low-level information units from two argumentative passages. The two factors expected to affect the Korean readers' comprehension were (1) whether the reading content corresponded or did not correspond with the readers' prior beliefs (i.e., topic congruence) and (2) whether the reading content was something of interest to readers (i.e., topic interest). To address the research question, a repeated-measures multivariate analysis of variance (MANOVA) was conducted with topic congruence as a within-subjects factor and topic interest as a between-subjects factor. This was to determine whether or not the two categorical independent variables (and their interactions) significantly affected the performance of the participants as measured by the two dependent interval variables: percent accurate recall of high-level information units and of low-level information units. All analyses were carried out using the statistical software SAS ver. 9.1 with the level of significance set at 0.05.

Table 2 shows the descriptive statistics of each variable. It was found that readers with high and low topic interest levels achieved comparable recall scores for the high-level information units, irrespective whether the reading topic was congruent or not congruent with their prior beliefs. In the case of the comprehension of low-level units, readers with high topic interest scored best when they read incongruent passages ($M = 36.44$), and they scored second best when they read congruent passages ($M = 25.86$). When readers with a low topic interest level read congruent passages, their recall scores for the low-level units were lowest ($M = 19.67$). Readers with a low topic interest level scored 22.23 points on average when they read incongruent passages.

Table 2. *Descriptive statistics*

Topic congruence	Topic interest	Variable	n	M	SD
	High interest	High-level units	34	32.84	19.64
Congruent		Low-level units	34	25.86	19.73
	Low interest	High-level units	26	32.12	22.32
		Low-level units	26	19.67	19.10
	High interest	High-level units	34	32.84	18.56
Incongruent		Low-level units	34	36.44	17.60
	Low interest	High-level units	26	29.17	19.06
		Low-level units	26	22.23	22.22

Note. All recall scores are given in percentages; hence, maximum possible scores were 100.

The results of the MANOVA revealed that the topic congruence factor had a statistically significant main effect on the two dependent measures, Wilks' Lambda = 0.84, $F(2, 57) = 5.35$, $p < .01$. The main effect of the topic interest factor was also statistically significant, Wilks' Lambda = 0.89, $F(2, 57) = 3.44$, $p < .05$. The interaction effect of topic congruence and topic interest, however, was not statistically significant, Wilks' Lambda = 0.96, $F(2, 57) = 1.20$, $p = .31$. In all cases the values of Wilks' Lambda were large (more than 0.84), suggesting that the two independent variables accounted for a small portion of the generalized multivariate variance in the dependent variables.

Post-hoc univariate pairwise comparisons revealed that the topic congruence factor did not have a statistically significant effect on the recall of high-level information units, $F(1, 58) = 0.35$, $p = .55$, $R^2 = .01$. On average, L2 readers who read the congruent topic passages performed better than the readers who read the incongruent topic passages by 1.48% on their recall of the high-

level information units (95% Confidence Interval [CI] for mean difference: [-3.49, 6.44]), which was a negligible difference at the .05 alpha level. By contrast, topic congruence had a significant effect on the recall of low-level units, $F(1, 58) = 6.49$, $p < .05$, $R^2 = .10$. Rather unexpectedly, the effect was detrimental, as the readers in the congruent topic reading condition scored significantly less than the readers in the incongruent topic reading condition by 6.58% on the recall of the low-level information units (95% CI for mean difference: [1.41, 11.74]). The findings for the topic interest factor paralleled the topic congruence findings, if in the reverse direction. Namely, topic interest did not have a statistically significant main effect on the recall of high-level information units, $F(1, 58) = 0.24$, $p = 0.63$, $R^2 = .004$. Specifically, L2 readers with high topic interest scored only 2.20% more than L2 readers with low topic interest on the high-level unit measure (95% CI for mean difference: [-6.87, 11.28]), which were not statistically significant gains. By contrast, and as was seen for topic congruence, a significant difference was found for topic interest on the recall of low-level units, $F(1, 58) = 5.36$, $p < .05$, $R^2 = .09$. However, in the case of topic interest, as expected, the effect on low-level units was positive: L2 readers with high interest in the reading topic outperformed those with low topic interest by 10.20% on the recall of the low-level information units (95% CI for mean difference: [1.38, 19.01]).

Figures 1 and 2 graphically show the same information reported above, by means of depiction of the 95% confidence intervals (CIs) for each mean recall score of the high-level and low-level information units, respectively.
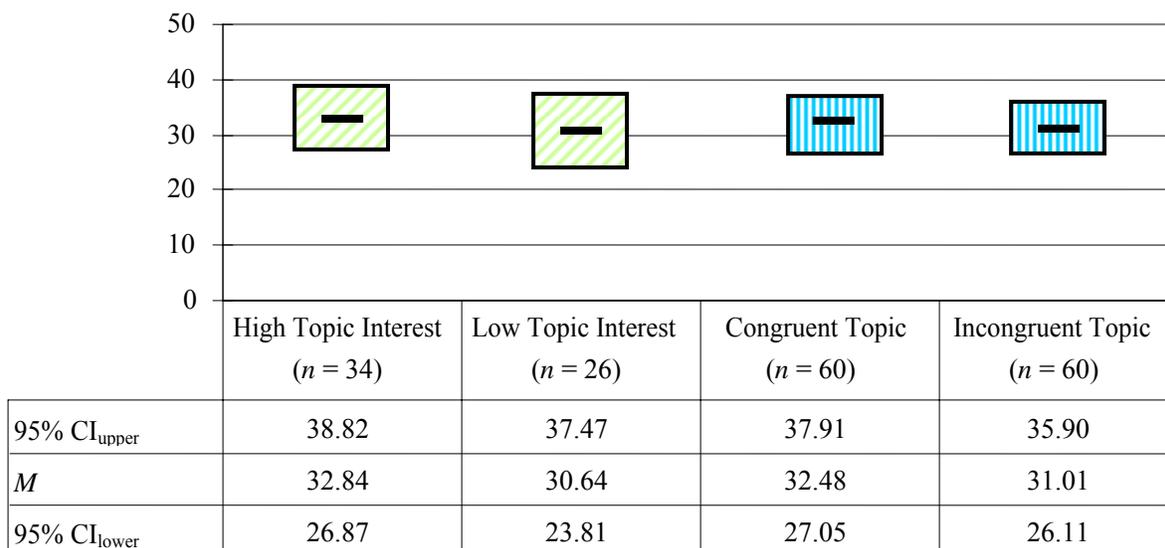
	High Topic Interest (n = 34)	Low Topic Interest (n = 26)	Congruent Topic (n = 60)	Incongruent Topic (n = 60)
95% CI$_{upper}$	38.82	37.47	37.91	35.90
M	32.84	30.64	32.48	31.01
95% CI$_{lower}$	26.87	23.81	27.05	26.11

Figure 1. 95% confidence intervals for the mean recall scores of high-level units.

As shown in Figure 1, the two CIs for the high and low topic interest groups largely overlap with each other, indicating that the observed mean difference on the recall of the high-level units is not statistically significant. This pattern can also be observed in the other two CIs for the two topic congruence reading conditions. Conversely, the marginal portion of overlap of each CI pair in Figure 2 illustrates that it is on the recall of the low-level information units that the observed mean differences between the two topic congruence reading conditions and between the high and low topic interest groups are statistically significant.
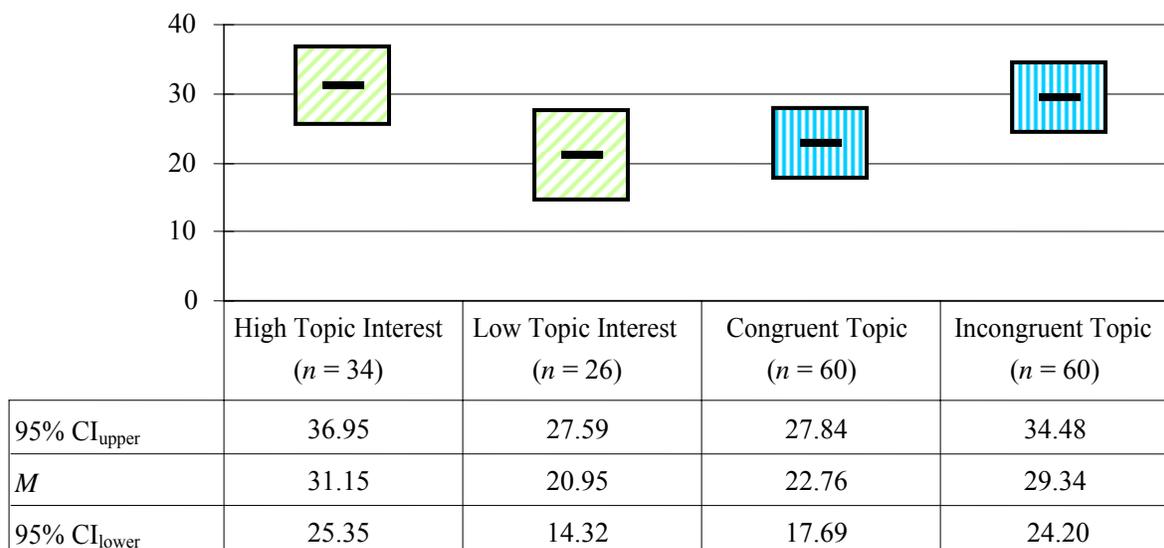
	High Topic Interest ($n = 34$)	Low Topic Interest ($n = 26$)	Congruent Topic ($n = 60$)	Incongruent Topic ($n = 60$)
95% CI$_{upper}$	36.95	27.59	27.84	34.48
M	31.15	20.95	22.76	29.34
95% CI$_{lower}$	25.35	14.32	17.69	24.20

Figure 2. 95% confidence intervals for the mean recall scores of low-level units.

Discussion

This study employed a controversial topic to elucidate the effects of topic congruence as a reading condition on the quality of L2 reading comprehension. L2 readers in this study did not show sizeable different behaviors on the recall of the high-level information units for either the topic congruence reading conditions or the reader interest levels. The first and second hypotheses were therefore supported. It may be that even when upper-intermediate to advanced-level L2 readers do not have high topic interest, they can effectively comprehend textual information with high content value. Similarly, at such competent reading levels, their comprehension of higher value information may not be compromised even under the unfavorable topic congruence reading condition.

By contrast, both variables were found to have significant effects on the recall of the low-level information units. The high topic interest group outperformed the low topic interest group, supporting Hypothesis 4. This would lead us to conclude that topic interest is an important factor and that L2 readers should be given engaging reading materials so they can understand and retain better the textual information with lower content value. Even at upper-intermediate to advanced-level L2 reading, less interesting reading content may negatively affect the recall of lower-level information in a text. An effect was also uncovered for topic congruence and low-level information units. However, contrary to my expectation in Hypothesis 3, the effect was detrimental. It is possible that, when readers found the reading topic congruent with their prior belief systems, the details of the passages were overlooked. Incongruent topic passages, on the other hand, may have been motivating enough for these L2 readers to focus their attention and search for the information with low content value. It was also found that the interactions between topic congruence and topic interest were not statistically significant, supporting the assumption that the two variables would exist independently from each other (cf. Carrell & Wise, 1998; Joh, 2006). They thus appear to have exerted separate influences on reading comprehension, as topic

interest played a facilitating role, whereas topic congruence played a debilitating role in the comprehension and retention of information with less prominent content value.

The present study, following past research, concentrated on assessing the textual information that was correctly recalled. A complementary, different perspective on topic congruence can be obtained by considering the textual information that is incorrectly remembered, that is, distorted. As discussed at the beginning of this paper, two previous studies (Read & Rosson, 1982; Reutzel & Hollingsworth, 1991) have shown that readers' recall may sometimes be colored by their prior beliefs. The current analysis of recall protocols also revealed that some study participants distorted factual information according to their prior belief systems. Thus, instances were found where the overall thesis of the recall protocols was completely the opposite of that of the original reading passages. For example, one low-interest reader read the passage that contained voices favorable to the issue of the legalization of euthanasia (Passage A). She initially had a negative attitude towards the issue (i.e., she was an incongruent topic reader for Passage A), as is indicated in the following excerpt from her short free-write essay, which was originally written in English:

> I do not agree with the idea of euthanasia is appropriate decision for anyone. I have seen a movie where one main character allowed her loved ones to die because she loved him so much. I know that if the patient is in great suffer, it is the hardest thing to observe. But I don't think this is the right way to deal with such problem . . .

The same reader's recall protocol, also originally written in English, shows that her understanding of the passage was substantially inaccurate and was influenced by the specific direction of her prior beliefs, as shown in the following excerpt:

> Human has a right to vote, to speech, and to die. Many people do not consider suicide as a crime or big of a deal. *However, when it comes to an assisted suicide it becomes a great crime and illegal practice* [italics added] . . .

The above example clearly shows the possibility that a reader's beliefs on an issue are sometimes so intense that recollected memory of the thesis of a text might be far from the author's intended one. Indeed, added understanding regarding the reconstructive nature of human memory could be gained through systematic analyses of the biasedly remembered information, rather than only of the correctly remembered information.

Limitations

Several limitations in the study must be acknowledged. First, this study adopted an immediate free recall task in measuring the degree of L2 reading comprehension. This choice was based on the previous literature that favors the advantageous role taken by such a measure (Bernhardt, 1983, 1991; Hayes, 1989; Hayes & Flower, 1980; Heinz, 2004; Johnston, 1983; Lee, 2007; Roebuck, 1998). However, some researchers (e.g., Alderson, 2000; Chang, 2006) have raised concerns that recall tasks are likely to be influenced by readers' differential memory capacity. Specifically, Chang (2006) maintained that immediate recall tasks might be constrained by memory requirements and hence might "bias our understanding of what readers actually

comprehend because teachers and researchers are unable to discern readers' comprehension of those unrecalled units" (p. 537). That is, it is impossible to determine whether units are not included in a recall because they were not comprehended or simply because they are not remembered after the reading.[3]

Second, several aspects of the procedures could be improved in future studies. For example, the study participants read two passages consecutively with a very short time interval, and the possibility cannot be discarded that the prior reading text affected the comprehension of the second reading text. The first reading and the subsequent free recall may have somehow affected reading processes or strategies in the ensuing reading and recall task. Although such effects were expected to be counterbalanced through the randomized reading order and minimized by making the recall not a surprise event, the possibility of some carryover may still exist. Another point to consider is that this study tested a single topic with two reading passages that are traditionally categorized as argumentative. Studies with other topics and with other text types may offer a clearer understanding of the effects of topic congruence and topic interest.

In addition, this study treated the two independent variables as categorical, with two levels for each. The 4-point Likert scale used for measuring the degree of reader interest somehow forced the study participants to have either high or low topic interest. The directions for eliciting readers' prior beliefs on the legalization of voluntary euthanasia, too, may have caused them to avoid a neutral position and select their position to be either for or against the issue. Studies that can consider readers who naturally have unbiased attitudes and neutral degrees of topic interest should be added to this research program.[4]

Lastly, only upper-intermediate to advanced-level L2 readers participated in this study, and thus the generalizability of the findings is limited to similar proficiency levels. No studies to date have examined how the variables of topic congruence and topic interest may interact with readers' differential proficiency levels. Accumulated research findings do suggest, however, that reader proficiency is a potentially important factor constraining the consequences of cognitive as well affective factors in reading comprehension (Bossers, 1991; Carrell, 1991; Hulstijn, 1991; Lee & Schallert, 1997; Yamashita, 2002).

Conclusion

This study is the first to investigate the potential simultaneous effects of topic congruence and topic interest on L2 reading comprehension. It showed that both congruence and interest had subtle but systematic effects on the comprehension of two argumentative reading texts by 60 upper-intermediate to advanced-level English L2 users from an L1 Korean background. With respect to L2 reading pedagogy, the findings suggest that reading passages that do not capture the interest of an L2 reader would risk the reader's retention of smaller details. Teachers and material developers may want to consider topics of interest for L2 readers in order for them to be motivated to read and to better retain information from reading. Controversial topics might bias the quality of comprehension of L2 readers as well. Specifically, readings whose content is congruent with the readers' preexisting belief systems (and thus transparent or expected) might be less than ideal for their understanding of lower-level textual information, whereas reading

materials with content that is not agreeable to readers may bring a higher level of retention of small details for L2 readers. Thus, congenial topic passages need not always be a virtue.

Given the theoretical and practical importance of the two variables for material development and the teaching of reading, future studies will hopefully further the line of research initiated in the present study and advance our understanding of the complicated roles of topic congruence and topic interest in L2 reading comprehension. In addition, the research should be expanded to include other variables of central interest in the study of reading, such as proficiency of L2 readers and effects on longer-term memory for text and on content learning.

Acknowledgments

Notes

1. As one reviewer correctly pointed out, the relationship between topic interest and background knowledge should be tested more, which could be a viable topic in future studies.

2. One reviewer raised the question if all the participants were either completely for or against voluntary euthanasia. Although some participants were wholly for or against the topic, other participants fell on a continuum at one point or another but at points that were distinguishable to be for or against the topic. This discernment of the participants' responses can be considered viable in light of the perfect interrater agreement between the two raters.

3. One reviewer commented that "all models of comprehension posit a fundamental role for memory as part of the comprehension process" and argued that, as one of the standard measures both in L1 and L2 comprehension research, the recall protocol has more advantages than other comprehension measures. I agree with the reviewer and expressed similar positions in Lee (2007).

4. Two participants actually marked in the middle on the Likert scale, showing that they may have had a neutral interest in the topic (or uninterested in the topic). Their responses were excluded from the analyses.

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Appendix A

Two Experimental Passages

Passage A

Every human being has a right to life, perhaps the most basic and fundamental of all our rights. However, every right has a choice. The right to speech does not remove the option to remain silent; the right to vote brings with it the right to abstain. In the same way, the right to choose to die is implicit in the right to life.

Those who are in the late stages of a terminal disease have a horrific future ahead of them: the gradual decline of their body, the failure of their organs and the need for artificial support. In some cases, the illness will slowly destroy their minds, the essence of themselves. Faced with this, it is surely more humane that those people be allowed to choose the manner of their own end, and die with dignity.

Society recognizes that suicide is unfortunate but acceptable in some circumstances–those who end their own lives are not seen as evil, nor is it a crime to attempt suicide. The illegality of assisted suicide is therefore particularly cruel for those who are disabled by their disease and are unable to die without assistance.

At the moment, doctors are often put into an impossible position. A good doctor will form a close relationship with their patients and will want to give them the best quality of life they can; however, when a patient has lost or is losing their ability to live with dignity and expresses a strong desire to die, they are legally unable to help. To say that modern medicine can totally remove pain is a tragic over-simplification of suffering. While physical pain may be reduced, the emotional pain of a slow death, of the loss of the ability to live a meaningful life, can be horrific. A doctor's duty is to address his or her patient's suffering, be it physical or emotional. As a result, doctors will in fact already help their patients to die–although it is not legal, assisted suicide does take place. It would be far better to recognize this, and bring the process into the open, where it can be controlled.

Passage B

There is no comparison between the right to life and other rights. When you choose to remain silent, you may change your mind at a later date; when you choose to die, you have no such second chance. Participating in someone's death is also to participate in depriving them of all choices they might make in the future, and is therefore immoral.

Modern health care is greatly flexible and effective, and helps to preserve quality of life as far as possible. There is no need for terminally ill patients ever to be in pain, even at the very end of the course of their illness. It is always wrong to give up on life. The future which lies ahead for the terminally ill is of course terrifying, but society's role is to help them live their lives as well as they can.

Those who commit suicide are not evil, and those who attempt to take their own lives are not accused. However, if someone is threatening to kill themselves it is your moral duty to try to stop them. You would not, for example, simply ignore a man standing on a cliff and threatening to jump simply because it is his

choice; and you would definitely not assist in his suicide by pushing him. In the same way, you should try to help a person with a terminal illness to live, not help them to die.

It is vital that a doctor's role not be confused. The guiding principle of medical ethics is to do no harm: A physician must not be involved in deliberately harming their patient. Without this principle, the medical profession would lose a great deal of trust; and admitting that killing is an acceptable part of a doctor's role would likely increase the danger of involuntary euthanasia, not reduce it. Legalizing assisted suicide also places an unreasonable burden on doctors. The daily decisions made in order to preserve life can be difficult enough; to require them to also carry the immense moral responsibility of deciding who can and cannot die, and the further responsibility of actually killing patients, is unacceptable. This is why the vast majority of medical professionals oppose the legalization of assisted suicide.

Appendix B

High-Level and Low-Level Units for Each Passage

Passage A

High-Level Pausal Units

  2. has a right to life,
  3. perhaps the most basic and fundamental
  6. every right has a choice.
 18. have a horrific future
 27. it is surely more humane
 28. that those people be allowed to choose the manner
 30. and die with dignity
 40. is therefore particularly cruel
 54. to live with dignity
 55. and expresses a strong desire to die,
 63. of the loss of the ability to live a meaningful life,
 70. doctors will in fact already help their patients to die-
 72. assisted suicide does take place.
 73. It would be far better to recognize this,
 74. and bring the process into the open,

Low-Level Pausal Units

  4. of all our rights.
  7. The right to speech
  8. does not remove the option
  9. to remain silent;
 10. the right to vote
 11. brings with it the right to abstain.
 12. In the same way,
 19. ahead of them:
 23. In some cases,
 26. Faced with this,
 34. in some circumstances-

45. At the moment,
48. will form a close relationship
49. with their patients
69. As a result,

Passage B

High-Level Pausal Units

2. between the right to life
8. you have no such second chance.
13. and is therefore immoral.
23. It is always wrong
24. to give up on life.
28. but society's role is to help them live their lives
35. it is your moral duty
47. with a terminal illness to live,
52. a physician must not be involved in deliberately harming their patient.
60. also places an unreasonable burden on doctors.
64. to require them to also carry the immense moral responsibility
71. oppose the legalization

Low-Level Pausal Units

4. when you choose to remain silent,
5. you may change your mind
6. at a later date;
18. as far as possible.
26. for the terminally ill
38. simply ignore a man
39. standing on cliff
40. and threatening to jump
41. simply because it is his choice;
42. and you would definitely not assist
43. in his suicide
44. by pushing him.
45. In the same way,
53. Without this principle,

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