Coherence Monitoring in Reading Comprehension

Investigating Coherence Monitoring in Reading Comprehension between Young Adults and Adolescents

Christos Tatsis
s1280007

Program for Educational Studies
Institute of Education and Child Studies
Leiden University
Supervisor: Anne Helder
30.01.2014
Coherence Monitoring in Reading Comprehension

Abstract

The aim of the present study was to investigate coherence monitoring in reading comprehension between young adults and adolescent. Coherence monitoring ability was examined in 26 young adults and 29 adolescents by using an inconsistency paradigm. Participants read 16 stories with consistent information and 16 stories with inconsistent information, which also contained some filler sentences that separated the two pieces of conflicting information and aimed to shift readers' attention. The filler section varied in stories from three to six filler sentences. We also examined differences in participants' working memory capacity and reading ability that could possibly explain differences in coherence monitoring between them. The results suggested that both adults and adolescents were able to perceive violation of coherence by showing an inconsistency effect, by being slower reading inconsistent compare to consistent information of the texts and this effect did not decrease as textual distance increased. However only in the condition of six filler sentences young adults showed an inconsistency effect while reading text with inconsistent information compare to consistent information while adolescents did not. The results also showed that the two groups do not differ in their working memory capacity but they do differ in their reading ability with adults showing higher reading ability than adolescents. This difference in reading ability could possibly explain their difference in inconsistency effect in the section of six filler sentences.

Keywords: Reading comprehension; Coherence monitoring ability; Inconsistency effect; Working memory capacity; Reading ability
Coherence Monitoring in Reading Comprehension

**Introduction**

Reading comprehension is a complex but very important ability that helps people perceive the meaning of written passages. Reading comprehension is crucial for students to perform better at school and is also a fundamental factor in order to achieve literacy and perform good in every science (Johnson, 2012). While readers go through a text and try to understand what they read, they engage in several cognitive processes to attain the construction of a coherent mental representation of the text that they read (Van den Broek, 2010; Albrecht & Myers, 1995). This mental representation refers to the situation that the story describes (Van den Broek, 2010; Graesser, Magliano & Zwaan, 1995). Based on a large amount of previous studies, it has been found that the combination of readers' characteristics and text's characteristics plays a crucial role on the construction of coherent mental representation (Van den Broek, 2010, 1994; Albrecht & Myers, 1995; Kendeou & Van den Broek, 2007; Elbro & Buch-Iversen, 2013; Kintsch, 1998). Specifically, reader's characteristics can be considered as reading ability, the ability to generate inferences and monitor whether the mental representation is coherent and working memory capacity. Text's characteristics can be considered as the organization of ideas in the text, text complexity, and texts with inconsistent information (Van den Broek, 2010, 1994; Graesser, et al., 1995; Albrecht & Myers, 1995; Kendeou & Van den Broek, 2007; Kintsch, 1998).

**Reader's Characteristics**

Successful reading comprehension requires a reader to engage in the right cognitive process at the right time. This depends on several characteristics of the reader. For instance, one important reader's characteristic that is highly correlated to successful reading comprehension is reading ability (Perfetti, 1985). Reading ability can be characterized as the proficiency of different reading skills, such as decoding skills, that enable readers to read and comprehend texts (BOCES & Westbury, 2013; Kintsch, 1998). Proficient readers are better able to go more rapidly and accurate through a text, and recognize misconceptions of the text easier compare to poor readers (Kintsch, 1998). Individual differences have been observed in reading ability. More specifically, Perfetti (1985) found that young adults have higher reading ability than school students mainly because they are more experienced with reading and have...
Coherence Monitoring in Reading Comprehension
greater literacy level.

Another important reader's characteristic that contributes to successful comprehension is reader's ability to identify connections between different parts of the text and between parts of the text and his background knowledge that leads to the generation of inferences (Van den Broek, 1994). Inferences can be described as the "connections" that a reader makes while he is reading a text by activating information from his background knowledge and combining them with information of the text that he is going through. This combination of information leads to the construction of a coherent mental representation as opposed to the exact word of the text (Elbro and Buch-Iversen, 2013; Van den Broek, 1994; Kintsch, 1998).

Working memory capacity is also an important ability that plays a significant role on the different cognitive processes that readers engage in to achieve reading comprehension (Kintsch, 1998). Working memory capacity can be defined as readers' capacity to temporarily perceive information while they process through any cognitive task such as reading comprehension (Colom & Shih, 2004; Colom, Shih, Flores-Mendoza, Quiroga & Privado, 2005; Swanson & Berninger, 1995). Baddeley (1992) also claimed that individual differences in working memory capacity can work as a strong performance predictor in several cognitive tasks such as reading comprehension. It is also worth mentioning that no significant differences in working memory capacity have been observed between young adults and adolescents (Sander, Linderberge, & Werkle-Bergner, M., 2012).

In the present thesis both reader's and text's characteristics of reading comprehension will be examined. More specifically, as a reader characteristic, we focus on a specific cognitive process, coherence monitoring, that plays a significant role on reading comprehension (Helder, Van Leijenhorst & Van den Broek, 2013). The capacity to perceive violation of coherence while reading a text is called coherence monitoring (Helder, Van Leijenhorst & Van den Broek, 2013). The maintenance of coherence leads to successful reading comprehension (Albrecht & O'Brien, 1992). A way to investigate coherence monitoring is through inconsistency detection (Albrecht & O'Brien, 1993). More specifically, in the present study we used an inconsistency paradigm which was adapted from Albrecht & O’Brien (1993) in order to examine coherence monitoring (for an example see Table 1). The inconsistency paradigm consists of short stories and some of those stories contain inconsistent information while some other do not. Each story begins with an
Coherence Monitoring in Reading Comprehension

introductory sentence. The second sentence of each story gives a description of a situational, physical, spatial or personal characteristic of the main protagonist of the story. Right after the second sentence the story continues with several filler sentences that provide neutral information and aim to shift reader's attention from the main topic of the story. A target sentence is following the filler sentences. The target sentence is either consistent or inconsistent with the information provided in the second sentence. Previous studies (Albrecht & O'Brien, 1993) have found that readers generally take longer to read inconsistent target sentences compare to consistent target sentences, which reflects that readers engage in additional cognitive processing when reading something that is inconsistent. This is called the inconsistency effect.

Table 1. Trial Example of Inconsistency Paradigm (Helder, Van Leijenhorst, & Van den Broek, 2013).

(S1) Oscar and Mike are ten-year-old twins who do almost everything together.

(C) Because there has been a lot of snow in the past few days, they don't have to go to school today.

(I) Because the weather has been very hot in the past few days, they don’t have to go to school today.

(F-1) Their mother works for a large company and is working from home today.

(F-2) Today she is very busy with her work, she has to finish a report.

(F-3) To not disturb her, Oscar and Mike are playing outside.

(T) They decide to build a snowman in the backyard.

(CS) They are happy to have a day off

Text’s Characteristics

According to Kendeou and Van den Broek (2007), apart from reader's characteristics, text structure plays also an important role in reading comprehension. A text that describes its events in a rational way and provides coherence, enables readers to make mental representations easier and attain reading comprehension (Black & Bower, 1980). Moreover, Kendeou and Van den Broek (2007) claimed that text complexity might influence readers' ability of making correct inferences or lead
Coherence Monitoring in Reading Comprehension

to misconceptions, having as a result the generation of different, not coherent mental representation of the texts. Textual complexity can be provoked when related information are placed far apart in the text. In addition, Kendeou and Van den Broek indicated in their study (2007) that reading comprehension also depends on the structure of the text and more specifically on the way that it displays its information. Van den Broek (2010) also claimed that elements which are described far apart in the text might impede readers to detect connections between these elements and attain reading comprehension. Furthermore, in the present study text complexity is manipulated by the variation of textual distance with the increase of filler sentences that separate the context information from the target sentence. Previous studies used this textual complexity in terms of local and global coherence break. For example, Long and Chong (2001) found that poor comprehenders were able to detect inconsistent information when they were adjacent in the text, which they refer to as a local coherence break, but not when the context information was separated from the target sentences with filler sentences (a global coherence break). Thus, they were able to maintain local-but not global-coherence while processing through a text. More specifically, local coherence refers to the settlement of connections between current information and immediate preceding information of the text which is still active in working memory, whereas global coherence refers to the settlement of connections between current information and other information that are stated earlier and is not active in working memory anymore (Long & Chong, 2001; Albrecht & O’ Brien, 1993).

Both text's and reader's characteristics have an impact on the different cognitive processes that readers engage in when they try to build a mental representation of the text and achieve reading comprehension (Albrecht & O’ Brien, 1992; Van den Broek, 2010, 1994; Graesser, et al., 1995; Albrecht & Myers, 1995; Kendeou & Van den Broek, 2007; Elbro & Buch-Iversen, 2013; Kintsch, 1998). The aim of the current study is to investigate both readers' and text's characteristics in the context of reading comprehension in adolescents and young adults. More specifically the reader characteristic that will be examined is coherence monitoring by using an inconsistency paradigm. The text characteristic that will be examined is the textual distance that is, the amount of information that will be presented between the two pieces of information that contradict each other.

The first research question is: Do young adults and adolescents perceive
Coherence Monitoring in Reading Comprehension

violation of coherence by showing an inconsistency effect while reading inconsistent target sentences compared to consistent target sentences of the texts and is there any difference in the inconsistency effect between the two groups?

Taking into account the information of previous studies that texts with no inconsistent information are easier to be comprehended (Fletcher and Bloom, 1988; Albrecht & O'Brien, 1993; Black & Bower, 1980;), I expect that both groups will spend more time on reading inconsistent target sentences compared to consistent target sentences.

The second research question is: If adolescents and young adults both show an inconsistency effect will this inconsistency effect be different for stories when the textual distance between the two pieces of information increases?

I expect that young adults will show a greater inconsistency effect than adolescents as textual distance increases mainly because, previous literature (Perfetti, 1985) claimed that young adults are more proficient readers than adolescents and more experienced in reading. As more proficient readers, young adults might be better able to create more accurate and complete mental representation of the text and this is why might be more able than adolescents to detect the inconsistent information even when filler sentences separate the context information from the target sentence.

Finally, the third research question is: Do adolescents and young adults differ in terms of working memory capacity and reading ability that could explain possible differences in inconsistency effect between the two groups?

Based on previous studies (Colom & Shih, 2004; Sander, Lindenberger and Werkle-Bergner, 2012), I expect that no difference will be found between the two groups in working memory capacity. However, I expect that a significant difference will be observed between the two groups in reading ability with young adults showing higher reading ability compared to adolescents mainly because they are more familiar with reading (Perfetti, 1985; Kintsch, 1998).

Method

Participants

Fifty five subjects participated in the present study. Twenty six undergraduate students of Leiden University (21 females and 5 males) between 19 and 21 years old ($M_{age} = 20.02$ and $SD = .99$), and twenty nine adolescents form a pre-university
Coherence Monitoring in Reading Comprehension

track of a secondary school in the Netherlands (15 females and 14 males) between 13 and 17 years of age (Mean Age = 15.51 and SD = 1.85) were recruited in order to participate in the present study. University students received two course credits as a reward for their participation. All subjects were Dutch native speakers. Dyslexia, ADHD, and other developmental disorders were considered as exclusion criteria for the study.

Materials

**Working Memory Capacity.** As a measure of working memory capacity the Mental Counters task was administered. The Mental Counters task is a time accuracy task that measures subject's working memory capacity (Huizinga et al., 2006). The participants' task is to keep numerical scores active in their working memory. More specifically, two or three horizontal lines appear in the middle of the computer screen. A box appears one by one above or below one of the lines-counters. The time between the presentations of the boxes on the screen ranges between 1000 and 1300 ms. Participant's task is to keep track of the score that is changing every time that a box appears on the screen. At the beginning of the task, the initial score of each of the counters-lines is zero. Every time that a box appears above one of the lines the score of the counter-line goes up by one while every time that a box appears below one of the lines the score of the counter-line goes down by one. Participants should keep track of the score and press with their right index the question mark (?) button of the keyboard when the score of one of the counters-lines is bigger than the number suggested in the instruction. For instance, if in the instruction it is indicated "Press the button if the score of one of the counters is bigger than two" participants should press the button when the score of one of the two or three counters-lines is three because it is bigger than two. Participants should give the right response within 3500 ms after the appearance of the box that makes the score of one of the counter-lines bigger than the suggested number in the instruction. Participants were instructed to response as quick and accurate as possible. After the end of each trial a + is shown on the screen when participant's answer is correct, a - when the answer is wrong and an x when the participant pressed the button too late. The dependent variable in the present study will be the percentage of the correct trials completed.

**Inconsistency Paradigm.** Participants were asked to read 32 brief stories on a computer screen. Half of the stories contained information that was semantically
Coherence Monitoring in Reading Comprehension

inconsistent with previous information within the text (so 16 consistent stories and 16 inconsistent stories). For an example see Table 1. The paradigm is based on the inconsistency paradigm by O’Brien and colleagues (Albrecht & O’Brien, 1993) and it is a self-paced computer reading task. In addition, the textual complexity was manipulated by separating the two pieces of conflicting information with either three, four, five or six filler sentences. Stories with different length of the filler section were equally distributed across the materials (so eight stories in each filler section condition). Each story consists of five sections. An introduction, an elaboration condition, the filler sentences, a target sentence and a closing sentence. More specifically, every story starts with an introductory sentence. Then a second sentence which has been manipulated to be either consistent or inconsistent with the target sentence, follows the introductory sentence. The filler section follows. The filler section consists of either three, four, five or six filler sentences. The filler section does not contain relevant information concerning the second and the target sentence of the text. After the filler sentences a target sentence is shown on the screen which is either consistent or inconsistent with the second sentence. The target sentence is followed by a closing sentence. A comprehension question follows each story in order to make sure that participants were reading for comprehension. The stories were presented sentence by sentence on the screen. Participants had to press the space bar after finishing reading one sentence in order to move to the other sentence of the story. Participants did not have the possibility to look back into a sentence. All trials begun with the sentence "Press the space bar to move to the next story" that appeared in the middle of the screen. Participant were instructed to place their thumbs on the space bar in order to press it and move from one sentence to the other. Each press of the space bar deletes the current sentence and presents another one. Reading time of each sentence is considered as the duration between the space bar presses. After the completion of each story a comprehension question was appeared in the middle of the screen with a Yes and a No option below the question. Participants were asked to place their right index on the S button of the keyboard and the left on the L button so they could answer the question by pressing either the S button for Yes or the L button for No respectively. Participants were also instructed to read the stories as they would normally read, neither faster nor slower and pay close attention during reading the stories because they would have had to answer a question after each story. In the present study the dependent variable is the amount of time that participants spent in
Coherence Monitoring in Reading Comprehension

order to read the target sentences of the stories. More specifically, the reading time for all target sentences was divided by the number of syllables, to correct for sentence length.

**Reading Ability.** As a measure of reading ability the Maze task was administered to all participants. The Maze task is a multiple-choice task of accuracy and speed (Fuchs, Fuchs, Hamlett, & Ferguson, 1992) which was adapted and translated by Chung and Espin (2013). The Maze task consists of a hard-copy-passage of a 400-word length with a 53 set of multiple-choice options. The first sentence of the passage is always intact and gives basic information about the story. Every seventh word of the passage is replaced by three possible options. Only one of the words is semantically correct to the passage while the other two are not. In a time-limit of two minutes participants should read the passage and circle with a pen as many correct words as they can. After the time period of two minutes, participants should stop reading the passage and circling the correct words. The dependent variable in the present thesis is the total number of the correct words circled within the period of two minutes.

**Procedure**

The experiment took place at the Pieter de la Court building of Leiden University. Participants were tested individually for approximately 60 minutes. Because this is a part of a bigger research project, an additional test, the Raven Standard Progressive Matrices Test, was administered during the experiment. In the present thesis only the Mental Counters task, the Maze task and the Inconsistency task are described. During the experiment session participants were placed in front of a computer screen in a quiet room of Pieter de la Court building, and were instructed by the researcher how to perform the tasks. The instructor of the experiment informed the participants that all their information will be dealt with anonymously and confidentially. Participants first started the experiment with the Mental Counters task, they continued with the Inconsistency task and then with the Maze task. All participants received the instructions of the Mental Counters task first. Every participant had first to complete five practice trials. After the practice trials, subjects continued with the actual task. First they had to complete eight trials with two counters-lines and then other eight trials with three counters-lines. The whole task consists of 21 trials and lasts approximately ten minutes.
Coherence Monitoring in Reading Comprehension

After the Mental Counters Task, subjects continued the experiment with the Inconsistency task. First participants received the instructions by the researcher. Before the beginning of the actual task each participant completed a practice trial of two stories. After the practice trial participants were ready to start reading the 32 stories of the actual task. The duration of this task was approximately 20 minutes. Participants could have two small breaks, one after that they had read the first twelve stories and another after twenty two stories.

After the completion of the Inconsistency task, participants were asked to continue with the Maze task. Firstly, subjects received the instructions of the task by the experimenter. An example in a piece of paper and a pen were provided to participants by the researcher. The researcher explained to the participants that some words of the text are replaced by three possible options but only one of the words fits best to the text while the other two do not. He also explained to them that their task is to read the text, find the correct words and circle them. The experimenter asked the participants to read the first three sentences of the example trial and circle the first three correct words of the text. After that, he asked them to start reading the rest of the text and circling the correct words when he will say the word "Start". After 30 seconds, the experimenter asked participants to stop reading the texts and circling the correct words. After the completion of the experimental trial the researcher explained to the subjects that now they are going to start the actual task that is bigger than the practice trial that they have just completed. He explained to them that they have to read the passage and circle with the pen as many correct words as they can in a time period of two minutes. After the time-limit of two minutes subjects had to stop reading the text and circling the right words. Participants were also asked if they have understood how to perform the task and if they had any further question. After that the experimenter provided the actual task to subjects and he introduced them to start reading the text.

All the data and the materials that were used in the present study are part of a bigger project where children, adolescents and young adults participate (Helder, Van Leijenhorst, & Van den Broek, 2013).

Results

A first data inspection was conducted in order to investigate normality of distribution of the data. The statistical analysis revealed that the data was normally
Coherence Monitoring in Reading Comprehension
distributed for all tasks used in the present thesis. Histograms were also selected in
order for normality to be checked.

In order to examine whether young adults and adolescents show an
inconsistency effect by taking longer to read inconsistent target sentences compared
to consistent target sentences and whether this effect differs in terms of textual
distance, a repeated measures ANOVA was conducted with age group (adolescents
vs young adults) as a between subjects factor and consistency (Consistent vs
Inconsistent Target Sentence) and the number of filler sentences (Three vs Four vs
Five vs Six) as a within subjects factor. Table 2 presents the means and standard
deviations of young adults' and adolescent' reading times on consistent and
inconsistent target sentences.

Table 2. Means and Standard Deviations of Reading Times for Young Adults and
Adolescents on Consistent and Inconsistent Target Sentences.

<table>
<thead>
<tr>
<th></th>
<th>Adolescents (N = 29)</th>
<th>Adults (N = 26)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Consistent_Target_Sentences</td>
<td>142.37</td>
<td>39.49</td>
</tr>
<tr>
<td>Inconsistent_Target_Sentences</td>
<td>152.86</td>
<td>43.44</td>
</tr>
</tbody>
</table>

First of all, the assumption of sphericity has been checked. Inspecting the
Mauchly's Test of sphericity a violation of the assumption has observed with \( p < .05 \). Due to the violation of sphericity the Huynh-Feldt test was selected. The analysis revealed that there is a main effect of consistency. Overall participants took longer to read the inconsistent target sentences compared to consistent target sentences \( F(1, 53) = 29.22, p < .001, d = .355 \). In addition, there was a main effect of the number of filler sentences over participants' reading times, \( F(3, 51) = 20.11, p < .001 \), indicating that there is a difference in participants' reading times of target sentences when the number of filler sentences differ. The calculated effect size is \( d = .275 \), indicating a large effect size (Cohen, 1998).

An almost significant interaction effect has been observed between the
number of filler sentences and the two age groups of participants \( F(3, 159) = 2.43, p = .078, d = .044 \). This interaction shows that there is a difference between the two
Coherence Monitoring in Reading Comprehension

age groups when they read the target sentences of texts with different number of filler sentences. Although this interaction is technically not significant, perhaps because of the relatively small number of trials in each of the filler condition, we decided that it would be informative to look at the underlying effects of this almost significant interaction. Post-hoc tests were conducted for each level (three, four, five and six) of filler sentences separately in order to identify where there is a difference between young adults and adolescents and between consistent and inconsistent target sentences. In all four levels of filler sentences participants overall showed an inconsistency effect when comparing reading times of inconsistent and consistent target sentences. More specifically, a significant main effect of consistency in the three filler sentences condition \(F(1, 53) = 7.09, p = .010\), four filler sentences condition \(F(1, 53) = 13.56, p = .001\), five filler sentences condition \(F(1, 53) = 4.22, p = .045\) and six filler sentences condition \(F(1, 53) = 6.65, p = .013\) of the texts has been observed for all participants' reading times of consistent and inconsistent target sentences. However, only in the condition of the six filler sentences, a significant interaction effect has been observed between the reading times of target sentences and the two groups of participants, \(F(1, 53) = 8.34, p = .006\), indicating that there is a difference in the inconsistency effect between the two groups when they read texts with six filler sentences compared to texts with five or less filler sentences. The calculated effect size is \(d = 136\), which is a large effect size according to Cohen (1998). Finally a post-hoc test has been run for each group separately in order to identify which of the two groups showed an inconsistency effect while reading texts with six filler sentences and which did not. The statistical analysis revealed that there is no main effect of consistency for texts with six filler sentences for adolescents \(F(1, 28) = .047, p = .831\). However, the analysis showed that there was a significant main effect of consistency for texts with six filler sentences for young adults, \(F(1, 25) = 15.413, p = .001, d = .381\), indicating that young adults slow down when the contradicting pieces of information are presented with six intervening filler sentences whereas the adolescents do not. The means and standard deviations of participants reading times of target sentences with three, four, five and six filler sentences are presented in Table 3.
Table 3. Means and standard deviations of adolescents' and young adults' reading times of consistent and inconsistent target sentences of texts with three, four, five and six filler sentences.

<table>
<thead>
<tr>
<th></th>
<th>Adolescents (N = 29)</th>
<th>Adults (N = 26)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Three Filler Sentences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent</td>
<td>140.62</td>
<td>35.49</td>
</tr>
<tr>
<td>Inconsistent</td>
<td>161.34</td>
<td>51.18</td>
</tr>
<tr>
<td>Four Filler Sentences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent</td>
<td>149.36</td>
<td>50.75</td>
</tr>
<tr>
<td>Inconsistent</td>
<td>164.27</td>
<td>54.68</td>
</tr>
<tr>
<td>Five Filler Sentences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent</td>
<td>129.59</td>
<td>42.98</td>
</tr>
<tr>
<td>Inconsistent</td>
<td>137.14</td>
<td>38.74</td>
</tr>
<tr>
<td>Six Filler Sentences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent</td>
<td>149.90</td>
<td>46.82</td>
</tr>
<tr>
<td>Inconsistent</td>
<td>148.68</td>
<td>42.07</td>
</tr>
</tbody>
</table>

The results from the previous analyses show that both adolescents and young adults show an inconsistency effect. However, when the context information and the target sentence are separated by six filler sentences, only young adults take longer to read inconsistent target sentences compared to consistent target sentences. In order to examine whether both groups differ on other aspects than age, a one-way ANOVA was conducted to investigate whether both groups differ on their working memory capacity and reading ability.

**Working Memory Capacity**

Differences in working memory capacity between university students and adolescents were examined as it has been measured by the Mental Counters Task. Homogeneity of variances was checked with $p > .05$. Table 4 reveals descriptive statistics of participants' scores on the Mental Counter Tasks. The analysis indicated that there was not a statistically significant difference in the mean scores of the Working Memory Task for young adults and adolescents, $F (1, 53) = .670, p = .417,$
indicating that the two groups of people do not significantly differ in working memory capacity. The effect size was also calculated, revealing that $d = .01$, which indicates a small effect size (Cohen, 1998).

Table 4. Mean and Standard Deviation of Percentages Correct on the Mental Counter Task for Young Adults and Adolescents.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young adults</td>
<td>26</td>
<td>85.33</td>
<td>10.74</td>
</tr>
<tr>
<td>Adolescents</td>
<td>29</td>
<td>87.50</td>
<td>8.83</td>
</tr>
</tbody>
</table>

Reading Ability

Differences in reading ability between young adults and adolescents were also examined as it has been measured by the Maze Task. In order to examine whether there is a significant difference in reading ability between young adults and adolescents a one-way ANOVA was conducted. According to the Levene's Test of Equality of Variances, homogeneity of variance of the dependent variable of the present hypothesis has been met with $p > .05$. Table 5 presents descriptive statistics of the mean scores of young adults and adolescents in the Maze Task. The one-way analysis of variance revealed that there was a statistically significant difference in the Maze Task scores for young adults and adolescents, $F(1, 53) = 10.279, p = .002$, indicating that young adults show a higher reading ability compare to adolescents. The calculated effect size is $d = .16$ which is considered as a large effect size according to Cohen (1998).

Table 5. Mean and Standard Deviation of the Maze Task Scores for Young Adults and Adolescents.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young Adults</td>
<td>26</td>
<td>42.69</td>
<td>8.51</td>
</tr>
<tr>
<td>Adolescents</td>
<td>29</td>
<td>35.38</td>
<td>8.38</td>
</tr>
</tbody>
</table>
Coherence Monitoring in Reading Comprehension

Discussion

The aim of the present study was to investigate coherence monitoring ability in young adults and adolescents by using an inconsistency paradigm. In addition, working memory capacity and reading ability were also examined as executive factors of reading comprehension. We found out that differences exist in reading comprehension between university students and adolescents.

The results of the analysis confirmed the first hypothesis of the current thesis that both young adults and adolescents are able to perceive violation of coherence by showing an inconsistency effect while reading inconsistent target sentences of the texts compare to consistent target sentences. More specifically, the average time of reading times was higher for inconsistent target sentences compare to consistent target sentences for both groups. This difference in the reading times indicates that both young adults and adolescents showed an inconsistency effect by spending more time reading inconsistent target sentences compare to consistent target sentences. Moreover, the statistical analysis revealed that there is no significant difference in the inconsistency effect between the two age groups. The results of the first hypothesis are in line with previous studies (Fletcher and Bloom, 1988; Albrecht & O' Brien, 1993; Black & Bower, 1980;) that supported that texts with no inconsistent information, which display their events in a rational way, are easier to be comprehended by readers.

In the second hypothesis of the present study, we examined whether young adults' and adolescents' inconsistency effect will be different for stories when the textual distance between the two pieces of information increases. The results of the analysis showed that overall participants' inconsistency effect does not defer as textual distance increases. More specifically, participants are able to perceive violation of coherence even when the number of filler sentences of the text, that separates the context information from the target sentence increases. However, only in the condition of six filler sentences an interaction effect between the reading times of target sentences and the two age groups has been found, indicating that there is a difference in participants' inconsistency effect when they read texts with six filler sentences compare to texts with less filler sentences. The results revealed that young adults showed an inconsistency effect when they read inconsistent target sentences compare to consistent target sentences of texts with six filler sentences, whereas
Coherence Monitoring in Reading Comprehension

adolescents did not. More specifically, the present finding indicates that young adults are able to notice disruption of coherence when they read texts which separate the context information from the target sentence by six filler sentences, while adolescents are not able to notice this disruption.

Based on extensive, previous studies (Van den Broek, 2010, 1994; Graesser, et al., 199; Elbro & Buch-Iversen, 2013; Kintsch, 1998, Perfetti, 2007) it has been found that working memory capacity and reading ability are highly correlated with reading comprehension. As a result, it was examined in the present thesis whether young adults and adolescents show an significant difference in their working memory capacity and reading ability that could explain possible difference in coherence monitoring ability between the two groups. The results of the analysis confirm the third hypothesis that young adults and adolescents show no difference in working memory capacity, as it measured by the Mental Counters task, but they do show a difference in their reading ability as it was measured by the Maze task, with young adults showing higher reading ability than adolescents. More specifically the results indicate that young adults are more proficient in reading than adolescents mainly because they are more acquainted with reading since they are university students, have access to greater range of words and higher literacy level. The results of the third hypothesis are in agreement with previous findings (Colom & Shih, 2004; Sander, Lindenberger and Werkle-Bergner, 2012; Kintsch, 1998, Perfetti, 1985; Huizinga et. al, 2006) that adolescents and young adults do not significantly differ in their performance in working memory capacity but they do differ in their reading ability.

The present finding can possibly explain the difference in inconsistency effect between young adults and adolescents in texts with six filler sentences that we found in the second hypothesis. More specifically, the results of the third hypothesis showed that young adults have higher reading ability than adolescents. As more proficient readers, young adults are more likely to perceive misconceptions of the texts and create a more complete and accurate mental representation of the texts that they read than adolescents (Knitsch, 1998). Thus, young adults' higher reading ability than adolescents' can possibly explain the fact that young adults are more likely to perceive violation of coherence by showing an inconsistency effect while reading target sentences of texts with six fillers sentences while adolescents do not. Finally, working memory capacity has been proved not to play a significant role on the difference of inconsistency effect between the two age groups since the results showed that young
 adults and adolescents do not significantly differ in their working memory capacity.

The present study has a number of limitations. First of all, the low number of trials in each filler sentences condition of the Inconsistency task which has been used in the present study might held the results as not reliable enough. More analytically, only four trials were examined for each of the four filler sentences conditions. The small number of stories in each filler sentences condition could probably explain the fact that we found an almost significant interaction effect between the number of filler sentences and the two groups of participants. In addition, the instruments that were used in the present thesis to measure participants' working memory capacity and reading ability had a small number of trials as well. Specifically participants performed sixteen trials of the Mental Counters task (eight with two lines and eight with three lines) and one text of the Maze task. The small number of trials in each instrument could possibly bias the results of the analysis.

As it mentioned in the introduction the combination of text's and reader's characteristics plays a crucial role on the construction of a coherent mental representation of the text that leads to successful reading comprehension. In the present thesis, textual complexity was examined as text's characteristics and as a reader's characteristic, a specific cognitive process, coherence monitoring was explored between young adults and adolescents. Working memory capacity and reading ability were also examined as executive factors of reading comprehension. In order to examine whether other factors play a crucial role on reading comprehension in young adults and adolescents further research is needed on other reader's characteristics such as background knowledge. In addition, it would be also interesting for future studies to investigate coherence monitoring in young adults, by adding texts with more than six filler sentences in order to investigate to what extent textual distance can influence coherence monitoring in adults.
Coherence Monitoring in Reading Comprehension

References


Coherence Monitoring in Reading Comprehension


Coherence Monitoring in Reading Comprehension