

EZGİ ERSEN THE EFFECT OF TEXT COHERENCE ON METACOGNITIVE JUDGMENTS Bilkent University 2018

# THE EFFECT OF TEXT COHERENCE ON METACOGNITIVE JUDGMENTS

A Master's Thesis

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THE EFFECT OF TEXT COHERENCE ON  
METACOGNITIVE JUDGMENTS

The Graduate School of Economics and Social Sciences  
of  
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August 2018

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## ABSTRACT

# THE EFFECT OF TEXT COHERENCE ON METACOGNITIVE JUDGMENTS

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Text coherence has an important influence on measures of learning and memory performance. The more coherent the texts are, the easier they are learned and remembered in subsequent memory tests. Moreover, studies also reveal that participants believe that they will remember coherent texts better than incoherent texts. Yet, some of precautions that are taken to ensure that participants are paying attention to the texts such as verification questions may confound memory predictions. In the current study, the effects of timing of verification questions on memory predictions for texts were investigated. Participants were presented with coherent or incoherent texts, followed by memory predictions. Participants also received simple verification questions about text either before or after their memory predictions. In the testing phase, they were given a cued – recall task. The results of the study revealed that timing of verification question did not have an influence on memory predictions. On the other hand, coherent texts led to faster reading time, higher JOL ratings and better memory performance than incoherent texts.

**Keywords:** Experience – Based Judgments, Judgments of Learning, Metacognition,  
Text Coherence

## ÖZET

### METİN TUTARLILIĞIN ÜST – BİLİŞ ÜZERİNDEKİ ETKİSİ

Ersen, Ezgi

Yüksek Lisans, Psikoloji Bölümü

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Metin tutarlılığının öğrenme ve bellek performansı üzerinde önemli etkileri bulunmaktadır. Metinler ne kadar tutarlı olursa daha çabuk öğrenilir ve sonraki bellek testlerinde daha iyi hatırlanırlar. Bunun yanı sıra, araştırmalar katılımcıların tutarlı metinleri tutarsız metinlere göre daha iyi hatırlayacağını düşündüklerine dair kanıt sunmuştur. Ne yazık ki, katılımcıların öğrenme sırasında okudukları metne dikkat etmelerini sağlayan doğrulama sorusu gibi bazı tedbirlerin bellek tahminleri için karıştırıcı bir etkiye sahip olabileceği düşünülmektedir. Bu çalışmada, doğrulama sorularının zamanlamasının bellek tahminleri üzerindeki etkileri araştırılmıştır. Katılımcılara tutarlı ve tutarsız metinler sunulmuş, katılımcılardan her metni ne kadar hatırlayacaklarına dair tahminlerde bulunmaları istenmiştir. Bunun yanı sıra katılımcılar bellek tahminleri öncesinde veya sonrasında metne dair doğrulama soruları cevaplamışlardır. Öğrenme aşamasının ardından katılımcılara ipuçlu – hatırlama testi verilmiştir. Araştırmanın sonuçları, doğrulama sorularının zamanlamasının bellek tahminleri üzerinde bir etkisi olmadığını göstermiştir. Buna ek olarak, tutarlı metinler tutarsız metinlere göre daha hızlı okuma, daha yüksek bellek tahminleri ve bellek performansı sağlamıştır.

**Anahtar kelimeler:** Deneyimden Kaynaklanan Yargılar, Metin Tutarlılığı, Öğrenme  
Hakkındaki Yargılar, Üst – Biliş



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## CHAPTER 1

### RESEARCH QUESTION

Thoughts about one's own thoughts and cognition are called metacognition.

Understanding the constraints of memory is a subset topic of metacognition and it is called metamemory. Metamemory studies are interested in one's beliefs and knowledge about memory. In metamemory studies, participants are usually asked to make judgments about their encoding and retrieval processes, as well as trying to regulate and control their studying procedures. There are various methods of acquiring memory predictions from the participants. One of these methods is called judgments of learning (JOL), which is used to evaluate participants' judgments of the likelihood of remembering recently studied items on an upcoming memory test by asking them to rate their memory performance for that specific item on a likert-type scale (Dunlosky & Metcalfe, 2009). One factor that is hypothesized to affect JOL ratings is fluency, ease of processing an item at the time of encoding. This is an experience – based type of cue, because it is related to how one experiences the item at the time of encoding (Koriat, Bjork, Sheffer & Bar, 2004). Most of the time, researchers study these types of experience-based cues through the use of simple materials, such as words presented in

visual (Rhodes & Castel, 2008) or auditory modality (Besken & Mulligan, 2014), or through pictures (Besken, 2016). However, the use of texts in order to investigate JOLs is studied less. The current study aims to examine how ease of processing at encoding may affect experience-based cues such as reaction time, JOLs and the actual memory performance. In order to achieve this, I examined text coherence, because processing texts can be made easier or more difficult through various methods.

The coherence of a text is established by relating the different information units in the text (Sanders & Noordman, 2000). It can be manipulated in several ways such as using different types of connectives (Van – Silfhout, Evers – Vermeul, Mak & Sanders, 2014; Van – Silfhout, Evers – Vermeul & Sanders, 2015; Hall, Maltby, Filik & Paterson, 2016), using the same noun throughout text or not (Hall, Maltby, Filik & Paterson, 2016) and using different semantic relations between sentences in a text (Sanders & Noordman, 2000). The common methodology of the studies that employ texts are typically as follows: Participants read each text, followed by comprehension questions/verification statements (van – Silfhout, Evers – Vermeul, Mak & Sanders, 2014; van – Silfhout, Evers – Vermeul & Sanders, 2015; Hall, Maltby, Filik & Paterson, 2016; and Sanders & Noordman, 2000). These studies typically reveal that the more coherent a text is, the shorter are the reading times and the more the comprehension scores.

There were some studies that examined the effect of text coherence on metacognitive judgments and memory. The text coherence was manipulated in various ways such as changing the sequence of sentences (Carroll & Korukina, 1999), the structure of

sentences (Rawson & Dunlosky, 2002), or giving clues about the situation that makes it either easier or harder to comprehend the sentence (Zaromb, Karpicke & Roediger, 2010) and local cohesion (Ikeda & Kitagami, 2013). The common methodology of these studies is similar to studies that only investigate the effect of text coherence on reading time and comprehension. Participants read the texts, followed by evaluation of their metacognition. Then, participants were asked to remember the texts. Typically, these studies on text coherence and metacognition reveal that coherent texts produce higher JOLs than incoherent texts (Carroll & Korukina, 1999; Rawson & Dunlosky, 2002; Zaromb, Karpicke & Roediger, 2010 and Ikeda & Kitagami, 2013).

In the current study, our main interest is related to the methodology used in text coherence manipulations. Most of the time, in order to see if the participants are paying attention to the materials, researchers ask participants simple verification questions about the text that usually requires a yes or no answer. These questions sometimes come before the JOL-rating and sometimes after JOLs for each item. However, this might be a confound in a study, because the mere act of answering a question more or less easily might change the experience that the participant is having, because answering a questions correctly may lead to misinterpretations about ease of learning and this may reflect on JOL ratings. Thus, the main research of the study is whether the timing of JOLs (verification before/after JOLs) has an effect on the judgments of learning. Moreover, the effect of coherence on reading times, the accuracy of the answer of verification question, judgments of learning and memory performance is investigated.



## CHAPTER 2

### INTRODUCTION

Metacognition represents thoughts about an individual's own thoughts and cognitions. Metacognition consist of three components: metacognitive knowledge, metacognitive monitoring and metacognitive control. Metacognitive knowledge can be described as declarative knowledge (facts, beliefs and episodes that can be stated verbally) about cognition. Metacognitive monitoring helps one's to assess the current state of cognitive activity. Metacognitive control enables one to regulate some feature of a cognitive activity. Thinking about our thoughts and cognition and using this thinking ability to control our thoughts and actions may separate human nature from many other animals (Dunlosky & Metcalfe, 2009).

Metacognition provides the understanding limits of memory, because metacognition is also interested in beliefs and knowledge about memory. The area that specifically focuses on beliefs and knowledge about memory is called metamemory (Dunlosky & Metcalfe, 2009).

Metamemory investigates one's knowledge, monitoring and control of their memory processes. To investigate metamemory, participants are typically asked to answer questions which assess both their encoding and retrieval. One form of these questions is

called judgments of learning (JOLs). JOLs are one's evaluation about the likelihood of recalling recently studied materials on an upcoming memory task. JOLs are assessed in two different ways: immediate JOLs and/or delayed JOLs. In studies that use immediate JOLs, participants make their judgments immediately after studying each item. For delayed JOLs, participants make their judgments about the items after the encoding phase is completed. (Dunlosky & Metcalfe, 2009). According to cue – utilization framework, there are many cues that influence JOLs. These cues can be categorized as intrinsic cues, extrinsic cues and mnemonic cues. Characteristics of items such as perceptual features and associative relatedness are intrinsic cues. Settings of the encoding or retrieval like presentation rate and recall vs. recognition test are extrinsic cues. Internal markers that reveal the one's memorial experience of an item such as familiarity of a cue are mnemonic cues. Research has shown that all these cues impact one's memory predictions to differing extents. Besides the variety of cues, JOL ratings may also depend on one's mnemonic experience during processing an item (experience – based judgments) or one's general knowledge and beliefs about learning and memory (theory – based judgments). Several studies revealed that ease of processing at encoding or retrieval, associated with experience – based judgments, was one of the central cues that may influence the nature of JOL. If the processing an item is easy, the JOL ratings will be higher for that item. One's general beliefs about memory and learning, theory – based judgments, were also one of the factors that can affect the nature of JOL rating. If one had a belief which is one type of items recalled better than others, the JOL ratings will be higher for that item (Rhodes, 2016).

The current study focuses on the relationship between metacognition and coherence of a text. Specifically, I am investigating the effect of coherence on reading time, judgments of learning, accuracy of answers to the verification questions and memory performance on cued recall test.

Coherence in the text is established by connecting the different information units in the text (Sanders & Noordman, 2000). Prior studies have typically investigated the effect of coherence of text on reading times, comprehension, judgments of learning and memory performance. The current study aims to contribute to literature by also looking at the effect of timing of JOL on metamemory ratings. This question is based on the methodologies of the studies. I will give examples from the literature that the studies examined the effect of coherence on reading time and accuracy of answers to the verification questions and describe the methodologies of all studies in detail.

## 2.1 Review of Coherence and Its Effect on Reading Time and Comprehension

Sanders and Noordman (2000) used different types of coherence relation and connectives to manipulate the coherence of texts. They examined the effects of coherence relation and connectives on reading times, verification and memory performance. The coherence relation was manipulated in two different ways: problem-solution relation vs. list relation. Problem-solution relation was established by using elements that express the causal relation between problem and solution. List relation was established by using elements of the additive relation. One group of texts included connectives such as “because”, “also” and “next” whereas rest of the texts did not contain any connectives. For each text, there were three verification statements. For one

of them, participants need to decide whether the sentence identical to the given sentence in text or not. For two of the statements, participants could decide whether the statements are true or false. Participants were asked to read texts and each text was followed by verification statements. Then, participants were asked to write down everything that they could remember about 1 of the 12 texts. After the break, participants were given the rest of the texts and related verification statements. Then, participants were asked to write down everything that they remember of 3 of the 12 texts. The results of the study revealed that problem solution relation leads to faster reading times and faster response time to verification statements and more accurate answers to the verification statements than list – relation texts. Participants remembered problem solution relation better than list relation. The texts with connectives were read faster than the texts with no connectives, but there were no significant differences between the texts with connectives and no connective for verification accuracy, response time for verification statements and memory performance.

Van – Silfhout, Evers – Vermeul, Mak and Sanders (2014) used different types of connectives and layouts to manipulate coherence. They examined the effect of connectives and layout on students' on-line processing (reading time) and the relationship between students' on-line processing and their off-line comprehension scores. To answer their research questions, one group of text in the study involved the additive connectives such as “also” and “moreover” and causal connectives such as “so” and “because”, whereas another group of text did not include any kind of connectives. The layout was manipulated in two different ways: discontinuous layout vs. continuous

layout. In discontinuous layout, sentences were written one under the other. In continuous layout, sentences followed each other. To examine students' off-line comprehension scores, comprehension questions (open – ended inference questions) were used. Participants were asked to read two of the texts which were separated into three slides. Then, participants were asked to answer the comprehension questions; it was followed by a five-minute break, followed a session in identical format. The results of the study revealed that texts with connectives were read faster especially when the text was presented in continuous layout than discontinuous layout. There was a negative linear relationship between reading times and comprehension scores, meaning that participants who read faster had higher comprehension scores.

Van – Silfhout, Evers – Vermeul and Sanders (2015) used different types of connectives and text genre to manipulate coherence of texts. The research question was whether connectives and text genre have an effect on students' online processing (reading time) and their off – line comprehension scores. There were two types of text genre: narrative texts and expository texts. Narrative texts emphasize people's actions and motivations whereas expository texts represent new and abstract ideas and enable us to learn new information without an episode. In this study, all the texts involved additive, temporal and causal connectives. One group of texts involved connectives more than another group of text. The texts which involved more connectives were called explicit whereas the texts which involved fewer connectives were called implicit text. There were four texts: an explicit narrative text, an implicit narrative text, an explicit expository text and an implicit expository text. To measure comprehension, two types of questions (open-

ended bridging questions and sorting questions) were prepared for each text. Open-ended bridging questions required integration of two or more sentences within a paragraph. For sorting questions, participants had to sort a set of sentences from the text in the group. Participants read two texts on two separate sessions, followed by a distractor task. Subsequently, participants were asked to answer open-ended bridging questions and sorting questions about these texts. The results of the study revealed that explicit texts lead to more rereading; however, participants reread explicit texts faster than implicit texts. Participants who read faster had higher comprehension scores than others. There was no interaction between text genre and connectives.

Hall, Maltby, Filik and Paterson (2016) used different types of connectives and referential cohesion to manipulate coherence of the text. They investigated the effect of text cohesion on reading times and comprehension in secondary school children. They designed two experiments. In experiment 1, they investigated the effect of referential cohesion on reading time, comprehension accuracy and response time for comprehension question. There were two different referential cohesion types: high referential cohesion vs. low referential cohesion. In the high referential cohesion condition, noun phrase was repeated in the same way throughout the text. In the low referential cohesion condition, the noun phrase that was used in the first sentence was replaced with a more general referent in the rest of the text. To measure comprehension of participants, comprehension questions were used. There was one comprehension question that could be answered either with “yes” or “no” for each text. The question specifically asked about the information that was mentioned in the third sentence of the

text. Participants were asked to read the text. Then, they were asked to answer the comprehension question about the text; it was followed by a feedback about their answers for three seconds. The results of the experiment 1 revealed that there was no significant difference in reading time for referential cohesion. On the other hand, participants answered comprehension questions about high referential cohesion text more accurately and faster than low referential cohesion text. In experiment 2, the effect of connectives on reading times, comprehension accuracy and response time for comprehension question was examined. In one group of texts, causal connectives like “because” or additive connectives like “and” were used in the third sentence of texts. Rest of the texts did not include any type of connectives. As in experiment 1, comprehension questions that could be answered with “yes” or “no” were used for each text, related to the third sentence of the texts. The procedure of experiment 2 was the same as experiment 1. The results revealed that reading time for the part which was after the connective was lower for texts which included causal connectives than additive connectives and no connective. Participants’ reading time prior to the connectives, comprehension accuracy and response time for comprehension questions did not differ for causal connective, additive connective and no connective conditions.

In all of these studies, coherence was manipulated in several ways. The results of the studies revealed that coherence was one of the factors that affected the reading times and comprehension. In addition to this, the methodology of these studies can be generalized like this: Participants read the text in which coherence was manipulated, followed by verification statements/comprehension question.

## 2.2 Review of Coherence and Its Effect on Metacognitive Judgments and Memory Performance

The subsequent studies which I will review do not only focus on reading times and accuracy of answers to the verification question but on also judgments of learning and memory performance. Therefore, I will give examples from studies that investigated the effect of coherence on judgments of learning and memory performance.

Carroll and Korukina (1999) used the sequence of sentences to manipulate text coherence. They investigated the effect of the sequence of sentences and modality of presentation on ease of learning, judgments of learning and memory performance. There were two different the sequence of sentences: ordered vs. disordered. In ordered texts, the sequence of sentences was organized as in the original text. In disordered texts, the sequence of sentences was rearranged randomly. There were two different modalities of presentation: visual and auditory. In the visual presentation condition, the material was written on cards. In the auditory presentation condition, the material was recorded as soundfiles and participants listened to the material. The experiment was separated into two sessions two weeks apart. In the first session, participants were given the texts to read or listen to. Then, participants were asked to evaluate their ease of learning by rating it on a 6-point scale. It was followed by reading or listening to the same texts one more time. Then, participants were asked to answer twenty questions about text (immediate recall). Reading and listening to texts continued until participants answered each question correctly. Then, participants were asked to evaluate the likelihood of remembering each correct answer by rating it on a 6-point scale. After two weeks, participants came back and were asked the same twenty questions (cued recall test). The



results revealed that modality of presentation did not have a significant effect on ease of learning judgment. However, participants gave higher ease of learning ratings to ordered texts than disordered texts. In the immediate recall, participants remembered the ordered texts better than disordered texts. Participants gave higher judgments of learning rating to questions about ordered texts than disordered texts. Moreover, participants gave higher judgments of learning ratings to auditory presented items than visually presented items. For cued recall, participants remembered the auditorily presented items more than visually presented items. Ordered texts produced better memory performance than disordered texts.

Rawson and Dunlosky (2002) used the structure of sentences within paragraphs to manipulate text coherence. They examined the effect of ease of processing through text coherence on performance predictions, reading time and test performance. There were two different sentence structures within paragraphs: coherent texts vs. incoherent texts. In coherent texts, synonyms and ambiguous terms were replaced with the original terms and given information which was presented in previous sentences was followed by the new information. In incoherent texts, subject – verbs order was reversed and objects nouns and prepositional phrases were placed between subject and verb. Moreover, the given information was not followed by new information in incoherent texts. To measure participants' test performance, eight comprehension questions (multiple – choice questions) were prepared. Four of the questions could be answered with the information in the text. The rest of the question could be answered with making inferences about information in the text. Participants read the text. It was followed by performance

prediction, which is the evaluation of the performance in the later test question on a scale between 0 and 100. Then, participants were asked to answer comprehension questions. After that, they were asked to evaluate their confidence (postdiction performance prediction) about answering correctly the questions between 0 and 100. The results of the study revealed that participants gave higher ratings for performance predictions for coherent texts than incoherent texts. There was no effect of the structure of sentences within paragraphs on postdiction performance predictions. Participants read coherent texts faster than incoherent texts. The structure of sentences within paragraphs did not have an effect on performance scores for comprehension questions.

Zaromb, Karpicke and Roediger (2010) used sentences that had a different level of comprehension with or without clues (learning condition) to make it easy to comprehend the sentence. They investigated the effect of sentence type and learning condition on participants' judgments of learning and memory performance. There were two sentence types: difficult to comprehend vs. easy to comprehend and three learning condition: no – clue condition (no clue was given for sentence) vs. embedded – clue condition (clues were embedded in sentences) vs. delayed – clue condition (sentences were followed by clues after 10 seconds). An example was easy-to-comprehend sentences was “*The colors appeared because the rain stopped (clue: rainbow)*” whereas an example for difficult-to-comprehend sentences was “*The boy spilled his popcorn because lock broke (clue: lion cage)*” (Zaromb, Karpicke and Roediger, 2010, p.553). The sentences were presented auditorily. Participants heard the sentence and the possible clue. Then, participants were asked to make a rating for JOL. The encoding phase was followed by a

5-minute number matching distractor task. Then, participants were asked to write down every sentence that they would remember. The results revealed that participants remembered sentences from delayed – clue condition more than sentences from embedded – clue condition and no – clue condition. Moreover, there were no significant differences between easy to comprehend sentences and difficult to comprehend sentences for delayed – clue condition and embedded – clue condition. Participants gave higher JOL rating to easy-to-comprehend sentences than difficult-to-comprehend sentences. The JOL ratings for delayed – clue condition and embedded clue condition did not differ from each other.

Ikeda and Kitagami (2013) used local cohesion to manipulate text coherence. They investigated the interactive effect of working memory capacity and text difficulty on metacomprehension accuracy, comprehension and reading times. There were two different types of local cohesion: easy – text condition vs. difficult – text condition. In difficult – text condition, the text was presented in their original version. The texts were selected from encyclopedia. In easy – text condition, the level of inference was decreased by inserting conjunctions, changing ambiguous words with specific ones, adding words to strengthen the overlap between adjacent sentences and separating complex sentences. To measure participants' comprehension, multiple choice comprehension questions were used. Some of them were detailed questions which required the memory of information in the text. Rest of the questions were inferential in nature such that they could not be answered only by remembering information in the text, they also required making inferences. Participants were first given an operational

span task to measure their working memory capacity. Then, participants read the text. It was followed by evaluation of their comprehension on a seven-point scale for each text. Last of all, participants answered comprehension questions at testing phase. The results revealed that participants gave higher comprehension rating to easy – text condition than difficult – text condition. Participants’ comprehension test scores were higher for easy – text condition than difficult – text condition. Participants read easy – text faster than difficult – text condition. Participants who had higher working memory capacity predicted their comprehension more accurately than participants who had lower working memory capacity for difficult – text condition. However, the relationship between the working memory capacity and predicting comprehension accurately was not significant for easy – text condition.

In these studies, coherence was manipulated in different ways and the effect of coherence on judgments of learning and memory was examined. The results of the foregoing studies reveal that coherence is one of the factors that affect the judgments of learning and memory performance. In addition to this, the methodology of these studies can be generalized like this: Participants read the text. It was followed by evaluation of their confidence/prediction about their memory performances.

Overall, all these studies revealed that the effect of coherence on reading time (Sanders & Noordman, 2000; Rawson & Dunlosky, 2002; Van – Silfhout, Evers – Vermeul, Mak & Sanders, 2014; Hall, Maltby, Filik & Paterson, 2016), judgments of learning (Carrol & Korukina, 1999; Rawson & Dunlosky, 2002; Zaromb, Karpicke & Roediger, 2010;

Ikeda & Kitagami, 2013) and memory performance (Carrol & Korukina, 1999; Sanders & Noordman, 2000).

### 2.3 Research Questions of the Current Study

Even though all of the foregoing studies focus on text coherence and judgments of learning, these studies usually do not employ verification questions after each paragraph. However, other studies which only focus on the effects of text coherence on reading time and comprehension typically employ verification questions, and this can be easily justified, because experimenters may want to measure comprehension. Yet, the use of verification questions and the timing of these verification questions may change the nature of JOLs because of experience – based judgments. Experience – based judgments depend on mnemonic cues which come from processing of the items (Koriat, Bjork, Sheffer & Bar, 2004). Answering verification question before or after JOL rating may change the nature of JOLs because this may affect the processing an item. For example, if the verification questions are asked before JOLs are made, participants may not use the experience of reading text appropriately while producing JOL, because answering verification question may lead to miscalculations of the experience of reading text. In more depth, answering the question correctly, regardless of whether the text is coherent or not, might increase their JOL ratings. On the contrary, if the verification questions are asked after the JOLs are already made, they will definitely not affect JOLs because they can use the experience of reading text appropriately while producing JOL.

Moreover, those participants who have to answer the verification questions after the JOL ratings will need to retrieve the answer from their long term memory, which might boost

their actual memory performance. However, no studies have investigated how timing of JOLs may affect JOLs or actual memory performance. Thus, the current study aims to manipulate timing of JOLs to see how timing affects memory predictions and actual memory performance. In order to realize this, I created and employed two types of texts: problem – relevant solution texts vs. problem – irrelevant solution texts. In problem – relevant solution texts, the solution that was provided as the last sentence of the text provided a reasonable solution to the problem that was presented in the preceding sentences. In problem – irrelevant solution texts, the solution was not appropriate for the problem that was described in the text. For each text, there was a simple verification question that should be answered with “yes” or “no”. Participants read the texts. The order of JOLs and verification questions were altered depending on the condition. This was followed by a distractor phase and a cued-recall test. The dependent variables were reading times, judgments of learning, the accuracy of the answers to the verification question and memory performance on the cued – recall task.

Experience – based judgments which come from the one’s online processing the items are based on mnemonic cues. Ease of processing an item can reflect on JOL ratings (Koriat, Bjork, Sheffer & Bar, 2004). Presenting JOL rating before or after verification question can mislead the ease of processing an item. In the current study, especially in verification before JOLs condition, answering verification question before JOLs should lead to underestimation of the difficulty of processing for incoherent text and overestimation of the ease of processing for coherent text. It may lead to decrease in difference on JOLs for coherent and incoherent texts for verification before JOL

condition. Thus, I expect there might be no difference in JOLs for coherent texts and incoherent texts for verification before JOLs condition. However, one should use their experience – based judgments appropriately for verification after JOL because participants make their JOL rating after reading the text. In verification after JOL condition, I expect a difference in JOLs for coherent texts and incoherent texts.

In addition to the question of timing on JOLs and memory performance, the effect of text coherence on reading times, the accuracy of the answer to the verification question, judgments of learning and memory performance are also examined. The prior studies show that coherence facilitates reading time (Sanders & Noordman, 2000; Rawson & Dunlosky, 2002; Van – Silfhout, Evers – Vermeul, Mak & Sanders, 2014; Hall, Maltby, Filik & Paterson, 2016), increases judgments of learning (Carrol & Korukina, 1999; Rawson & Dunlosky, 2002; Zaromb, Karpicke & Roediger, 2010; Ikeda & Kitagami, 2013) and actual memory performance (Carrol & Korukina, 1999; Sanders & Noordman, 2000). Thus, I expect problem – relevant solution texts to lead to faster reading, better recall, higher JOL ratings and more accurate answers to the verification questions than problem – irrelevant solution texts.

## CHAPTER 3

### PILOT STUDY – METHOD

#### 3.1 Participants

24 people who are native speakers of Turkish voluntarily participated in the online survey. The online survey was advertised with a post on “Bilkent Duyuru” page on Facebook. All parts of the experiment were conducted according to the guidelines of Bilkent University’s Ethics Committee for behavioral experiments.

#### 3.2 Material and Design

Twenty – eight texts were constructed. There were seven different major topics (traffic, global, workspace, family, sports, student and internet). Each major topic consisted of four texts. Each text comprised of four sentences and a title. Three sentences of each text defined and explained a problem like messaging while driving. These three sentences were called preceding sentences. One of the examples of preceding sentences can be seen below.

*Writing messages while driving car is one of the main reasons of traffic accidents. Writing messages while driving a car decreases the level of attention of the driver towards the traffic and makes it difficult to notice the changes in the environment. Hence, this makes traffic accidents unavoidable.*



These preceding sentences were followed by a final statement, which provided a solution to the problem that was mentioned in the preceding statements. The last sentence was called the target sentence. The target sentence can either be a relevant to the problem mentioned in the text or irrelevant to the problem that mentioned the text. One of the examples of relevant and irrelevant target sentences can be seen below.

*Example of the relevant target sentence. Authorities made a law obligating those drivers who text while driving have their driver licenses be seized for 3 months.*

*Example of the irrelevant target sentence. Authorities made it obligatory for drivers to attend a seminar which explains the harmful consequences of driving under intoxication.*

The title of the text was given according to the preceding sentences.

All texts comprised of six idea units. Preceding sentences had five idea units. The target sentence had one idea unit. To control for the effect of text length on reading, the total number of words in texts was held in similar. The minimum number of words in a text was 45 words. The maximum number of words in a text was 62 words. The average number of words in a text was 53.06 words (SD=4.08).

Half of the texts had the solution that followed logically from the problem. These types of texts were called problem – relevant solution texts. Another half of the texts had the solution that was also about the same general topic (e.g. traffic), but they did not logically follow the preceding sentences. These texts were called problem – irrelevant solution texts. The problem-irrelevant solution texts were constructed by switching the last sentences within the same general topic.

These texts were distributed into four different blocks. In order to ensure that the participants completed the online survey, each participant was given a total of fourteen texts, consisting of 7 problem – relevant solution texts and 7 problem – irrelevant solution texts. Whether the participant received problem –relevant solution or problem – irrelevant solution texts for the same topic was counterbalanced across participants. The order of texts was randomized for each participant.

### 3.3 Procedure

The pilot study was conducted through Qualtrics website. Participants were initially given basic information about the survey and electronically signed the consent form. Next, participants were given instructions. They were informed that they would have to read various texts. After reading each text, they would have to evaluate each text separately for comprehensibility and coherence on a scale from 0 to 100. 0 represented the lowest level of comprehensibility and coherence whereas 100 represented the highest level of comprehensibility and coherence. They were also informed that they could use any number between 0 and 100. After receiving instructions, participants read each text and gave their ratings of comprehensibility and coherence on two separate sliding scales. Finally, when participants finished reading and rating all the texts, participants were given debriefing on the last page of the survey.

## CHAPTER 4

### PILOT STUDY – RESULTS

The descriptive statistics for the comprehensibility and the coherence of each text are presented in Appendix E. The mean comprehensibility for problem – relevant solution text was 89.39 ( $SD=4.94$ ). The mean comprehensibility for problem – irrelevant solution text was 83.96 ( $SD=6.89$ ). The mean coherence for problem – relevant solution text was 81.305 ( $SD=10.45$ ). The mean coherence for problem – irrelevant solution was 54.45 ( $SD=10.31$ ). Two texts out of twenty-eight texts were excluded from the main experiment, because problem – irrelevant solution version of these texts produced higher comprehensibility and coherence rating than problem – relevant solution versions of these texts.

## CHAPTER 5

### METHOD

#### 5.1 Participants

48 students who are native speakers of Turkish voluntarily participated in the experiment. Participants were compensated with course credit (20 course credits GE250/251). The experiment was advertised through an e-mail sent by Bilkent University Administrative Information Systems. Participants who made a request to participate were directed to the Research Participation System website where they could find specific details about the experiment and sign up to participate online:

[https://bilkent.sona-systems.com/exp\\_info.aspx?experiment\\_id=8](https://bilkent.sona-systems.com/exp_info.aspx?experiment_id=8) . All parts of the experiment were conducted according to the guidelines of Bilkent University's Ethics Committee for behavioral experiments.

#### 5.2 Material and Design

The texts that were obtained from the pilot study were used in the main experiment. However, in the main experiment, only six out the seven different major topics (traffic, global, workspace, family, sports and student) were used. The texts about internet were

excluded from the main experiment, because the means of problem – irrelevant solution texts was higher than problem – relevant solution texts in the pilot experiment.

The independent variables of the study were coherence (problem – relevant vs. problem – irrelevant), the answer to the verification question (yes vs. no) and timing of the JOL (before vs. after verification). As also explained in the pilot section, the coherence was manipulated by presenting participants with either relevant or irrelevant solutions in a within-subjects design. Each participant was presented 12 problem – relevant solution text and 12 problem – irrelevant solution. Whether the participants received relevant or irrelevant solution for a certain text was counterbalanced across participants.

The answer to the verification question was manipulated in a within-subjects design. After each text, participants were asked to answer a verification question that was related to the target sentence of the text. The verification question was constructed such that the answer to the question could either be “yes” or “no”. The questions that required a “yes” answer provided the same information mentioned in target sentence of the text. One of the examples of verification questions that should answer with “yes” can be seen below.

*Did authorities make a law obligating those drivers who text while driving have their driver licenses be seized for 3 months?*

The questions that required a “no” answer providing meaningfully different but minor changes mentioned target sentence of the text. One of the examples of verification questions that should be answered with a “no” can be seen below.

*Did authorities make a law obligating those drivers who text while driving have their driver licenses be seized for 9 months?*

For each text, two versions of the verification question that required either a “yes” answer or a “no” answer were constructed. The answer type (yes vs. no) was counterbalanced across participants. For each participant, twelve of the verification questions required “yes” answer and twelve of the verification questions required “no” answer.

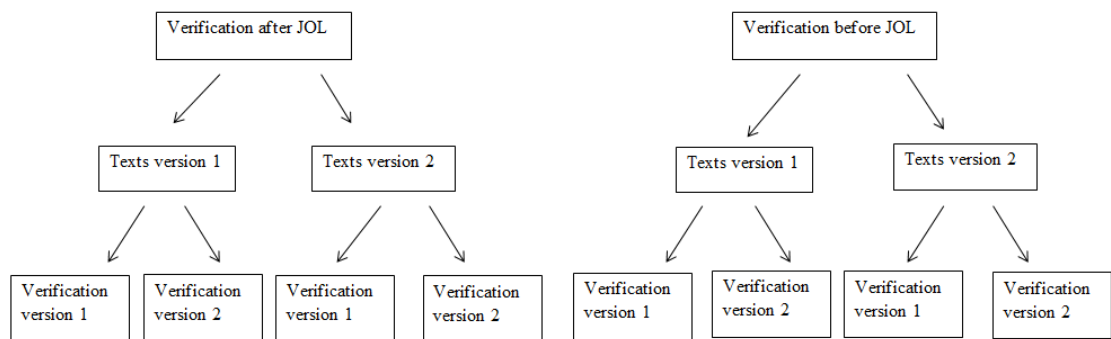


Figure 1. Design of Experiment

The timing of the JOL was manipulated in a between-subjects design. Participants either first answered the verification question followed by the JOLs ratings or they first produced the JOLs ratings followed by answering the verification question.

The dependent variables were reading times (preceding sentences, target sentence, total text), JOL (0 - 100), memory performance (access and detail).

We obtained three different measures for the reading time (reading time for preceding sentences, reading time for the target sentence and total reading time for each text). The reading time for the preceding sentences was calculated by measuring the time that

elapsed from the onset of the title and preceding sentence until participant pressed “ENTER” on the keyboard to proceed to the target sentence. The reading time for the target sentence was obtained by measuring the time that elapsed from the onset of the target sentence until participant pressed “ENTER” on the keyboard to proceed to either verification question or JOL rating according to their condition. The total reading time was calculated adding the reading time for preceding sentences and reading time for target sentence to each other.

The other dependent variable was judgments of learning (JOL). Participants were asked to make a guess how confident they were that they would remember the content of the text when they were given the title of the text in a subsequent memory test. Participants were allowed to use any number between 0 (no confidence that I will remember) and 100 (very high confidence that I will remember) to indicate their JOLs. The timing of the JOL could be either before verification question or after the verification question. For memory performance, we used a cued – recall test. Participants were presented with the titles of each text, and they were asked to remember as many details as they could remember about that text. We have used two different measures to assess their memory performance (access and detail). Access to the topic was calculated by evaluating whether the participant reproduced the text under the correct title or not. If the participants reproduced any correct information, participants’ memory performance for access to the topic was coded as 1. If the participants could not reproduce anything at all about the text, participants’ memory performance for access to the topic was coded as 0. Memory performance for the details of the text was calculated by how much the

participant could reproduce each idea unit used in the text. If the participants could reproduce the exact same idea unit in the text, participants' memory performance for that idea unit was coded as 1. If a participant could not reproduce exact same information but still reproduce some part of the information, participant's memory performance for that idea unit was coded as 0.5. If a participant could not reproduce any information, participant's memory performance was coded as 0. After coding all information that was reproduced by participants, participants' memory performance for details were transformed to a percentage value by dividing the sum score to 6 for participants' memory performance at each text.

### 5.3 Procedure

The experiment was conducted individually for each participant. The experiment lasted approximately 60 -70 minutes. Before starting the experiment, participants read and signed the consent forms. The experiment consisted of three phases: encoding phase, distractor phase and testing phase.

In the encoding phase, participants were told that they would read texts on screen that they would have to remember in the testing phase. First, participants were presented with the title of the text and preceding sentences on the screen. When participants finished reading these, participants were instructed to press "ENTER" key on the keyboard. The pressing of "ENTER" initiated the display of the target sentence on the same display as the title and the preceding sentences. Participants were told to press "ENTER" again to indicate that they have finished reading the text. Depending on the condition (timing of JOL: before vs. after) participants either had to produce a JOL or



answer a verification question. For the verification question display, participants were asked to answer the verification question about the text with “yes” or “no”. If the participants thought that the answer to the question was yes, participants were asked to press “E/e” (EVET) key on the keyboard. If participants thought that the answer to the question was no, participants were asked to press “H/h” (HAYIR) key on the keyboard. For the JOL display, participants were told that they would later be presented with the title of the text, and they would be asked to remember the details as much as possible about that specific text. Participants were asked to estimate their future memory performance for the text on a scale from 0 (no confidence that I will remember) – 100 (very high confidence that I will remember). Participants were allowed to use any number between 0 – 100. After participants wrote down the number by using the keyboard, participants were asked to press “ENTER” key to proceed onto the next text or the verification question, depending on the condition. The order of the texts was randomized for each participant, with the condition that no more than two problem-solution-relevant or irrelevant texts would appear consecutively. Participants practiced with two texts before the actual encoding phase. One of the texts was a problem – relevant solution text and the other one was a problem – irrelevant text. If they had any questions about the procedure, they could ask the experimenter before the actual encoding phase began. When participants completed practice session, participants were asked to complete encoding phase.

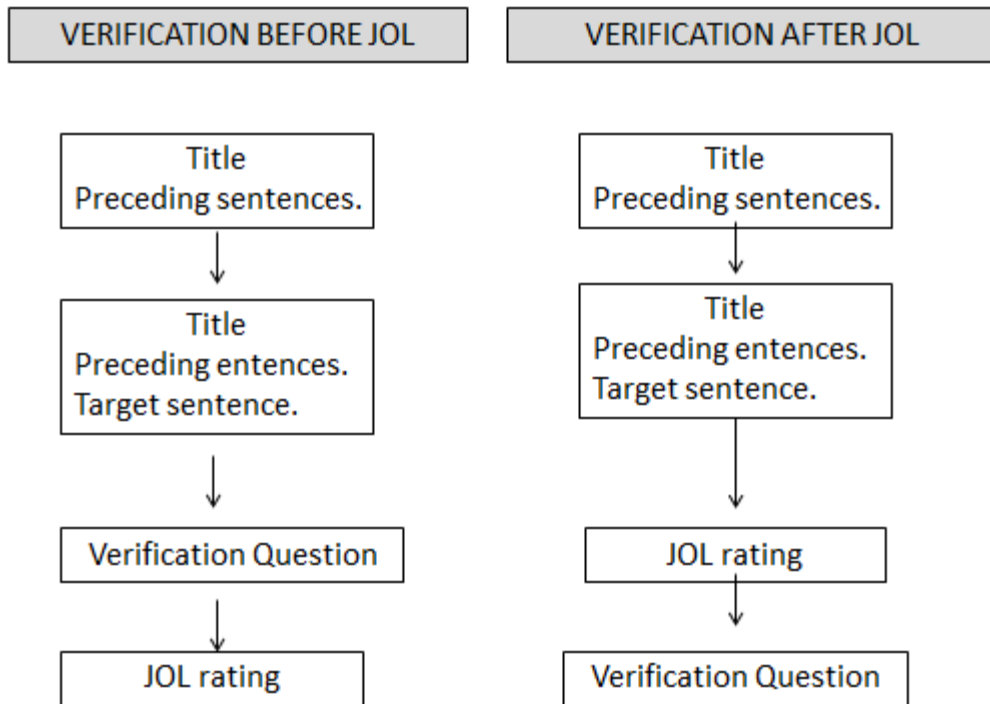


Figure 2. Tasks within Encoding Phase According to Conditions

After the encoding phase, the experiment proceeded onto distractor phase. In the distractor phase, participants were asked to solve simple mathematical problems (addition, subtraction, multiplication and division) for three minutes. Participants were instructed that they could not use a calculator or a paper and pen to solve the question. Each problem was presented on screen individually. Participants used the keyboard to type in their answers and pressed “ENTER” to proceed on to the next problem. The order of the questions was randomized for each participant.

When distractor phase was over, participants proceeded on to the testing phase. During the testing phase, participants were given the title of text as a cue on the screen. When participants saw the title of the text, they were expected to write down everything that they remembered that was related to the title on a paper. After writing all the details that they remembered on a certain title on paper, participants pressed “ENTER” key to see the next title until all the titles that were presented in the encoding phase were displayed on the screen. The order of text titles was randomized for each participant.

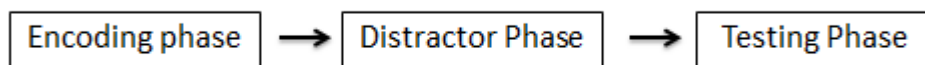


Figure 3. The Sequence of the Phases in Experiment

After the testing phase, participants were debriefed.

## CHAPTER 6

### RESULTS

For all analyses, the alpha level was set at .05. The dependent variables consisted of reading times (preceding sentences, target sentence and total), the accuracy of verification, JOL ratings and recall scores (access and detail). The data were analyzed in two different ways: unconditional and conditionalized upon the accuracy of the answers to the verification questions. In the unconditional analyses, the dependent variables (reading time, JOL and recall) were analyzed regardless of whether the participant answered the verification question correctly or incorrectly for that trial. In conditionalized analyses, only the trials that produced accurate answers were included in the analyses (92% of the data). For all analyses, mixed analyses of variance (ANOVA) were carried out with coherence (problem – relevant solution/problem – irrelevant solution) and the valence of the verification question (yes/no) as the repeated measures and timing of the JOL (JOL before verification / JOL after verification) as the between-subjects variable. Before reporting the unconditional and conditionalized analysis, I will first report the accuracy of answers to the verification question.

## 6.1 The Accuracy of the Answers to the Verification Question

A mixed ANOVA was conducted to compare the accuracy of the answers to the verification question for coherence, the valence of the verification question and timing of JOL. The analyses revealed that there was no significant effect of coherence on the accuracy of verification question,  $F(1,46)=1.15$ ,  $MS=0.01$ ,  $p=0.29$ ,  $\eta^2=0.02$ . There was a significant main effect of the valence of the verification question on the accuracy of verification question,  $F(1,46)=9.66$ ,  $MS=0.12$ ,  $p<0.01$ ,  $\eta^2=0.17$ . Participants answered the verification questions that should be answered with “yes” ( $M=0.94$ ,  $SE=0.01$ ) more accurately than the verification questions that should be answered with “no” ( $M=0.89$ ,  $SE=0.01$ ). There was no significant main effect of timing of JOL on the accuracy of verification question,  $F(1,46)=0.49$ ,  $MS=0.01$ ,  $p=0.49$ ,  $\eta^2=0.01$ . There was no significant interaction between coherence and timing of JOL ( $F(1,46)=0.01$ ,  $MS=0.00$ ,  $p=0.91$ ,  $\eta^2=0.00$ ), no significant interaction between coherence and the valence of the verification question ( $F(1,46)=0.34$ ,  $MS=0.01$ ,  $p=0.57$ ,  $\eta^2=0.01$ ) and no significant interaction between the valence of the verification question and timing of JOL ( $F(1,46)=0.11$ ,  $MS=0.00$ ,  $p=0.92$ ,  $\eta^2=0.00$ ) on the accuracy of the verification question. There was no significant interaction between coherence, the valence of the verification question and timing of JOL on the accuracy of the verification question,  $F(1,46)=0.01$ ,  $MS=0.00$ ,  $p=0.93$ ,  $\eta^2=0.00$ .

## 6.2 Reading Times

The descriptive statistics for reading times (preceding sentences, target sentence and total) for unconditional analyses and conditionalized analyses are presented in Appendix F.

### 6.2.1 Unconditional Analyses

A mixed ANOVA was conducted to compare the reading time for preceding sentences of participants for coherence, the valence of the verification question and timing of JOL.

The analyses revealed that there is no significant main effect of coherence

( $F(1,46)=0.45$ ,  $MS=3526658.66$ ,  $p=0.51$ ,  $\eta^2=0.01$ ), the valence of the verification

question ( $F(1,46)=0.43$ ,  $MS=4051458.28$ ,  $p=0.52$ ,  $\eta^2=0.01$ ) and timing of the JOL

( $F(1,46)=1.67$ ,  $MS=148402454.17$ ,  $p=0.20$ ,  $\eta^2=0.04$ ) on reading time for preceding

sentences. There is no significant interaction between coherence and timing of the JOL

( $F(1,46)=0.20$ ,  $MS=157638.03$ ,  $p=0.89$ ,  $\eta^2=0.00$ ), no significant interaction between

coherence and the valence of the verification question ( $F(1,46)=0.00$ ,  $MS=356.16$ ,

$p=0.99$ ,  $\eta^2=0.00$ ) and no significant interaction between the valence of the answer of

verification question and timing of the JOL ( $F(1,46)=2.60$ ,  $MS=24414904.28$ ,  $p=0.11$ ,

$\eta^2=0.05$ ) on reading time for preceding sentences. There was no significant interaction

between coherence, the valence of the verification question and timing of the JOL

( $F(1,46)=2.58$ ,  $MS=10108327.97$ ,  $p=0.12$ ,  $\eta^2=0.05$ ) on reading time for preceding

sentences.

A mixed ANOVA was conducted to compare the reading time for target sentence of participants for coherence, the valence of the verification question and timing of the

JOL. There was a significant main effect of coherence on reading time for target sentence,  $F(1,46)=39.21$ ,  $MS=141447325.06$ ,  $p<0.01$ ,  $\eta^2=0.46$ . Participants read target sentence of the problem – relevant solution texts ( $M=6588.25$ ,  $SE=286.70$ ) faster than target sentence of the problem – irrelevant solution texts ( $M=8304.88$ ,  $SE=426.331$ ). There was no significant main effect of the valence of the verification question ( $F(1,46)=0.02$ ,  $MS=43998.66$ ,  $p=0.89$ ,  $\eta^2=0.00$ ) on reading time for target sentence. There was no significant main effect of timing of the JOL on reading time for target sentence,  $F(1,46)=0.06$ ,  $MS=1289778.29$ ,  $p=0.81$ ,  $\eta^2=0.00$ . There was no significant interaction between coherence and timing of the JOL ( $F(1,46)=0.60$ ,  $MS=2152544.64$ ,  $p=0.44$ ,  $\eta^2=0.01$ ), interaction between coherence and the valence of the verification question ( $F(1,46)=0.32$ ,  $MS=781128.97$ ,  $p=0.57$ ,  $\eta^2=0.01$ ) and interaction between the valence of the verification question and timing of the JOL ( $F(1,46)=0.22$ ,  $MS=477253.94$ ,  $p=0.64$ ,  $\eta^2=0.01$ ) on reading time for target sentence. There was no significant interaction between coherence, the valence of the verification question and timing of the JOL ( $F(1,46)=1.60$ ,  $MS=3858293.26$ ,  $p=0.21$ ,  $\eta^2=0.03$ ) on reading time for target sentence.

A mixed ANOVA was conducted to compare the total reading time for each text for coherence, the valence of the verification question and timing of the JOL. There was a significant main effect of coherence on total reading time for each text,  $F(1,46)=12.73$ ,  $MS=144194267.30$ ,  $p<0.01$ ,  $\eta^2=0.22$ . Participants read the problem – relevant solution texts ( $M=24067.21$ ,  $SE=990.81$ ) faster than the problem – irrelevant solution texts ( $M=25800.43$ ,  $SE=1029.21$ ). There was no significant main effect of the valence of the

verification question on total reading time for each text,  $F(1,46)=1.13$ ,  $MS=13236825.88$ ,  $p=0.29$ ,  $\eta^2=0.02$ . There was no significant main effect of timing of the JOL on total reading time for each text,  $F(1,46)=0.58$ ,  $MS=107139222.01$ ,  $p=0.45$ ,  $\eta^2=0.01$ . There was no significant interaction between coherence and timing of the JOL ( $F(1,46)=0.00$ ,  $MS=88.02$ ,  $p=1.00$ ,  $\eta^2=0.00$ ) and no significant interaction between coherence and the valence of the verification question ( $F(1,46)=0.01$ ,  $MS=89700.52$ ,  $p=0.92$ ,  $\eta^2=0.00$ ) on total reading time for each text. There was a significant interaction between the valence of the verification question and timing of the JOL on total reading time for each text,  $F(1,46)=5.04$ ,  $MS=59009892.52$ ,  $p=0.03$ ,  $\eta^2=0.99$ . The mean of total reading time for each text with verification questions that should be answered with “yes” and the mean of total reading time for each text with the verification questions that should be answered with “no” were calculated. Then, two paired sample t-tests was conducted to compare the mean of total reading time for each text with verification questions that require “yes” and “no” for both verification question after JOL and verification before JOL condition. The results revealed that there was no significant effect of valence of the verification question on total reading time for each text for verification question after JOL condition,  $t(23)=1.05$ ,  $p=0.31$ ,  $d=0.10$ . Participants total reading time for each text did not differ for the verification question that requires “yes” ( $M=24478.64$ ,  $SD=5901.56$ ) and the verification question that requires “no” ( $M=23895.00$ ,  $SD=6461.05$ ) for verification question after JOL condition. For verification question before JOL condition, there was no significant effect of the valence of verification question on total reading time for each text,  $t(23)=-2.00$ ,  $p=0.06$ ,  $d=0.22$ .



Participants' total reading time for each text did not differ for the verification question that requires "yes" ( $M=24863.88$ ,  $SD=6862.95$ ) and the verification question that requires "no" ( $M=26497.78$ ,  $SD=8523.38$ ) for verification question before JOL condition. There was a significant interaction between coherence, the valence of the verification question and timing of the JOL on total reading time for each text,  $F(1,46)=5.05$ ,  $MS=42552975.63$   $p=0.03$   $\eta^2=0.10$ . Participants read the problem – relevant solution text with the verification question that requires "yes" at verification question after the JOL ( $M=23162.19$ ,  $SE=1426.17$ ) faster than all other conditions. Participants read the problem – irrelevant solution texts with the verification question that requires "no" at verification question before JOL condition ( $M=27856.10$ ,  $SE=1737.751$ ) slower than all other conditions.

### 6.2.2. Conditional Analysis

In conditionalized analyses, only trials that produced accurate answers to verification questions were included (92% of the trials). A mixed ANOVA was conducted to compare the reading time for preceding sentences for coherence, the valence of the verification question and timing of the JOL. The analyses revealed that there is no significant main effect of coherence ( $F(1,46)=0.14$ ,  $MS=1240507.76$ ,  $p=0.72$ ,  $\eta^2=0.00$ ), the valence of the verification question ( $F(1,46)=0.10$ ,  $MS=972563.67$ ,  $p=0.76$ ,  $\eta^2=0.00$ ) and effect of timing of the JOL ( $F(1,46)=1.76$ ,  $MS=154276894.08$ ,  $p=0.19$ ,  $\eta^2=0.04$ ) on reading time for preceding sentences. There was no significant interaction between coherence and the valence of the verification question ( $F(1,46)=0.09$ ,  $MS=363225.01$ ,  $p=0.77$ ,  $\eta^2=0.00$ ), interaction between coherence and timing of the JOL ( $F(1,46)=0.11$ ,

$MS=1010360.33$ ,  $p=0.74$ ,  $\eta^2=0.00$ ), interaction between the valence of the verification question and timing of the JOL ( $F(1,46)=3.45$ ,  $MS=34644309.19$ ,  $p=0.07$ ,  $\eta^2=0.07$ ) on reading time for preceding sentences. There was no significant interaction between coherence, the valence of the verification question and timing of the JOL,  $F(1,46)=1.76$ ,  $MS=7328907.00$ ,  $p=0.19$ ,  $\eta^2=0.04$  on reading time for preceding sentences.

A mixed ANOVA was conducted to compare the reading time for target sentence for coherence, the valence of the verification question and timing of the JOL. There was a significant main effect of coherence on reading time for target sentence,  $F(1,46)=37.66$ ,  $MS=162081281.54$ ,  $p<0.01$ ,  $\eta^2=0.45$ . Participants read target sentence of the problem – relevant solution texts ( $M=6602.10$ ,  $SE=275.82$ ) faster than target sentence of the problem – irrelevant solution texts ( $M=8439.68$ ,  $SE=437.56$ ). There was no significant main effect of the valence of the verification question ( $F(1,46)=0.00$ ,  $MS=329.44$ ,  $p=0.99$ ,  $\eta^2=0.00$ ) on reading time for target sentence. There was no significant main effect of timing of the JOL on reading time for target sentence,  $F(1,46)=0.02$ ,  $MS=441264.69$ ,  $p=0.89$ ,  $\eta^2=0.00$ . There were no significant interactions between coherence and timing of the JOL ( $F(1,46)=0.61$ ,  $MS=2643402.67$ ,  $p=0.44$ ,  $\eta^2=0.13$ ), or between coherence and the valence of the verification question ( $F(1,46)=0.38$ ,  $MS=9332349.06$ ,  $p=0.54$ ,  $\eta^2=0.01$ ). There was no significant interaction between the valence of the verification question and timing of the JOL ( $F(1,46)=0.08$ ,  $MS=203222.72$ ,  $p=0.78$ ,  $\eta^2=0.00$ ) on reading time for target sentence. There was no significant interaction between coherence, the valence of the verification question and

timing of the JOL on reading time for target sentence,  $F(1,46)=2.07$ ,  $MS=5023469.75$ ,  $p=0.16$ ,  $\eta^2=0.04$ .

A mixed ANOVA was conducted to compare the total reading time for each text for coherence, the valence of the verification question and timing of the JOL. There was a significant main effect of coherence on total reading time for each text,  $F(1,46)=10.19$ ,  $MS=121175551.88$ ,  $p<0.01$ ,  $\eta^2=0.18$ . Participants read the problem – relevant solution texts ( $M=24188.71$ ,  $SE=981.43$ ) faster than the problem – irrelevant solution texts ( $M=25777.58$ ,  $SE=1034.16$ ). There was no significant main effect of the valence of the verification question on total reading time for each text,  $F(1,46)=0.49$ ,  $MS=5923831.38$ ,  $p=0.49$ ,  $\eta^2=0.01$ . There was no significant main effect of timing of the JOL on total reading time for each text,  $F(1,46)=0.76$ ,  $MS=139053400.08$ ,  $p=0.39$ ,  $\eta^2=0.02$ . There were no significant interaction between coherence and timing of the JOL ( $F(1,46)=0.04$ ,  $MS=517193.88$ ,  $p=0.84$ ,  $\eta^2=0.00$ ) and no interaction between coherence and the valence of the verification question ( $F(1,46)=0.13$ ,  $MS=1087212.00$ ,  $p=0.72$ ,  $\eta^2=0.00$ ) on total reading time for each text. There was a significant interaction between the valence of the verification question and timing of the JOL on total reading time for each text,  $F(1,46)=5.93$ ,  $MS=71881851.26$ ,  $p=0.02$ ,  $\eta^2=0.11$ . The mean of total reading time for each text with verification questions that should be answered with “yes” and the mean of total reading time for each text with the verification questions that should be answered with “no” were calculated. Then, two paired sample t-tests was conducted to compare the mean of total reading time for each text with verification questions that requires “yes” and “no” for both verification question after JOL and verification before JOL

condition. The results revealed that there was no significant effect of the valence of the verification question on total reading time for each text for verification question after JOL condition,  $t(23)=1.61$ ,  $p=0.12$ ,  $d=0.14$ . Participants' total reading time for each text did not differ for the verification question that requires "yes" ( $M=24568.34$ ,  $SD=5920.25$ ) and the verification question that requires "no" ( $M=23695.90$ ,  $SD=6603.33$ ) for verification question after JOL condition. For verification before JOL condition, there was no significant effect of the valence of verification question on total reading time for each text,  $t(23)=-1.86$ ,  $p=0.08$ ,  $d=0.21$ . Participants total reading time for each text did not differ for the verification question that requires "yes" ( $M=25046.65$ ,  $SD=6754.69$ ) and the verification question that requires "no" ( $M=26621.69$ ,  $SD=8431.60$ ) for verification question before JOL condition. The analyses revealed that there was a significant interaction between coherence, the valence of the verification question and timing of the JOL on total reading time for each text,  $F(1,46)=5.76$ ,  $MS=47515230.19$ ,  $p=0.02$ ,  $\eta^2=0.11$ . Participants read the problem – relevant solution text with the verification question that requires "yes" for verification question after JOL ( $M=23149.29$ ,  $SE=1415.80$ ) the fastest than other conditions. Participants read the problem – irrelevant solution texts with the verification question that requires "no" for verification question before JOL condition ( $M=27786.44$ ,  $SE=1740.37$ ) the slowest than other conditions.

### 6.3 Judgments of Learning

Both in unconditional analyses and conditionalized analyses, trials in which the participant did not enter the JOL rating or mistyped a number above 100 were excluded (1% of the trials).

Table 1. Mean and Standard Error of the Mean (in Parentheses) for Judgments of Learning for Unconditional Analyses and Conditionalized Analyses

	Judgments of Learning	
	Coherent	Incoherent
Unconditional	78.44(2.10)	74.27(2.36)
Conditionalized	78.72(2.17)	74.65(2.44)

#### 6.3.1 Unconditional Analyses

A mixed ANOVA was conducted to compare JOL ratings for coherence, the valence of the verification question and timing of the JOL. There was a significant main effect of coherence on JOL rating,  $F(1,46)=23.38$ ,  $MS=832.36$ ,  $p<0.001$ ,  $\eta^2=0.34$ . Participants gave higher JOL ratings to the problem – relevant solution texts ( $M=78.44$ ,  $SE=2.12$ ) than the problem – irrelevant solution texts ( $M=74.27$ ,  $SE=2.38$ ). There were no significant main effect of the valence of the verification question ( $F(1,46)=0.00$ ,  $MS=0.05$ ,  $p=0.97$ ,  $\eta^2=0.00$ ) on JOL rating. There was no significant main effect of timing of the JOL on JOL rating,  $F(1,46)=0.30$ ,  $MS=281.22$ ,  $p=0.59$ ,  $\eta^2=0.01$ . There were no significant interaction between coherence and timing of the JOL ( $F(1,46)=0.34$ ,  $MS=12.15$ ,  $p=0.56$ ,  $\eta^2=0.01$ ), interaction between coherence and the valence of the

verification question ( $F(1,46)=1.75$ ,  $MS=62.75$ ,  $p=0.19$ ,  $\eta^2=0.04$ ) and interaction between the valence of the verification question and timing of the JOL ( $F(1,46)=0.63$ ,  $MS=19.83$ ,  $p=0.43$ ,  $\eta^2=0.01$ ) on JOL rating. There was no significant interaction between coherence, the valence of the verification question and timing of the JOL on JOL rating,  $F(1,46)=1.49$ ,  $MS=53.17$ ,  $p=0.23$ ,  $\eta^2=0.03$ .

### 6.3.2 Conditional Analyses

In conditionalized analyses, only trials that produced accurate answers to verification questions were included (91% of the data). A mixed ANOVA was conducted to compare JOL rating of participants for coherence, the valence of the verification question and timing of the JOL. There was a significant main effect of coherence on JOL rating,  $F(1,46)=23.72$ ,  $MS=796.87$ ,  $p<0.01$ ,  $\eta^2=0.34$ . Participants gave higher JOL rating to the problem – relevant solution texts ( $M=78.72$ ,  $SE=2.19$ ) than target sentence of the problem – irrelevant solution texts ( $M=74.65$ ,  $SE=2.47$ ). There was no significant main effect of the valence of the verification question ( $F(1,46)=0.26$ ,  $MS=5.86$ ,  $p=0.61$ ,  $\eta^2=0.01$ ) on JOL rating. There was no significant main effect of timing of the JOL on JOL rating,  $F(1,46)=0.10$ ,  $MS=100.03$ ,  $p=0.76$ ,  $\eta^2=0.00$ . There were no significant interaction between coherence and timing of the JOL ( $F(1,46)=0.25$ ,  $MS=8.47$ ,  $p=0.62$ ,  $\eta^2=0.01$ ), interaction between coherence and the valence of the verification question ( $F(1,46)=1.40$ ,  $MS=52.07$ ,  $p=0.24$ ,  $\eta^2=0.03$ ) and interaction between the valence of the verification question and timing of the JOL ( $F(1,46)=0.42$ ,  $MS=9.46$ ,  $p=0.52$ ,  $\eta^2=0.02$ ) on JOL rating. There was no significant interaction between coherence, the valence of

the verification question and timing of the JOL on JOL rating,  $F(1,46)=0.18$ ,  $MS=6.84$ ,  $p=0,67$ ,  $\eta^2=0,00$ .

#### 6.4 Memory Performance

Two separate memory performance measures, access and detail, are analyzed. The details for the coding of these measures are explained in materials and design section. In addition to those, all coding was done by two independent coders. When they finished coding of 48 participants' recall sheets individually, they compared their coding with each other for each participant. If there were some disagreements, two coders resolved the disagreement through discussion. There were no unresolved cases for either measure. The descriptive statistics for memory performance (access and detail) for unconditional analyses and conditionalized analyses are presented in Appendix G.

##### 6.4.1. Unconditional Analyses

A mixed ANOVA was conducted to compare participants' memory performance for access to the text for coherence, the valence of the verification question and timing of the JOL. There was a significant main effect of coherence on memory performance for access to the text,  $F(1,46)=13.82$ ,  $MS=0.37$ ,  $p<0.01$ ,  $\eta^2=0.24$ . Participants had more access when the text was a problem – relevant solution text ( $M=0.89$ ,  $SE=0.15$ ) than when it was a problem – irrelevant solution text ( $M=0.80$ ,  $SE=0.03$ ). There was a significant main effect of the valence of the verification question on memory performance for the topic of the text,  $F(1,46)=4.54$ ,  $MS=0.08$ ,  $p=0.04$ ,  $\eta^2=0.09$ . Participants remembered the topic of text with verification question that requires “no” ( $M=0.86$ ,  $SE=0.02$ ) more than the topic of the text with verification question that

requires “yes” ( $M=0.82$ ,  $SE=0.03$ ). There was no significant main effect of timing of the JOL on memory performance for access to the text,  $F(1,46)=0.23$ ,  $MS=0.02$ ,  $p=0.64$ ,  $\eta^2=0.01$ . There were no significant interaction between coherence and timing of the JOL ( $F(1,46)=0.94$ ,  $MS=0.03$ ,  $p=0.34$ ,  $\eta^2=0.02$ ) and interaction between coherence and the valence of the verification question ( $F(1,46)=0.00$ ,  $MS=0.00$ ,  $p=0.97$ ,  $\eta^2=0.00$ ) on memory performance for access to the text. There was a significant interaction between the valence of the verification question and timing of the JOL on memory performance for access to the text,  $F(1,46)=8.29$ ,  $MS=0.15$ ,  $p=0.01$ ,  $\eta^2=0.16$ . The mean of memory performance for access to the text with verification questions that require “yes” and the mean of memory performance for access to the text with the verification questions that require “no” were calculated. Then, two paired sample t-test were conducted to compare the mean of memory performance for access to the text with verification questions that require “yes” and “no” for both verification question after JOL and verification before JOL condition. The results revealed that there was a significant effect of the valence of the verification question on memory performance for access to the text for verification question after JOL condition,  $t(23)=-3.90$ ,  $p<0.01$ ,  $d=0.68$ . Participants remembered the topic of the text with the verification question that requires “no” ( $M=0.88$ ,  $SD=0.11$ ) better than the topic of the text with the verification question that requires “yes” ( $M=0.79$ ,  $SD=0.19$ ) for verification question after JOL condition. For verification before JOL condition, there was no significant effect of the valence of verification question on memory performance for access to the text,  $t(22)=0.48$ ,  $p=0.63$ ,  $d=0.11$ . Participants’ memory performance for access to the text did not differ for the verification question



that requires “yes” ( $M=0.86$ ,  $SD=0.15$ ) and the verification question that requires “no” ( $M=0.84$ ,  $SD=0.13$ ) for verification question before JOL condition. There was no significant interaction between coherence, the valence of the verification question and timing of the JOL on memory performance for the topic of the text,  $F(1,46)=2.79$ ,  $MS=0.04$ ,  $p=0.11$ ,  $\eta^2=0.06$ .

A mixed ANOVA was conducted to compare participants’ memory performance for details of the text for coherence, the valence of the verification question and timing of the JOL. There was a significant main effect of coherence on memory performance for details of the text,  $F(1,46)=40.10$ ,  $MS=0.33$ ,  $p<0,01$ ,  $\eta^2=0.47$ . Participants remembered the details of the problem – relevant solution texts ( $M=0.27$ ,  $SE=0.01$ ) more than the details of the problem – irrelevant solution texts ( $M=0.19$ ,  $SE=0.02$ ). There was no significant main effect of the valence of the verification question on memory performance for details of the text,  $F(1,46)=0.42$ ,  $MS=0.00$ ,  $p=0.52$ ,  $\eta^2=0.01$ . There was no significant main effect of timing of the JOL on memory performance for details of the text,  $F(1,46)=0.31$ ,  $MS=0.01$ ,  $p=0.58$ ,  $\eta^2=0.01$ . There were no significant interaction between coherence and timing of the JOL ( $F(1,46)=0.13$ ,  $MS=0.00$ ,  $p=0.72$ ,  $\eta^2=0.00$ ) and interaction between coherence and the valence of the verification question ( $F(1,46)=1.82$ ,  $MS=0.01$ ,  $p=0.18$ ,  $\eta^2=0.04$ ) on memory performance for details of the text. There was a significant interaction between the valence of the verification question and timing of the JOL on memory performance for details of the text,  $F(1,46)=11.15$ ,  $MS=0.03$ ,  $p<0.01$ ,  $\eta^2=0.20$ . The mean of memory performance for details of the text with verification questions that require “yes” and the mean of memory performance for

details of the text with the verification questions that require with “no” were calculated. Then, two paired sample t-tests were conducted to compare the mean of memory performance for details of the text with verification questions that require “yes” and “no” for verification question after JOL and verification before JOL conditions. The results revealed that there was a significant effect of the valence of the verification question on memory performance for details of the text for verification question after JOL condition,  $t(23)=-2.61, p=0.02, d=0.34$ . Participants remembered the details of the text with the verification question that requires “no” ( $M=0.24, SD=0.09$ ) better than the details of the text with the verification question that requires “yes” ( $M=0.21, SD=0.10$ ) for verification question after JOL condition. For verification before JOL condition, there was a significant effect of the valence of the verification question on memory performance for details of the text for verification question before JOL condition,  $t(23)=2.09, p=0.05, d=0.23$ . Participants remembered the details of the text with the verification question that requires “yes” ( $M=0.25, SD=0.10$ ) better than the details of the text with the verification question that requires “no” ( $M=0.22, SD=0.09$ ) for verification question before JOL condition. There was no significant interaction between coherence, the valence of the verification question and timing of the JOL on memory performance for details of the text,  $F(1,46)=0.39, MS=0.00, p=0.54, \eta^2=0.01$ .

#### 6.4.2 Conditional Analyses

In conditionalized analyses, only trials that produced accurate answers to verification questions were included (92% of the trials). A mixed ANOVA was conducted to compare participants’ memory performance for access to the text for coherence, the

valence of the verification question and timing of the JOL. There was a significant main effect of coherence on memory performance for access to the text,  $F(1,46)=14.12$ ,  $MS=0.39$ ,  $p<0.01$ ,  $\eta^2=0.24$ . Participants had more access to the problem – relevant solution texts ( $M=0.89$ ,  $SE=0.02$ ) than the topic of the problem – irrelevant solution texts ( $M=0.80$ ,  $SE=0.03$ ). There was no significant main effect of the valence of the verification question on memory performance for the access to the text,  $F(1,46)=3.66$ ,  $MS=0.07$ ,  $p=0.06$ ,  $\eta^2=0.07$ . There was no significant main effect of timing of the JOL on memory performance for access to the text,  $F(1,46)=0.04$ ,  $MS=0.00$ ,  $p=0.85$ ,  $\eta^2=0.00$ . There was no significant interaction between coherence and timing of the JOL,  $F(1,46)=0.11$ ,  $MS=0.00$ ,  $p=0.74$ ,  $\eta^2=0.00$ , and no interaction between coherence and the valence of the verification question ( $F(1,46)=0.38$ ,  $MS=0.01$ ,  $p=0.54$ ,  $\eta^2=0.01$ ) on memory performance for access to the text. There was a significant interaction between the valence of the verification question and timing of the JOL on memory performance for access to the text,  $F(1,46)=10.05$ ,  $MS=0.20$ ,  $p<0.01$ ,  $\eta^2=0.18$ . The mean of memory performance for access to the text with verification questions that require “yes” and the mean of memory performance for access to the text with the verification questions that require “no” were calculated. Then, two paired sample t-tests were conducted to compare the mean of memory performance for access to the text with verification questions that require “yes” and “no” for both verification question after JOL and verification before JOL conditions. The results revealed that there was significant effect of the valence of the verification question on memory performance for access to the text for verification question after JOL condition,  $t(23)=-4.07$ ,  $p<0.01$ ,  $d=0.73$ . Participants remembered the

topic of the text with the verification question that requires “no” ( $M=0.89$ ,  $SD=0.10$ ) better than the topic of the text with the verification question that requires “yes” ( $M=0.79$ ,  $SD=0.19$ ) for verification question after JOL condition. For verification question before JOL condition, there was no significant effect of the valence of the verification question on memory performance for access to the text for verification question before JOL condition,  $t(23)=0.81$ ,  $p=0.43$ ,  $d=0.18$ . Participants’ memory performance for access to the text did not differ for the verification question that requires “yes” ( $M=0.86$ ,  $SD=0.16$ ) and the verification question that requires “no” ( $M=0.83$ ,  $SD=0.14$ ) for verification question before JOL condition. There was no significant interaction between coherence, the valence of the verification question and timing of the JOL on memory performance for access to the text,  $F(1,46)=3.11$ ,  $MS=0.05$ ,  $p=0.09$ ,  $\eta^2=0.06$ .

A mixed ANOVA was conducted to compare participants’ memory performance for details of the text for coherence, the valence of the verification question and timing of the JOL. There was a significant main effect of coherence on memory performance for details of the text,  $F(1,46)=36.55$ ,  $MS=0.33$ ,  $p<0.01$ ,  $\eta^2=0.44$ . Participants remembered details of the problem – relevant solution texts ( $M=0.27$ ,  $SE=0.01$ ) more than the details of the problem – irrelevant solution texts ( $M=0.19$ ,  $SE=0.02$ ). There was no significant main effect of the valence of the verification question on memory performance for details of the text,  $F(1,46)=0.53$ ,  $MS=0.00$ ,  $p=0.47$ ,  $\eta^2=0.01$ . There was no significant effect of timing of the JOL on memory performance for details of the text,  $F(1,46)=0.34$ ,  $MS=0.01$ ,  $p=0.56$ ,  $\eta^2=0.01$ . There was no significant interaction between coherence and

timing of the JOL ( $F(1,46)=0.38$ ,  $MS=0.00$ ,  $p=0.54$ ,  $\eta^2=0.01$ ) and interaction between coherence and the valence of the verification question ( $F(1,46)=2.14$ ,  $MS=0.01$ ,  $p=0.15$ ,  $\eta^2=0.04$ ) on memory performance for details of the text. There was a significant interaction between the valence of the verification question and timing of the JOL on memory performance for details of the text,  $F(1,46)=11.01$ ,  $MS=0.03$ ,  $p<0.01$ ,  $\eta^2=0.19$ . The mean of memory performance for details of the text with verification questions that require “yes” and the mean of memory performance for details of the text with the verification questions that require “no” were calculated. Then, two paired sample t-tests were conducted to compare the mean of memory performance for details of the text with verification questions that require “yes” and “no” for both verification question after JOL and verification before JOL conditions. The results revealed that there was a significant effect of the valence of the verification question on memory performance for details of the text for verification question after JOL condition,  $t(23)=-2.90$ ,  $p=0.01$ ,  $d=0.35$ . Participants remembered the details of the text with the verification question that requires “no” ( $M=0.24$ ,  $SD=0.09$ ) better than the details of the text with the verification question that requires “yes” ( $M=0.20$ ,  $SD=0.10$ ) for verification question after JOL condition. For verification question before JOL condition, there was no significant effect of the valence of verification question on memory performance for details of the text for verification question before JOL condition,  $t(23)=1.81$ ,  $p=0.08$ ,  $d=0.24$ . Participants memory performance for details of the text did not differ for the verification question that requires “yes” ( $M=0.24$ ,  $SD=0.10$ ) and the verification question that requires “no” ( $M=0.22$ ,  $SD=0.09$ ) for verification question before JOL condition.

There was no significant interaction between coherence, the valence of the verification question and timing of the JOL on memory performance for details of the text,  $F(1,46)=0.51$ ,  $MS=0.00$ ,  $p=0.48$ ,  $\eta^2=0.01$ .

## 6.5 Additional Analyses

Since the target sentence of one problem - irrelevant solution text was the actual solution to another problem – irrelevant solution text, some of the time when participants were given a title as a cue, they reconstructed the text to be problem – relevant solution text. Thus, to analyze how often participants remembered the actual solution rather than the irrelevant target sentence, an additional analysis was conducted. Only the trials in which the participants were presented with the problem – irrelevant solution texts were included (50% of the trials.). The coding process was same as coding for memory performances for details of the text.

### 6.5.1. Unconditional Analyses

There were 576 data points which consisted of problem – irrelevant solution texts. The mean for participant's memory performance for an actual solution rather than irrelevant target sentence was 0.21 ( $SD=0.35$ ). In 11.6% of the trials, participants remembered the actual solution than the irrelevant target sentence completely. In 18.8% of the trials, participants remembered some portion of the actual solution than the irrelevant target sentence. In 69.6% of the trials, participants could not remember the actual solution than irrelevant target sentence.

A mixed ANOVA was conducted to compare participant's memory performance for an actual solution than irrelevant target sentence for the valence of the verification question

and timing of JOL. There was no significant main effect of the valence of the verification question ( $F=1.22$ ,  $MS=0.01$ ,  $p=0.28$ ,  $\eta^2=0.03$ ) and timing of JOL ( $F=2.87$ ,  $MS=0.15$ ,  $p=0.10$ ,  $\eta^2=0.06$ ) on participant's memory performance for actual solution than irrelevant target sentence. There was no significant interaction between the valence of the verification question and timing of JOL on participant's memory performance for actual solution than the irrelevant target sentence,  $F=1.22$ ,  $MS=0.01$ ,  $p=0.28$ ,  $\eta^2=0.03$ .

### 6.5.2 Conditional Analyses

In conditionalized analyses, only trials that produced accurate answers to verification questions were included (46% of the trials). There were 525 data which consists of problem – irrelevant solution texts. The mean for participant's memory performance for an actual solution than irrelevant target sentence was 0.216 ( $SD=0.35$ ). In 12.6% of the trials, participants remembered the actual solution completely rather than irrelevant target sentence. In 18.1% of the trials, participants remembered some portion of the actual solution rather than the irrelevant target sentence. In 69.3% of the trials, participants could not remember the actual solution than the irrelevant target sentence. A mixed ANOVA was conducted to compare participant's memory performance for an actual solution than irrelevant target sentence for the valence of the verification question and timing of JOL. There was no significant main effect of the valence of the verification question ( $F=1.76$ ,  $MS=0.03$ ,  $p=0.19$ ,  $\eta^2=0.04$ ) and timing of JOL ( $F=2.07$ ,  $MS=0.12$ ,  $p=0.16$ ,  $\eta^2=0.04$ ) on participant's memory performance for actual solution than irrelevant target sentence. There was no significant interaction between the valence

of the verification question and timing of JOL on participant's memory performance for actual solution than irrelevant target sentence,  $F=1.14$ ,  $MS=0.02$ ,  $p=0.24$ ,  $\eta^2=0.03$ .

## 6.6 Mediation Analyses

Multilevel regression analyses were conducted by using R statistical package lme4 (Bates, Maechler, Bolker & Walker, 2015; R Core Team, 2013) in order to reveal whether JOLs for the current experiment was mediated by the objective measures of fluency (reading time for the target sentence and reading time for the whole text). The trials in which participant did not enter the JOL rating, mistyped a number above 100 or in which participants answered verification questions incorrectly were excluded from analyses (9% of the trials). Reading time for the target sentence and reading time for the whole text were natural – log transformed to normalize the reading time data. Two mixed linear models (Level 1: items; Level 2: participants) with participants as random effects, and coherence and reading time as fixed effects were fixed separately for both dependent measures. In the first model, reading time was regressed on coherence. In the second model, JOLs were regressed on coherence and reading time. The unstandardized co-efficients for direct effects of coherence on reading time measures and the direct effects of coherence on JOLs for reading time for target sentence (Figure 4) and total reading time for each text (Figure 5) were presented in the upper portion of Figure 4 and Figure 5. As can be seen, all effects were significant.

Mediation analyses were carried out by using R package mediation (Tingley, Yamamoto, Hirose, Keele & Imai, 2014; for underlying methods, see Imai, Keele & Tingley, 2010). To reveal whether participants used their experience – based judgments



while JOL rating, the indirect effects of coherence on JOL was calculated and to reveal whether participants used their theory – based judgments while JOL rating, the direct effects of coherence on JOLs was calculated. The indirect effects of coherence on JOLs mediated by reading time for the target sentence and their 95% CIs were estimated through the Tingley et al. (2014) nonparametric bootstrapping procedure with 5,000 bootstrap samples for this and all following analyses. For reading time for target sentence mediational analyses, the direct effect of coherence on JOLs was 3.28 (95% CI [1.48, 5.11],  $p < 0.001$ ). The indirect effect of coherence on JOLs was 0.78 (95% CI [0.35, 1.28],  $p < 0.001$ ). The proportion of total effect of coherence on JOLs mediated by reading time for the target sentence was 0.19 (95% CI [0.08, 0.39],  $p < 0.001$ ).

For total reading time for each text mediational analyses, the direct effect of coherence on JOLs was 3.56 (95% CI [1.83, 5.27],  $p < 0.001$ ). The indirect effect of coherence on JOLs was 0.48 (95% CI [0.20, 0.84],  $p < 0.001$ ). The proportion of total effect of encoding condition on JOLs mediated by total reading time for each text was 0.12 (95% CI [0.05, 0.25],  $p < 0.001$ ).

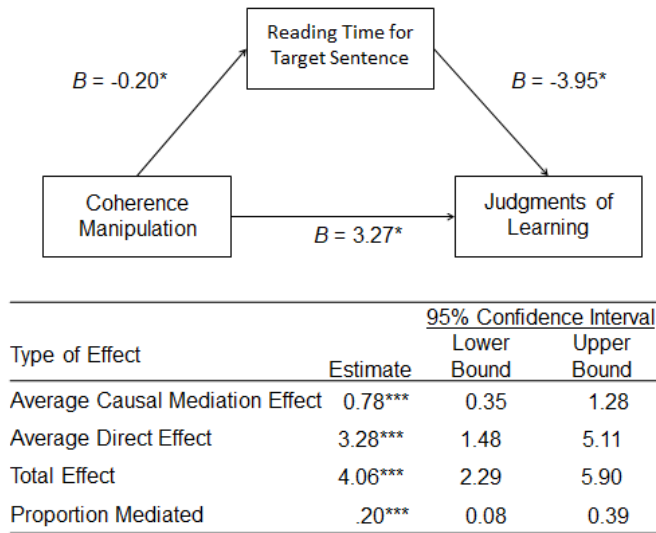


Figure 4. Reading Time for Target Sentence Mediation Analyses

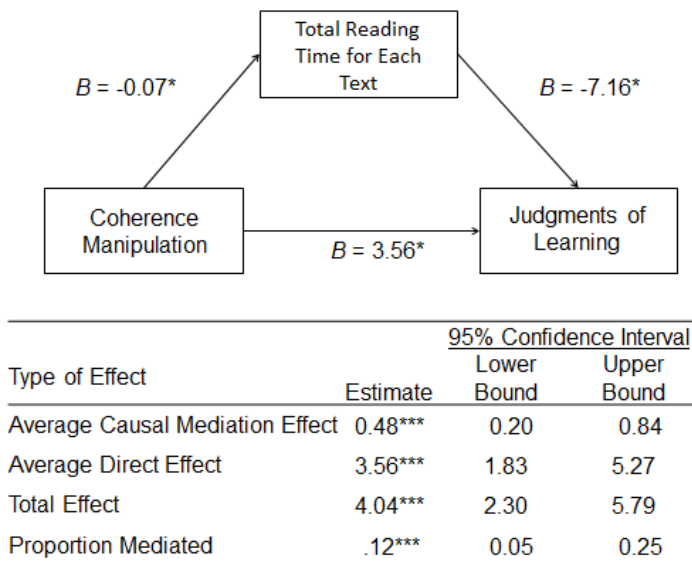


Figure 5. Total Reading Time for Each Text Mediation Analyses

## CHAPTER 7

### DISCUSSION

In the current study, I investigated various issues. The main research question was to investigate whether the effect of timing of JOLs (verification before/after JOL) have an effect on typical metacognitive and memory performance measures, such as judgments of learning, memory access and memory details. . In addition to that, the current study aimed to investigate the effect of coherence on measures such as reading times, accuracy of answers to the verification question, judgments of learning and memory performances on a cued recall. In the discussion of the current study, I will first interpret the results of the current study. Then, I will discuss the limitations of the current study and I will offer potential future directions.

First, I hypothesized that text coherence would have an effect on accuracy of answers to the verification question: Participants should answer verification questions about coherent texts more accurately than incoherent texts. However, there was no effect of coherence on the accuracy of the answers to the verifications question in the current study. The result of the current study is inconsistent with prior studies. The prior studies revealed that coherence was one of the factors can affect participants' accuracy of the answer to the verification question (Sanders & Noordman, 2000; Ikeda & Kitagami, 2013; Hall, Maltby, Filik & Paterson, 2016). In prior studies, the texts were given as a whole to participants. They read the text, then they answered the question about text. On

the contrary, the text which was used in the current study was separated in two: first a title – preceding sentences were presented then a title – preceding sentences – target sentence were presented. The question was used in the current study could be answered with using the information in target sentence. Presenting target sentence in a separate display may lead participants to recall the information in target sentence easily for both verification question which requires “yes” and “no” answer. Thus, presenting target sentence in a separate display may produce null effects on the accuracy of answers to the verification questions.

I also hypothesized that there would be no significant effect of coherence on reading times for preceding sentences, but there would be an effect for the target sentence, because it is the last sentence that actually determines whether the text is coherent or not. The results revealed that coherence did not affect participants’ reading time for preceding sentences. Yet, coherence had an influence on both participants’ reading time for target sentence and total reading time for each text. Participants read coherent texts’ target sentences and coherent texts faster than incoherent texts’ target sentence and incoherent texts. These results were consistent with prior studies. Prior studies revealed the effect of coherence on reading time (Sanders & Noordman, 2000; Rawson & Dunlosky, 2002; Van – Silfhout, Evers – Vermeul, Mak & Sanders, 2014; Hall, Maltby, Filik & Paterson, 2016). According to many models of discourse processing, one pursues to link events to their causes in order to understand the text (Sanders & Noordman, 2002). In the current study, the solution did not logically follow from the problem in problem – irrelevant solution texts, but the solution logically followed from

the problem in problem – relevant solution texts. Thus, creating the link between text segments should be more difficult for the problem – irrelevant solution than problem – irrelevant solution texts. As the results revealed, participants read problem – irrelevant solution text’s target sentence and problem – irrelevant solution text slower than problem – relevant solution text’s target sentence and problem – relevant solution text. Based on these results, it can be said that it is harder to understand problem – irrelevant solution texts, because establishing relationship between text segments is more difficult for problem – irrelevant solution texts.

I also hypothesized that coherence of text would influence JOL ratings such that participants would produce higher JOLs for coherent than incoherent texts. The results revealed that this was the case: Participants gave higher JOLs to coherent texts than incoherent texts. This finding is consistent with prior studies. (Carrol & Korukina, 1999; Rawson & Dunlosky, 2002; Zaromb, Karpicke & Roediger, 2010; Ikeda & Kitagami, 2013). Problem – irrelevant solution texts were difficult to process (slower reading times) and problem – relevant solution texts were easier to process (faster reading times) in the current study. Easier to process texts (problem – relevant solution texts) were given higher JOL ratings than difficult to process texts (problem – irrelevant solution texts).

I hypothesized that coherence should have an effect on the memory performance measures (access and detail). As expected, there was a significant effect of coherence on memory performance (access and detail). Both memory performances for access to the text and details of the text were more for coherent texts than incoherent texts, in line

with prior studies (Carrol & Korukina, 1999; Sanders & Noordman, 2000). Easier to process text should lead to easier access to the text and reproduction of the text. Problem – relevant solution texts were easier to process and both access to the topic and details of the problem – relevant solution texts were remembered more.

Overall, the coherence had an influence on reading time (target sentence and total), judgments of learning and memory performance (access and detail) in the current study. The results of the current study were also consistent with prior studies that examined the effect of coherence on reading time (Sanders & Noordman, 2000; Rawson & Dunlosky, 2002; Van – Silfhout, Evers – Vermeul, Mak & Sanders, 2014; Hall, Maltby, Filik & Paterson, 2016), judgments of learning (Carrol & Korukina, 1999; Rawson & Dunlosky, 2002; Zaromb, Karpicke & Roediger, 2010; Ikeda & Kitagami, 2013) and memory performance (Carrol & Korukina, 1999; Sanders & Noordman, 2000).

In the current study, I hypothesized that the timing of JOLs on judgments of learning would affect actual JOLs, but not other measures, such as reading times, memory performance and accuracy of answers to the verification questions. As expected, the results revealed no significant effect of timing of JOLs on these measures. However, timing of JOLs also failed to affect actual JOL ratings. This hypothesis put forward because when participants are asked to answer questions about the content of the text, this also becomes a part of the experience that the participant is going through. If the participant is able to answer the question accurately in a short period of time, even if they had difficulty during the encoding process, this might be wiped out by the experience of being able to answer the question correctly. Thus, if the question is placed

before the JOL, one would assume that participants would produce high JOLs for incoherent texts, because they answered the question correctly. On the contrary, when the verification question is asked after the JOL, participants should only rely on the coherence of the text to make their judgments. This hypothesis about the effect of timing of JOL on JOL rating was based on the experience – based judgments.

Experience-based judgments refer the experience that comes from while processing an item. Experience-based judgments are one of the factors that can affect JOLs ratings (Koriat, Bjork, Sheffer & Bar, 2004). I expected that presenting verification question before or after JOL rating could lead to misevaluation about processing of text and this could be reflected on JOL ratings. Yet, there was no effect of timing of JOL on JOL ratings. In the current study verification questions which could be answered with the knowledge about target sentence were used. Answering the question before or after JOL rating may lead to low levels of effort that participants make in order to answer the question. In other words, there may be low processing demand for answering the question in timing of JOL conditions. To answer questions, participants only need to know the target sentence. During the encoding phase, they became more aware of the situation and they directed their attention more to the target sentence of the text to answer question. Because of that, the processing demand for answering the verification question might be low in both verification after JOL condition and verification before JOL condition. Therefore, the manipulation could not reveal the effect of timing of JOL on JOL ratings

Moreover, the analyses revealed that the interaction between the valence of the verification question and timing of JOL had an influence on both memory performance measures. According to the paired sample t-tests, participants remembered both topic and details of the text with the verification questions that require “no” better for verification after JOL condition. The interaction between the valence of the verification question and timing of JOL and its effect on memory performance may be explained by the deeper levels of processing an item. Deeper levels of processing an item are associated with more elaborate, longer lasting and stronger memory traces ( Craik & Lockhart, 1972). In the current study, verification question that requires “no” at verification after JOL condition may lead to processing an item more deeply than the verification question that requires “yes” because participants may need to reconsider the content of the texts while answering the verification question that requires “no”. Thus, the memory trace for the texts whose verification question that requires “no” may become stronger, longer lasting and more elaborate than the texts whose verification question that requires “yes”.

To investigate whether JOLs in the experimental manipulation were mediated by objective measures of fluency, I also conducted mediational analyses (Undorf & Erdfelder, 2015). In the current study, mediational analyses were conducted to examine whether JOLs in coherence manipulation was mediated by the objective measures of fluency (reading time for target sentence and total reading time for each text). Mediation analyses revealed that both direct and indirect effects of coherence on JOLs were significant. The objective measures of fluency (reading time for target sentence and total



reading time for each text) partially mediated the effects of coherence on JOLs. The results of mediation analyses suggest that participants made use of their experience – based judgments while evaluating their JOLs.

In the current study, frequency analysis was conducted to reveal how often participants remembered the actual solution rather than the irrelevant target sentence. The target sentence of one problem – irrelevant solution text was an actual solution to another problem – irrelevant solution text. The results of frequency analysis revealed that participants remembered very well or not quite so well the actual solution than the target sentence of the problem – irrelevant solution text in approximately 30% of trials, but this reconstruction was not different across any of the encoding conditions. Therefore, participants can sometimes mistakenly reconstruct the incoherent texts as a coherent text, even though they are not given instructions to do so, showing the reconstructive nature of memory.

All in all, coherence is a very important feature of the texts. Higher levels of coherence lead to faster reading times, higher JOL ratings and better memory performance. In the current study, participants gave higher JOLs ratings to coherent texts than incoherent texts and they remembered the coherent texts more than incoherent texts. Therefore, coherence did not create an illusion. The current study could not reveal the effect of timing of JOL on judgments of learning. It should be examined more deeply in different settings. According to the results of mediation analyses, participants benefited from their experience – based judgments while evaluating their JOLs.

## 7.1 Limitations and Future Directions

In the current study, there were verification questions which could be answered with only the knowledge of target sentence. As I mentioned in the discussion part, the processing demand for these question might be low in both verification after JOL and verification before JOL condition. Because of that, the potential effect of timing of JOL might eliminate on JOL ratings. Therefore, these questions are the limitation of the current study. In future studies, this limitation can be removed in several ways. One of the ways is that the verification questions are related to random sentence of the longer text rather than the target sentence of the text in the current study. In this way, to answer question, participants should direct their attention to whole text and participants need to put more effort to answer the question. Another way to resolve this problem is using comprehension questions such as open – ended bridging questions rather than verification question. To answer comprehension questions, participants should integrate the knowledge which mentioned in texts. Yet, for verification question, participants only need to indicate the information was correct or not. Answering comprehension questions might lead to higher processing demand than answering verification questions. Using verification questions are related to random sentence in a longer texts or comprehension questions instead of verification question might enable us to investigate the effect of timing of JOL more appropriately.

Another follow – up study idea involves more control over the experimental design. In the current study, participants studied the texts at their own pace. This was realized in order to see whether reading times have an effect on JOLs and memory performance.

The results revealed that if the reading time is longer, JOLs will be lower, as shown through the mediational analyses. Yet, reading times might not be the only indication of ease of processing. Sometimes, even when participants are given the same time to study the items, they still give lower JOLs to items that are difficult to encode (Rawson & Dunlosky, 2002). By exerting control over the reading time, we might be able to see whether the effect of text coherence happens purely through reading times, or whether we get similar effects even when the timing is kept constant across items and participants. If the effect sizes for JOLs are as high when the items are experimenter-paced as they are when self-paced, this might mean that the effect that we obtain is not necessarily about the time taken to read the text, but about the mental effort that needs to be exerted when reading incoherent texts.

In conclusion, the current study revealed that coherence has an effect on reading times (target sentence and total), judgments of learning and memory performance (access and detail) on a cued recall. There was a methodological question about timing of JOL however the timing of JOL did not affect judgments of learning when the processing demand for answering verification questions was low. In future studies, this methodological question should be examined by using verification questions that can be related random sentence in a longer text or comprehension questions. Moreover, the control of participants on experiment should be decreased by using experimenter – paced timing in the future studies to reveal whether the dependent variables were affected by control on experiment.

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## APPENDIX A: PROBLEM – RELEVANT SOLUTION TEXTS

### Araba Kullanırken Mesajlaşmak

Yapılan arařtırmalar gösteriyor ki araba sürerken mesaj yazmak alkollü araç kullanmaktan daha fazla trafik kazalarına neden oluyor. Araba sürerken mesaj yazmak sürücünün trafiğe yönlendirdiđi dikkati azaltıp, deđişiklikleri fark etmesini zorlařtırıyor. Bu durum da trafik kazalarını kaçınılmaz hale getiriyor. Yetkililer araba kullanırken mesaj yazdığı tespit edilen sürücülerin ehliyetlerine 3 ay el koymayı öne süren önergeyi yasalařtırdı.

### Alkollü Araç Kullanmak

Alkollü araç kullanmak trafik kazalarının başlıca nedenlerinden bir tanesidir. Alkol alımı kişinin motor hareketlerini ve karar verme yetisini olumsuz yönde etkilemektedir. Alkol alıp araç kullanmak yalnızca alkollü sürücünün deđil trafikteki diđer sürücülerin de hayatını riske atmaktadır. Yetkililer alkollü araç kullanmanın tehlikelerini anlatan bir seminere katılmayı bütün ehliyet sahipleri için zorunlu hale getirdiler.

### Emniyet Kemerini Takmamak

Trafik kazalarının ciddi yaralanma veya ölümlle sonuçlanma nedenlerinden biri emniyet kemeri takmamak. Emniyet kemeri takmamanın nedenlerinden birkaçı emniyet kemerinin öneminin anlařılmaması, emniyet kemerinin rahatsız edici bulunması ve emniyet kemerini takmayı unutmak. İstatiksel veriler gösteriyor ki emniyet kemeri takmak kaza sonucu karřılařılan yaralanma ve ölüm vakalarını %50 oranında düşürmektedir. Yetkililer emniyet kemeri takmamanın cezasını 95 liradan 200 liraya çıkardılar.

### Yaya Geçidi Eksikliđi

İlkokulun çevresinde yaya geçidi bulunmaması ilkokul öğrencilerin velilerini harekete geçirdi. İlkokulun çevresinde yaya geçidi olmadığı için çocukların okula giderken trafik

kazası geçirme ihtimali artıyor. Çocukları için endişelenen veliler Trafik İl Müdürlüğü'ne en kısa sürede yaya geçidinin yapılması için müracatta bulundu. Yetkililerin açıklamalarına göre en geç bir hafta sonra yaya geçidinin yapımı için çalışmalar başlayacak.

### İrkçılık

En geniş anlamıyla ırkçılık bir ırkın diğer ırklardan üstün veya aşağı derecede olduğu inancıdır. Belli bir ırka yönelik yapılan olumsuz yorumlar ırkçılığa örnek oluşturmaktadır. İrkçilik insanları derilerinin rengine göre ayırarak toplumu ayırmaya neden olmaktadır. İrkçi davranışlar sergileyen birini gördüğümüzde onu söylediğinin neden hoş olmadığını anlatmanız ırkçılığın azalmasına yardımcı olacak bir davranıştır.

### Yasadışı Göç

Bir ülkeden gelip başka bir ülkeye yasadışı yollarla girmek veya o ülkeden yasal çıkış süresi içerisinde çıkmamak yasadışı göç olarak tanımlanmaktadır. Ülkede yaşanan bölgesel savaşlar ve ekonomik güçlükler insanları yasadışı göç yapmaya zorlamaktadır. Fakat yasadışı göç ülkelerin güvenliğine karşı bir tehdit unsurudur. Yasadışı göçle mücadele için sınır kapılarındaki yasadışı geçişi zorlaştıracak tedbirler alınmalıdır.

### Holiganlık

Holiganlık spor karşılaşmasını izleyen grupların sözlü ve fiziksel şiddet içeren davranışlarda bulunmasına verilen addır. Bu gruplar tuttıkları takıma kontrolsüzce bağlı oldukları için spor karşılaşmaları esnasında ciddi yaralanma vakaları gerçekleşmektedir. Holiganlık vakalarının en fazla yaşandığı spor dalı futboldur. Maçların seyircisiz oynanması sözel şiddet ve fiziksel şiddet içeren davranışların tribünlerde görülmemesini sağlayacaktır.

### Bireysel Silahlanmadaki Artış

Toplumlarda güvenlik gereksinimi ortaya çıktığında bireysel silahlanma oranları da artış göstermektedir. Günümüzde artan terör olayları toplumda korkunun yaygınlaşmasına neden olup bireysel silahlanma oranını arttırmıştır. Ne yazık ki bireysel silahlanma hakkını kullanan bireyler, silahlarını sadece kendilerini yeri geldiğinde savunmak için

kullanmamaktadır. Bireysel silahlanma oranının artmaması için silah ruhsatı alım sürecinin zorlaştırılması gerekmektedir.

#### Sporcu Motivasyonu

Motivasyon en basit anlamıyla yapılan işin isteyerek yapılmasıdır ve bir sporcunun başarı seviyesi ile motivasyonu birbirine bağlıdır. Motivasyon seviyesi sporcunun fiziksel ve zihinsel durumunu etkilemektedir. Motivasyonu yüksek bir sporcu amaçlarına ulaşabilmek için maksimum seviyede çaba gösterebilir. Sporcu ve antrenör arasında kurulacak dürüstlüğe dayanan bir ilişki sporcunun motivasyonun yükselmesine yardımcı olmaktadır.

#### Spor ve Sağlık

Günümüz yaşam koşulları insanların gün içinde hareket ettikleri sürede ciddi düşümlere neden olmuştur. Gün içinde hareket edilen süredeki düşüş sağlık sorunlarını kaçınılmaz hale getirmiştir. Hareket edilen süredeki düşüş toplumda obezite, kalp ve damar hastalıkları ve diyabet hastalığının artmasına neden olmuştur. Hükümet yurttaşların daha fazla hareket etmeleri için spor yapmayı özendiren yeni kamu spotlarını yayına soktu.

#### Doping

Sporcuların kendilerine yarışta avantaj sağlaması için kullandıkları performans artırıcı ilaçlara doping denmektedir. Doping maddeleri yarış esnasında yorgunluğun geç ortaya çıkmasına veya yarış öncesindeki heyecanın yatıştırılmasına yardımcı olmaktadır.

Doping kullanımı sporcunun hem spor kariyerini riske atmakta ve hem de yaşam süresini kısaltmaktadır. Antrenörler sporcularını düzenli olarak dopingin sporculara vereceği zararlarla ilgili bilgilendirmelidir.

#### Spor Sakatlıkları

Spor yapmak sağlığımız için çok faydalı olmasına rağmen bazen spor yapmak sakatlıklara da neden olabilmektedir. Spor yapmadan önce yeterince ısınma ve esneme hareketi yapmamak spor sakatlanmalarına davetiye çıkarmaktadır. Spor yaparken yaşanan en yaygın sakatlanma türü aşıl tendonu yaralanmalarıdır. Spor sakatlığı riskini en aza indirmek için yumuşak zeminli spor sahalarının tercih edilmesi gerekmektedir.

#### Ödev Yapmayı Ertelemek



Ödev yapmayı son teslim tarihine kadar ertelemek öğrencilerin çoğunun yaşadığı bir sorundur. Öğrenci ödev yapması gerektiğinin bilincinde olmasına rağmen video veya dizi izleyerek zamanını geçirebilir. Öğrencinin ödevlerini yapmayı son teslim tarihine kadar ertelemesi öğrencinin başarıma isteğinin azalmasına ve öğretmenlerinin gözünde kötü bir üne kavuşmasına neden olmaktadır. Öğrenci ödevlerini son teslim tarihine kadar ertelemeden üstesinden gelebilmek için ödevi bölümlere ayırmalıdır.

#### Derse Odaklanamamak

Öğrenciler bazen anlatılan derse odaklanmakta zorluk yaşayabiliyorlar. İşlenen dersin öğrenci için yeterince ilgi çekici olmaması öğrencinin dikkatini ders dışındaki uyaranlara yöneltmesine neden olabilmektedir. Öğrenci derse dinlemek yerine diğer uyaranlara odaklandığı için öğrencinin dersteki başarısı da olumsuz yönde etkilenmektedir. Öğrenciler derse odaklanamamanın üstesinden gelebilmek için ders sırasında onlara sunulan bilgileri ayrıntılandırmayı öğrenmelidir.

#### Verimli Ders Çalışmamak

Üniversiteye yeni başlayan öğrenciler ders çalışmakla ilgili sorunlar yaşayabiliyorlar. Ders sisteminin liseden farklı olması öğrencinin dikkatini negatif yönde etkileyip çalışmalarından aldıkları verimi düşürebiliyor. Öğrenci çalışmalarından yeterince verim alamadığı için derslerinde de istediği kadar başarılı olamamasına neden oluyor. Öğrencilerin çalışmalarından yüksek verim alabilmek için ders notlarını tekrardan kendi kelimeleriyle yazmaları gerekmektedir.

#### Ev Özlemi Çekmek

Üniversiteyi ailesinin yaşadığı ilden başka bir yerde okuyan öğrenciler zaman zaman ev özlemi çekmektedirler. Ev özlemi çekmek en basit şekliyle eve dair düşünce ve duyguların kişinin aklına sürekli gelmesidir. Ciddi ev özlemi vakalarında kişinin evle ilgili obsesif düşünceleri bulunabilir ve kişi gelişigüzel zamanlarda ağlayabilir. Ev özlemi çekmeyi atlatabilmek için öğrenci hissettiklerini diğer öğrencilerle konuşmalıdır.

#### Çocukların Sosyal Medya Kullanımı

Teknolojinin yaygınlaşmasıyla sosyal medya büyük küçük herkesin hayatına girmiş bulunmakta. Fakat sosyal medyanın özellikle çocuklar üzerinde olumsuz etkileri olabilir.

Sosyal medya çocukların gün içinde daha az hareket etmelerine ve yaşlarına uygun olmayan reklamlara maruz kalmalarına neden olabilir. Çocukları sosyal medyanın olumsuz etkilerinden uzaklaştırmak için aileler çocuklarının kullandığı sosyal medya uygulamalarını kısıtlamalıdır.

#### Çocuklarda Beden İmgesi

Beden imgesi kişinin kendi bedeni hakkında nasıl hissettiğidir. Olumsuz beden imgesine sahip çocukların güven duygusu zedeleniyor ve okul aktivelerine katılma oranları ve okul başarıları düşüyor. Bunların yanı sıra olumsuz beden imgesine sahip çocuklar yeme bozuklarına da yatkın hale geliyor. Aileler olumlu beden imgesinin oluşması için çocuklarının kilolarının değil fiziksel sağlığının önemli olduğunu çocuklarına hissettirmelidir.

#### Yetiştirme Yurtları

Yetiştirme yurtlarında ne yazık ki çocukların ihtiyaçları yeterince karşılanamıyor. Bu yüzden çocuklar düşmanca davranışlar geliştirip diğer çocuklara şiddet uygulayabiliyorlar ve diğer çocuklarla sağlıklı bir ilişki kuramıyorlar. Çocukların yetiştirme yurdunda geliştirdiği bu davranışlar çocukların ileride sosyal hayata uyum sağlamalarını da zorlaştırmaktadır. Hükümet yetiştirme yurtlarındaki çocukların ihtiyaçlarının karşılanabilmesi için yetiştirme yurtlarının bütçesini %15 oranında arttırdı.

#### Zihinsel Engelli Çocuk Sahibi Olmak

Zihinsel engelli bir çocuğu yetiştirmek ailelerin omzuna çok fazla sorumluluk yükleyebiliyor. Aileler çocuklarını en iyi şekilde yetiştirmek için hem maddi hem de manevi açıdan sorunlar yaşayabiliyorlar. Ailelerin çocuklarıyla ilgilenmek için yeterince zaman bulamamaları da aileleri strese sokuyor. Aile ve Sosyal Politikalar Bakanlığı zihinsel engelli çocuğu olan ailelerin stres seviyesinin düşmesine yardımcı olmak için aileleri psikologlarla bir araya getirmeye başladı.

#### Mobbing

İş yerinde çalışma motivasyonunu ve kişinin özgüveni kırarak davranışlar mobbing olarak tanımlanmaktadır. Bu durum yalnızca işveren ve çalışan arasında değil, iki çalışan arasında da gözlemlenmektedir. Mobbinge uğrayan kişi huzursuzluk ve endişe

duygularını yoğun bir şekilde yaşamaktadır. Mobbinge maruz kalan kişiler yasaların onlara tanıdığı haklar çerçevesinde mobbing yapan kişiye dava açabilmektedir.

#### Adam Kayırma

Bir kişinin iş gerekliliklerini sağlamamasına rağmen kan bağı ve akrabalık ilişkileri nedeniyle işe alımına adam kayırma denmektedir. Adam kayırma iş yerindeki güven ve adalet duygusunu ve iş tatminini olumsuz yönde etkilemektedir. Adam kayırma vakaları çalışanın performansında da düşüğe neden olmaktadır. İşe alım süreçlerinde uygulanacak açık ve şeffaf yönetim adam kayırma vakalarını azaltmaktadır.

#### Cinsiyete Bağlı Ücret Farklılığı

Çalışanların aynı eğitim düzeyine ve eşit iş deneyimine sahip olmalarına rağmen farklı ücretlendirilmelerine ücret farklılığı denmektedir. Ücret farklılığı yaratan durumlardan birisi çalışanın cinsiyetidir. Küresel çaplı yaşanan ekonomik krizler cinsiyete dayalı ücret farklılıklarının yükselmesine neden oldu. Türkiye’de cinsiyete bağlı ücret farklılığının azaltılması için Çalışma ve Sosyal Güvenlik Bakanlığı bu durumun tespit edildiği iş yerlerine 5 bin lira para cezası verecek.

#### Sigortasız Çalışmak

Ülkemizde sigortasız işçi çalıştırmak kanunlara göre yasak olmasına rağmen bazı işyerleri bu yasağı delerek çalışanlarına sigorta yaptırmamaktadır. İstatistiklere göre günümüzde çalışanların %32’si sigortasız çalışmaktadır. Sigortasız çalışmak çalışanın sağlık hizmetlerinden yararlanamamasına ve hatta çalışanın emeklilik hakkını yitirmesine neden olabilmektedir. Sigortasız çalışan işçiler işyerlerini Sosyal Güvenlik Kurumu’na şikayet ederek sigortanın sağladığı hakları kazanabilirler.

## APPENDIX B: PROBLEM – IRRELEVANT SOLUTION TEXTS

### Araba Kullanırken Mesajlaşmak

Yapılan arařtırmalar gösteriyor ki araba sürerken mesaj yazmak alkollü araç kullanmaktan daha fazla trafik kazalarına neden oluyor. Araba sürerken mesaj yazmak sürücünün trafiğe yönlendirdiđi dikkati azaltıp, deđişiklikleri fark etmesini zorlařtırıyor. Bu durum da trafik kazalarını kaçınılmaz hale getiriyor. Yetkililer alkollü araç kullanmanın tehlikelerini anlatan bir seminere katılmayı bütün ehliyet sahipleri için zorunlu hale getirdiler.

### Alkollü Araç Kullanmak

Alkollü araç kullanmak trafik kazalarının başlıca nedenlerinden bir tanesidir. Alkol alımı kişinin motor hareketlerini ve karar verme yetisini olumsuz yönde etkilemektedir. Alkol alıp araç kullanmak yalnızca alkollü sürücünün deđil trafikteki diđer sürücülerin de hayatını riske atmaktadır. Yetkililer araba kullanırken mesaj yazdıđı tespit edilen sürücülerin ehliyetlerine 3 ay el koymayı öne süren önergeyi yasalařtırdı.

### Emniyet Kemerini Takmamak

Trafik kazalarının ciddi yaralanma veya ölümlü sonuçlanma nedenlerinden biri emniyet kemeri takmamak. Emniyet kemeri takmamanın nedenlerinden birkaçı emniyet kemerinin öneminin anlařılmaması, emniyet kemerinin rahatsız edici bulunması ve emniyet kemerini takmayı unutmak. İstatiksel veriler gösteriyor ki emniyet kemeri takmak kaza sonucu karřılařılan yaralanma ve ölüm vakalarını %50 oranında düşürmektedir. Yetkililerin açıklamalarına göre en geç bir hafta sonra yaya geçidinin yapımı için çalışmalar başlayacak.

### Yaya Geçidi Eksikliđi

İlkokulun çevresinde yaya geçidi bulunmaması ilkokul öğrencilerin velilerini harekete geçirdi. İlkokulun çevresinde yaya geçidi olmadığı için çocukların okula giderken trafik kazası geçirme ihtimali artıyor. Çocukları için endişelenen veliler Trafik İl Müdürlüğü'ne en kısa sürede yaya geçidinin yapılması için müracatta bulundu. Yetkililer emniyet kemeri takmamanın cezasını 95 liradan 200 liraya çıkardılar.

#### İrkçılık

En geniş anlamıyla ırkçılık bir ırkın diğer ırklardan üstün veya aşağı derecede olduğu inancıdır. Belli bir ırka yönelik yapılan olumsuz yorumlar ırkçılığa örnek oluşturmaktadır. İrkçılık insanları derilerinin rengine göre ayırarak toplumu ayırmaya neden olmaktadır. Yasadışı göçle mücadele için sınır kapılarındaki yasadışı geçişi zorlaştıracak tedbirler alınmalıdır.

#### Yasadışı Göç

Bir ülkeden gelip başka bir ülkeye yasadışı yollarla girmek veya o ülkeden yasal çıkış süresi içerisinde çıkmamak yasadışı göç olarak tanımlanmaktadır. Ülkede yaşanan bölgesel savaşlar ve ekonomik güçlükler insanları yasadışı göç yapmaya zorlamaktadır. Fakat yasadışı göç ülkelerin güvenliğine karşı bir tehdit unsurudur. İrkçı davranışlar sergileyen birini gördüğünüzde onu söylediğinin neden hoş olmadığını anlatmanız ırkçılığın azalmasına yardımcı olacak bir davranıştır.

#### Holiganlık

Holiganlık spor karşılaşmasını izleyen grupların sözlü ve fiziksel şiddet içeren davranışlarda bulunmasına verilen addır. Bu gruplar tuttıkları takıma kontrolsüzce bağlı oldukları için spor karşılaşmaları esnasında ciddi yaralanma vakaları gerçekleşmektedir. Holiganlık vakalarının en fazla yaşandığı spor dalı futboldur. Bireysel silahlanma oranının artmaması için silah ruhsatı alım sürecinin zorlaştırılması gerekmektedir.

#### Bireysel Silahlanmadaki Artış

Toplumlarda güvenlik gereksinimi ortaya çıktığında bireysel silahlanma oranları da artış göstermektedir. Günümüzde artan terör olayları toplumda korkunun yaygınlaşmasına neden olup bireysel silahlanma oranını arttırmıştır. Ne yazık ki bireysel silahlanma hakkını kullanan bireyler, silahlarını sadece kendilerini yeri geldiğinde savunmak için

kullanmamaktadır. Maçların seyircisiz oynanması sözel şiddet ve fiziksel şiddet içeren davranışların tribünlerde görülmemesini sağlayacaktır.

#### Sporcu Motivasyonu

Motivasyon en basit anlamıyla yapılan işin isteyerek yapılmasıdır ve bir sporcunun başarı seviyesi ile motivasyonu birbirine bağlıdır. Motivasyon seviyesi sporcunun fiziksel ve zihinsel durumunu etkilemektedir. Motivasyonu yüksek bir sporcu amaçlarına ulaşabilmek için maksimum seviyede çaba gösterebilir. Hükümet yurttaşların daha fazla hareket etmeleri için spor yapmayı özendiren yeni kamu spotlarını yayına soktu.

#### Spor ve Sağlık

Günümüz yaşam koşulları insanların gün içinde hareket ettikleri sürede ciddi düşümlere neden olmuştur. Gün içinde hareket edilen süredeki düşüş sağlık sorunlarını kaçınılmaz hale getirmiştir. Hareket edilen süredeki düşüş toplumda obezite, kalp ve damar hastalıkları ve diyabet hastalığının artmasına neden olmuştur. Sporcu ve antrenör arasında kurulacak dürüstlüğe dayanan bir ilişki sporcunun motivasyonun yükselmesine yardımcı olmaktadır.

#### Doping

Sporcuların kendilerine yarışta avantaj sağlaması için kullandıkları performans artırıcı ilaçlara doping denmektedir. Doping maddeleri yarış esnasında yorgunluğun geç ortaya çıkmasına veya yarış öncesindeki heyecanın yatıştırılmasına yardımcı olmaktadır.

Doping kullanımı sporcunun hem spor kariyerini riske atmakta ve hem de yaşam süresini kısaltmaktadır. Spor sakatlığı riskini en aza indirmek için yumuşak zeminli spor sahalarının tercih edilmesi gerekmektedir.

#### Spor Sakatlıkları

Spor yapmak sağlığımız için çok faydalı olmasına rağmen bazen spor yapmak sakatlıklara da neden olabilmektedir. Spor yapmadan önce yeterince ısınma ve esneme hareketi yapmamak spor sakatlanmalarına davetiye çıkarmaktadır. Spor yaparken yaşanan en yaygın sakatlanma türü aşıl tendonu yaralanmalarıdır. Antrenörler

sporcularını düzenli olarak dopingin sporculara vereceği zararlarla ilgili bilgilendirmelidir.

#### Derse Odaklanamamak

Öğrenciler bazen anlatılan derse odaklanmakta zorluk yaşayabiliyorlar. İşlenen dersin öğrenci için yeterince ilgi çekici olmaması öğrencinin dikkatini ders dışındaki uyarılara yönelmesine neden olabilmektedir. Öğrenci derse dinlemek yerine diğer uyarılara odaklandığı için öğrencinin dersteki başarısı da olumsuz yönde etkilenmektedir. Öğrenci ödevlerini son teslim tarihine kadar ertelemenin üstesinden gelebilmek için ödevi bölümlere ayırmalıdır.

#### Ödev Yapmayı Ertelemek

Ödev yapmayı son teslim tarihine kadar ertelemek öğrencilerin çoğunun yaşadığı bir sorundur. Öğrenci ödev yapması gerektiğinin bilincinde olmasına rağmen video veya dizi izleyerek zamanını geçirebilir. Öğrencinin ödevlerini yapmayı son teslim tarihine kadar ertemesi öğrencinin başarıma isteğinin azalmasına ve öğretmenlerinin gözünde kötü bir üne kavuşmasına neden olmaktadır. Öğrenciler derse odaklanamamanın üstesinden gelebilmek için ders sırasında onlara sunulan bilgileri ayrıntılandırmayı öğrenmelidir.

#### Verimli Ders Çalışamamak

Üniversiteye yeni başlayan öğrenciler ders çalışmakla ilgili sorunlar yaşayabiliyorlar. Ders sisteminin liseden farklı olması öğrencinin dikkatini negatif yönde etkileyip çalışmalarından aldıkları verimi düşürebiliyor. Öğrenci çalışmalarından yeterince verim alamadığı için derslerinde de istediği kadar başarılı olamamasına neden oluyor. Ev özlemi çekmeyi atlatabilmek için öğrenci hissettiklerini diğer öğrencilerle konuşmalıdır.

#### Ev Özlemi Çekmek

Üniversiteyi ailesinin yaşadığı ilden başka bir yerde okuyan öğrenciler zaman zaman ev özlemi çekmektedirler. Ev özlemi çekmek en basit şekliyle eve dair düşünce ve duyguların kişinin aklına sürekli gelmesidir. Ciddi ev özlemi vakalarında kişinin evle ilgili obsesif düşünceleri bulunabilir ve kişi gelişigüzel zamanlarda ağlayabilir.

Öğrencilerin çalışmalarından yüksek verim alabilmek için ders notlarını tekrardan kendi kelimeleriyle yazmaları gerekmektedir.

#### Çocukların Sosyal Medya Kullanımı

Teknolojinin yaygınlaşmasıyla sosyal medya büyük küçük herkesin hayatına girmiş bulunmakta. Fakat sosyal medyanın özellikle çocuklar üzerinde olumsuz etkileri olabilir. Sosyal medya çocukların gün içinde daha az hareket etmelerine ve yaşlarına uygun olmayan reklamlara maruz kalmalarına neden olabilir. Aileler olumlu beden imgesinin oluşması için çocuklarının kilolarının değil fiziksel sağlığının önemli olduğunu çocuklarına hissettirmelidir.

#### Çocuklarda Beden İmgesi

Beden imgesi kişinin kendi bedeni hakkında nasıl hissettiğidir. Olumsuz beden imgesine sahip çocukların güven duygusu zedeleniyor ve okul aktivelerine katılma oranları ve okul başarıları düşüyor. Bunların yanı sıra olumsuz beden imgesine sahip çocuklar yeme bozuklarına da yatkın hale geliyor. Çocukları sosyal medyanın olumsuz etkilerinden uzaklaştırmak için aileler çocuklarının kullandığı sosyal medya uygulamalarını kısıtlamalılar.

#### Yetiştirme Yurtları

Yetiştirme yurtlarında ne yazık ki çocukların ihtiyaçları yeterince karşılanamıyor. Bu yüzden çocuklar düşmanca davranışlar geliştirip diğer çocuklara şiddet uygulayabiliyorlar ve diğer çocuklarla sağlıklı bir ilişki kuramıyorlar. Çocukların yetiştirme yurdunda geliştirdiği bu davranışlar çocukların ileride sosyal hayata uyum sağlamalarını da zorlaştırmaktadır. Aile ve Sosyal Politikalar Bakanlığı zihinsel engelli çocuğu olan ailelerin stres seviyesinin düşmesine yardımcı olmak için aileleri psikologlarla bir araya getirmeye başladı.

#### Zihinsel Engelli Çocuk Sahibi Olmak

Zihinsel engelli bir çocuğu yetiştirmek ailelerin omzuna çok fazla sorumluluk yükleyebiliyor. Aileler çocuklarını en iyi şekilde yetiştirmek için hem maddi hem de manevi açıdan sorunlar yaşayabiliyorlar. Ailelerin çocuklarıyla ilgilenmek için yeterince zaman bulamamaları da aileleri strese sokuyor. Hükümet yetiştirme yurtlarındaki



çocukların ihtiyaçlarının karşılanabilmesi için yetiştirme yurtlarının bütçesini %15 oranında arttırdı.

### Mobbing

İş yerinde çalışma motivasyonunu ve kişinin özgüveni kıracak davranışlar mobbing olarak tanımlanmaktadır. Bu durum yalnızca işveren ve çalışan arasında değil, iki çalışan arasında da gözlemlenmektedir. Mobbinge uğrayan kişi huzursuzluk ve endişe duygularını yoğun bir şekilde yaşamaktadır. İşe alım süreçlerinde uygulanacak açık ve şeffaf yönetim adam kayırma vakalarını azaltmaktadır.

### Adam Kayırma

Bir kişinin iş gerekliliklerini sağlamamasına rağmen kan bağı ve akrabalık ilişkileri nedeniyle işe alımına adam kayırma denmektedir. Adam kayırma iş yerindeki güven ve adalet duygusunu ve iş tatminini olumsuz yönde etkilemektedir. Adam kayırma vakaları çalışanın performansında da düşüşe neden olmaktadır. Mobbinge maruz kalan kişiler yasaların onlara tanıdığı haklar çerçevesinde mobbing yapan kişiye dava açabilmektedir.

### Cinsiyete Bağlı Ücret Farklılığı

Çalışanların aynı eğitim düzeyine ve eşit iş deneyimine sahip olmalarına rağmen farklı ücretlendirilmelerine ücret farklılığı denmektedir. Ücret farklılığı yaratan durumlardan birisi çalışanın cinsiyetidir. Küresel çaplı yaşanan ekonomik krizler cinsiyete dayalı ücret farklılıklarının yükselmesine neden oldu. Sigortasız çalışan işçiler işyerlerini Sosyal Güvenlik Kurumu'na şikayet ederek sigortanın sağladığı hakları kazanabilirler.

### Sigortasız Çalışmak

Ülkemizde sigortasız işçi çalıştırmak kanunlara göre yasak olmasına rağmen bazı işyerleri bu yasağı delerek çalışanlarına sigorta yaptırmamaktadır. İstatistiklere göre günümüzde çalışanların %32'si sigortasız çalışmaktadır. Sigortasız çalışmak çalışanın sağlık hizmetlerinden yararlanamamasına ve hatta çalışanın emeklilik hakkını yitirmesine neden olabilmektedir. Türkiye'de cinsiyete bağlı ücret farklılığının azaltılması için Çalışma ve Sosyal Güvenlik Bakanlığı bu durumun tespit edildiği iş yerlerine 5 bin lira para cezası verecek.

## APPENDIX C: VERIFICATION QUESTIONS THAT SHOULD BE ANSWERED WITH “YES”

### Araba Kullanırken Mesajlaşmak

Yetkililer araba kullanırken mesaj yazdığı tespit edilen sürücülerin ehliyetlerine 3 ay el koymayı öne süren bir önergeyi mi yasalaştırdı?

### Yaya Geçidi Eksikliği

Yetkililerin açıklamalarına göre en geç bir hafta sonra mı yaya geçidinin yapımı için çalışmalar başlayacak?

### Alkollü Araç Kullanmak

Yetkililer alkollü araç kullanmanın tehlikelerini anlatan bir seminere katılmayı mı bütün ehliyet sahipleri için zorunlu hale getirdiler?

### Emniyet Kemerini Takmamak

Yetkililer emniyet kemeri takmamanın cezasını 95 liradan 200 liraya mı çıkardılar?

### İrkçilik

İrkçi davranışlar sergileyen birini gördüğünüzde onu söylediğinin neden hoş olmadığını anlatmanız mı ırkçılığın azalmasına yardımcı olacak bir davranıştır?

### Holiganlık

Maçların seyircisiz oynanması mı sözel şiddet ve fiziksel şiddet içeren davranışların tribünlerde görülmemesini sağlar?

### Yasadışı Göç

Yasadışı göçle mücadele için sınır kapılarındaki yasadışı geçişi zorlaştıracak tedbirler alınmalı mıdır?

### Bireysel Silahlanmadaki Artış

Bireysel silahlanma oranının düşmesi için silah ruhsatı alım süreci mi zorlaştırılmalıdır?

### Sporcu Motivasyonu

Sporcu ve antrenör arasında kurulacak dürüstlüğe dayanan bir ilişki mi sporcunun motivasyonun yükselmesine yardımcı olur?

#### Doping

Antrenörler sporcularını dopingin sporculara vereceği zararlarla ilgili düzenli olarak mı bilgilendirmelidir?

#### Spor ve Sağlık

Hükümet yurttaşların daha fazla hareket etmeleri için spor yapmayı özendiren yeni kamu spotlarını yayına mı soktu?

#### Verimli Ders Çalışmamak

Öğrencilerin çalışmalarından yüksek verim alabilmek için ders notlarını tekrardan kendi kelimeleriyle mi yazmalıdır?

#### Ödev Yapmayı Ertelemek

Öğrenci ödevlerini son teslim tarihine kadar erteleme için üstesinden gelebilmek için ödevi bölümlere mi ayırmalıdır?

#### Derse Odaklanamamak

Öğrenciler derse odaklanamamanın üstesinden gelebilmek için ders sırasında onlara sunulan bilgileri ayrıntılandırmayı mı öğrenmelidir?

#### Ev Özlemi Çekmek

Ev özlemi çekmeyi atlatabilmek için öğrenci hissettiklerini diğer öğrencilerle mi konuşmalıdır?

#### Çocukların Sosyal Medya Kullanımı

Çocukları sosyal medyanın olumsuz etkilerinden uzaklaştırmak için aileler çocuklarının kullandığı sosyal medya uygulamalarını kısıtlamalı mıdır?

#### Çocuklarda Beden İmgesi

Aileler olumlu beden imgesinin oluşması için çocuklarının kilolarının değil fiziksel sağlığının mı önemli olduğunu çocuklarına hissettirmelidir?

#### Yetiştirme Yurtları

Hükümet yetiştirme yurtlarındaki çocukların ihtiyaçlarının karşılanabilmesi için yetiştirme yurtlarının bütçesini %15 oranında mı arttırdı?

### Zihinsel Engelli Çocuk Sahibi Olmak

Aile ve Sosyal Politikalar Bakanlığı zihinsel engelli çocuđu olan ailelerin stres seviyesinin düşmesine yardımcı olmak için aileleri psikologlarla mı bir araya getirmeye başladı?

### Mobbing

Mobbinge maruz kalan kişiler yasaların onlara tanıdığı haklar çerçevesinde mobbing yapan kişiye dava açabilirler mi?

### Adam Kayırma

İşe alım süreçlerinde uygulanacak açık ve şeffaf yönetim mi adam kayırma vakalarını azaltır?

### Cinsiyete Bağlı Ücret Farklılığı

Türkiye’de cinsiyete bağlı ücret farklılığının azaltılması için Çalışma ve Sosyal Güvenlik Bakanlığı bu durumun tesğit edildiğı iş yerlerine 5 bin lira mı para cezası verecek?

### Sigortasız Çalışmak

Sigortasız çalışan işçiler işyerlerini Sosyal Güvenlik Kurumu’na mı şikayet ederek sigortanın sağladığı hakları kazanabilirler?

## APPENDIX D: VERIFICATION QUESTIONS THAT SHOULD BE ANSWERED WITH “NO”

Araba Kullanırken Mesajlaşmak

Yetkililer araba kullanırken mesaj yazdığı tespit edilen sürücülerin ehliyetlerine 9 ay el koymayı öne süren bir önergeyi mi yasalaştırdı?

Yaya Geçidi Eksikliği

Yetkililerin açıklamalarına göre en geç üç hafta sonra mı yaya geçidinin yapımı için çalışmalar başlayacak?

Alkollü Araç Kullanmak

Yetkililer alkollü araç kullanmanın tehlikelerini anlatan bir kitapçığı bütün ehliyet sahiplerinin adreslerine mi gönderdiler?

Emniyet Kemerini Takmamak

Yetkililer emniyet kemeri takmamanın cezasını 150 liradan 250 liraya mı çıkardılar?

İrkçılık

İrkçı davranışlar sergileyen birini gördüğünüzde onu polise şikayet etmeniz mi ırkçılığın azalmasına yardımcı olacak bir davranış mıdır?

Holiganlık

Maçlara yalnızca bir kulübün taraftarının alınması mı sözel şiddet ve fiziksel şiddet içeren davranışların tribünlerde görülmemesini sağlar?

Yasadışı Göç

Yasadışı göçle mücadele için sınır kapılarındaki geçiş uygun görüldüğü zamanlarda tamamen kapatılmalı mıdır?

Bireysel Silahlanmadaki Artış

Bireysel silahlanma oranının düşmesi için silah ruhsatı alım süreci yılın belli bir zamanında mı yapılmalıdır?

Sporcu Motivasyonu

Sporcu ve antrenör arasında kurulacak sevgiye dayanan bir ilişki mi sporcunun motivasyonun yükselmesine yardımcı olur?

Doping

Antrenörler sporcularını dopingin sporculara vereceği zararlarla ilgili sadece çalışmaya ilk başladıklarında mı bilgilendirmelidir?

Spor ve Sağlık

Hükümet yurttaşların daha fazla hareket etmeleri için spor yapmayı özendiren yeni afişleri panolara mı astı?

Verimli Ders Çalışmamak

Öğrencilerin çalışmalarından yüksek verim alabilmek için ders notlarını başkalarıyla mı karşılaştırmalıdır?

Ödev Yapmayı Ertelemek

Öğrenci ödevlerini son teslim tarihine kadar erteleme için üstesinden gelebilmek için ödev verildiği gün mü başlamalıdır?

Derse Odaklanamamak

Öğrenciler derse odaklanamamanın üstesinden gelebilmek için ders sırasında fark ettikleri ilgisiz uyarıyı bastırmayı mı öğrenmelidir?

Ev Özlemi Çekmek

Ev özlemi çekmeyi atlatabilmek için öğrenci hissettiklerini psikologla mı konuşmalıdır?

Çocukların Sosyal Medya Kullanımı

Çocukları sosyal medyanın olumsuz etkilerinden uzaklaştırmak için aileler çocuklarının sosyal medya uygulamalarını kullanmasını tamamen engellemeli midir?

Çocuklarda Beden İmgesi

Aileler olumlu beden imgesinin oluşması için çocuklarının kilolarının değil ruhsal sağlığının mı önemli olduğunu çocuklarına hissettirmelidir?

### Yetiştirme Yurtları

Hükümet yetiştirme yurtlarındaki çocukların ihtiyaçlarının karşılanabilmesi için yetiştirme yurtlarının bütçesini %25 oranında mı arttırdı?

### Zihinsel Engelli Çocuk Sahibi Olmak

Aile ve Sosyal Politikalar Bakanlığı zihinsel engelli çocuğu olan ailelerin stres seviyesinin düşmesine yardımcı olmak için aileleri din adamlarıyla mı bir araya getirmeye başladı?

### Mobbing

Mobbinge maruz kalan kişiler yasaların onlara tanıdığı haklar çerçevesinde mobbing yapan kişiyi polise şikayet edebilirler mi?

### Adam Kayırma

İşe alım süreçlerinde danışmanlık firmalarından yardım alınması mı adam kayırma vakalarını azaltır?

### Cinsiyete Bağlı Ücret Farklılığı

Türkiye’de cinsiyete bağlı ücret farklılığının azaltılması için Çalışma ve Sosyal Güvenlik Bakanlığı bu durumun tespit edildiği iş yerlerine 10 bin lira para cezası mı verecek?

### Sigortasız Çalışmak

Sigortasız çalışan işçiler işyerlerini Çalışma ve Sosyal Güvenlik Bakanlığı’na mı şikayet ederek sigortanın sağladığı hakları kazanabilirler?

APPENDIX E. MEAN COMPREHENSION AND COHERENCE SCORES FOR  
EACH TEXT ACCORDING TO PILOT STUDY

Title of the Text	n	Mean_Relevant _Comprehensibil ity	SD_Relevant_C omprehensibili ty	n	Mean_Relev ant_Coheren ce	SD_Relevan t_Coherenc e	n	Mean_irrelevant _Comprehensibili ty	SD_irrelevant_ Comprehensibili ty	n	Mean_irrelev ant_Coheren ce	SD_irrelewa nt_Coheren ce
Araba Kullanırken Mesajlaşmak	5	91.20	12.52	5	80.60	13.67	6	90.33	12.08	5	53.40	35.44
Yaya Geçidi Eksikliği	6	97.33	4.32	6	99.00	2.00	5	66.40	23.58	4	25.25	24.57
Alkollü Araç Kullanmak	8	91.13	13.83	8	78.13	15.27	5	93.80	8.84	5	52.60	45.04
Emniyet Kemerini Takmamak	5	96.00	5.52	5	85.20	17.25	8	88.88	13.78	8	50.75	28.08
Sosyal Medya Zorbalığı	5	85.20	17.60	5	75.20	13.77	6	96.17	4.83	5	78.60	23.13
Sosyal Medya Bağımlılığı	6	91.50	15.92	6	92.50	11.57	5	77.60	13.94	5	48.40	26.25
Sanal Arkadaşlıklar	8	91.63	10.78	8	82.25	17.97	5	85.00	12.81	5	42.20	31.78
İnternette Alışveriş Yapmak	5	91.00	12.45	5	89.60	11.10	8	86.75	16.25	7	47.43	29.74
İrkçilik	5	81.80	14.94	5	72.20	17.44	6	81.50	19.86	5	52.80	41.94
Holiganlık	6	88.67	11.48	6	75.00	24.30	5	86.00	15.18	5	61.00	19.52
Yasadışı Göç	8	89.88	13.23	8	89.38	16.38	5	91.00	12.45	5	55.80	32.66



Title of the Text	n	Mean_Relevant_Comprensibility	SD_Relevant_Comprensibility	n	Mean_Relevant_Coherence	SD_Relevant_Coherence	n	Mean_Irrelevant_Comprensibility	SD_Irrelevant_Comprensibility	n	Mean_Irrelevant_Coherence	SD_Irrelevant_Coherence
Bireysel Silahlanma	5	93.20	8.20	5	87.00	8.00	8	87.25	15.89	7	54.86	28.76
Sporcu Motivasyonu	5	84.00	14.37	5	71.20	24.20	6	88.50	12.08	5	48.40	40.28
Doping	6	94.00	7.51	6	78.83	27.59	5	81.80	16.77	5	50.40	32.65
Spor ve Sağlık	8	88.25	17.38	8	73.88	18.72	5	89.40	9.07	5	58.00	34.21
Spor Sakatlıkları	5	84.80	15.66	5	83.80	19.10	8	86.88	22.27	7	65.71	21.40
Ödev Yapmayı Ertelemek	5	81.00	11.98	5	54.60	17.46	6	83.00	18.67	5	55.00	37.10
Derse Odaklanamamak	6	78.67	20.23	5	61.40	23.51	5	73.80	26.05	5	51.00	30.01
Verimli Ders Çalışamamak	8	89.88	10.19	8	72.50	17.90	5	91.00	10.63	5	57.20	29.95
Ev Özlemi Çekmek	5	89.20	15.83	5	88.60	10.71	8	77.00	26.54	8	58.25	21.35
Çocukların Sosyal Medya Kullanımı	5	85.40	12.54	5	90.20	7.05	6	84.83	16.81	6	63.67	33.21
Yetiştirme Yurtları	6	91.50	6.63	6	79.33	24.15	5	77.60	24.31	5	63.20	30.96
Çocuklarda Beden İmgesi	8	85.00	17.90	8	70.38	26.31	5	88.00	17.38	5	49.40	31.13
Zihinsel Engelli Çocuk Sahibi Olmak	5	92.40	11.24	5	89.60	10.92	8	75.50	22.56	8	47.13	29.36
Mobbing	5	86.00	18.12	5	81.00	27.06	6	79.67	19.76	5	67.00	29.32

Title of the Text	n	Mean_Relevant_Comprensibility	SD_Relevant_Comprensibility	n	Mean_Relevant_Coherence	SD_Relevant_Coherence	n	Mean_Irrelevant_Comprensibility	SD_Irrelevant_Comprensibility	n	Mean_Irrelevant_Coherence	SD_Irrelevant_Coherence
Cinsiyete Bağlı Ücret Farklılığı	6	92.00	11.54	6	86.83	20.07	5	73.20	20.85	5	41.80	22.73
Adam Kayırma	8	94.25	6.98	8	92.75	11.66	5	83.00	19.74	5	55.40	33.84
Sigortasız Çalışmak	5	98.00	3.46	5	95.60	6.66	8	87.00	19.53	7	70.00	22.91

APPENDIX F. MEDIAN AND STANDARD ERROR OF THE MEDIAN (IN PARENTHESES) FOR READING TIMES (PRECEDING SENTENCES, TARGET SENTENCE AND TOTAL) FOR UNCONDITIONAL ANALYSES AND CONDITIONALIZED ANALYSES

	Reading Time for Preceding Sentences		Reading Time for Target Sentence		Total Reading Time for Each Text	
	Coherent	Incoherent	Coherent	Incoherent	Coherent	Incoherent
Unconditional	16605.03(15118.7)	16276.08(15490.88)	6588.25(284.954)	8304.88(421.79)	24067.21(986.26)	25800.43(1024.00)
Conditionalized	16631.12(734.33)	16791.88(695.58)	6602.10(273.93)	8439.68(433.00)	24188.71(979.83)	25777.58(1029.72)

APPENDIX G. MEAN AND STANDARD ERROR OF THE MEAN (IN PARENTHESES) FOR MEMORY PERFORMANCES (ACCESS AND DETAIL) FOR UNCONDITIONAL ANALYSES AND CONDITIONALIZED ANALYSES

	Memory Performance for Access to the Topic of Text		Memory Performance for Details of the Text	
	Coherent	Incoherent	Coherent	Incoherent
Unconditional	0.89(0.02)	0.80(0.03)	0.27(0.01)	0.19(0.02)
Conditionalized	0.89(0.01)	0.80(0.03)	0.27(0.01)	0.19(0.02)

