

THE EFFECT OF PROCESSING FLUENCY ON SEMANTIC ILLUSION

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2017

THE EFFECT OF PROCESSING FLUENCY ON SEMANTIC ILLUSION

Thesis submitted to the  
Institute for Graduate Studies in Social Sciences  
in partial fulfillment of the requirements for the degree of

Master of Arts  
in  
Cognitive Science

by  
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Boğaziçi University

2017

## DECLARATION OF ORIGINALITY

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## ABSTRACT

### The Effect of Processing Fluency on Semantic Illusion

Semantic illusion occurs when a question like “How many animals of each kind did Moses take on the ark?” was responded with “two” in spite of knowing that animals were taken to the ark by “Noah” not “Moses”, according to the flood myth. The aim of the present study is to investigate the effect of different types of processing disfluencies on semantic illusion rate and to see whether there is a correlation between confidence in knowledge and illusion rate. Previous research by Song and Schwarz (2008) showed that disfluent processing facilitates detection of illusions. On the other hand, Geipel, Hadjichristidis, and Surian’s (2015) findings showed the opposite pattern. With the aim to clarify this incompatibility in earlier findings, we conducted two experiments, in which the effects of conceptual and perceptual (dis)fluencies on semantic illusion rate were investigated. Results of the first experiment supported Geipel et al.’s (2015) finding by showing less illusion in native language (i.e., fluent) compared to the foreign language (i.e., disfluent). On the other hand, perceptual fluency did not influence illusion rate. Additionally, confidence in knowledge was revealed to be negatively correlated with illusion rate, and positively correlated with correct response rate in undistorted questions.

## ÖZET

### İşleme Akıcılığının Anlamsal Yanılsamaya Etkisi

Anlamsal yanılsama “Musa gemiye her hayvan türünden kaç tane almıştır?” gibi bir sorunun tufan efsanesine göre hayvanların gemiye “Musa” değil de “Nuh” tarafından alındığı bilindiği halde “iki” diye cevaplandırılması ile oluşur. Bu çalışmanın amacı, işleme akıcılığındaki farklı tiplerdeki bozuklukların anlamsal yanılsama oranına etkisini incelemek ve yanılsama oranı ile bilgiye duyulan güven arasında bir korelasyon olup olmadığını araştırmaktır. Song ve Schwarz (2008) tarafından yapılan bir çalışma, akıcı olmayan işlemenin yanılsamaları fark etmeyi kolaylaştırdığını göstermiştir. Öte yandan, Geipel, Hadjichristidis, ve Surian’ın (2015) bulguları aksi yöndeydi. Önceki bulgulardaki uyumsuzlığa açıklık getirmek amacıyla, kavramsal ve algısal akıcılığın etkilerinin araştırıldığı iki deney yürütüldü. İlk deneyin sonuçları Geipel ve arkadaşlarını (2015) destekleyerek katılımcıların ana dillerinde (akıcı) yabancı dile (akıcı olmayan) göre yanılsamaya daha az yatkın olduklarını gösterdi. Diğer taraftan, algısal akıcılık yanılsama oranını etkilemedi. Bunlara ek olarak, bilgiye duyulan güvenin yanılsama oranı ile negatif, bozuk olmayan soruları doğru cevaplama oranı ile pozitif ilişkili olduğu ortaya konuldu.

## ACKNOWLEDGEMENTS

Firstly, I would like to express my deep gratitude to my advisor Assist. Prof. Esra Mungan for her time, guidance, and support. Her positive attitude and encouraging comments kept me motivated during my studies.

I would like to thank my co-advisor Assoc. Prof. Elena Guerzoni for her guidance and support throughout my thesis process. I would like to thank my committee members Assist. Prof. Ümit Akırmak, Assoc. Prof. Meltem Kelepir, and Assoc. Prof. Mine Nakipoğlu for being a part of my committee and for their guidance and valuable suggestions.

During my thesis process, I have consulted Assist. Prof. Miri Besken, Prof. Levent Arslan, Assist. Prof. Nart Bedin Atalay for help and advice. I would like to thank them for their time and guidance.

I thank Elif Canseza Kaplan for her help in translating my experimental questions, Ekin Tünçok for helping me with data collection, Yusuf Taha Ceritli for helping with sound files, and Aysu Mutlutürk for her efforts in arranging laboratory reservations at busy times. Moreover, I would like to thank my friends who participated in my pilot experiments and shared their valuable comments.

I would like to thank TÜBİTAK (Scientific and Technological Research Council of Turkey) for their financial support during my undergraduate and master's studies.

Finally, I would like to thank my family for their endless love and support throughout my life.

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# CHAPTER 1

## INTRODUCTION

When people were asked “How many animals of each kind did Moses take on the Ark?” most of them responded “two” in spite of knowing that according to the flood myth Noah who took animals to the Ark (Erickson & Mattson, 1981). The failure to recognize the impostor term in the question and responding as if it was undistorted is called “semantic illusion” or “Moses illusion” (e.g., Park & Reder, 2004). The first study investigating this phenomenon was carried out by Erickson and Mattson in 1981. It showed that even though participants were informed beforehand about the possibility of encountering distorted questions, the illusion still occurred. They also showed that semantic similarity between the original word and the impostor word is critical for the semantic illusion to occur. Subsequent studies replicated the semantic illusion effect and attempted to explain its underlying mechanisms (Hannon & Daneman, 2001; Shafto & MacKay, 2000; Reder & Kusbit, 1991). The aim of the present study is to investigate possible effects of processing fluency on semantic illusion rate. Moreover, we would like to look at whether confidence in knowledge is correlated with semantic illusion rate.

### 1.1 Theories on semantic illusion

In order to explain the semantic illusion phenomenon, Reder and Kusbit (1991) proposed the partial match hypothesis. According to this theory, a certain degree of match (“sufficient match”, Park & Reder, 2004, p. 281) between the distorted question and the mental representation of the knowledge should be established in order for the illusion to occur.

Park and Reder (2004) mentioned Erickson and Mattson's (1981) finding that if the original and impostor words are not semantically related, the impostor word stands out which then leads to a careful inspection for the detection of the illusion. Moreover, they noted that in order for the impostor term to be less detectable, it should semantically fit well with the rest of the sentence or question (e.g., "How many animals of each kind did Nixon take on the Ark?" did not lead to illusion, Erickson & Mattson, 1981; Park & Reder, 2004, p. 282). These two factors were also found to be influential in semantic illusion rate by Hannon and Daneman (2001). They showed that the illusion rate increased as the number of cues related to the theme of the sentence increased (e.g., a question with more cues like "Snoopy is a black and white cat [instead of dog] in what famous Charles Schulz comic strip?" lead to more illusion than "Snoopy is a cat [instead of dog] in what famous comic strip?", Hannon & Daneman, 2001, p. 460).

Park and Reder (2004) suggested that partial match is being employed for all sorts of memory matching because we are not always presented with stimuli that are completely identical to our mental representations in daily life. Yet, we are able to recognize and understand things. In that way, partial match is considered to be an efficient and economical way of processing information for everyday life. Kamas and Reder (1995) attempted to explain partial match through spreading activation. According to them, when a person encounters an illusory question, semantic network is activated in search of an answer for the question. Activation will spread from context of the sentence through the impostor word. If the impostor word is semantically related to the original word, then the original word will also get activated, and the distortion will go unnoticed.

Shafto and MacKay (2000) proposed the node structure theory in order to explain the Moses illusion. They argued that the effect of phonological similarity on the

Moses illusion was overlooked by previous studies. According to the node structure theory, information is stored in nodes that get activated “bottom-up” or “top-down” (Shafto & MacKay, 2000, p. 373). Thus, when a person is presented with a Moses illusion question (e.g., “How many animals of each kind did Moses take on the Ark?”), while “Moses” is only primed phonologically, “Noah” is semantically primed through two sources: contextual information in the question (e.g., animal, Ark, etc.), and the semantic relatedness between Noah and Moses. Due to “the-most-primed-wins principle”, since “Noah” is primed more than “Moses”, “Noah” gets activated (Shafto & MacKay, 2000, p. 374). Because of this shift in the direction of activation, “Moses” is misconceived as “Noah”. Using the node structure theory, Shafto and MacKay were also able to explain Armstrong and Mega-Moses illusions. Armstrong illusion relies on the phonological similarity between the original and the impostor term (e.g., “What was the famous line uttered by Louis Armstrong [instead of Neil Armstrong] when he first set foot on the moon?” Shafto & MacKay, 2000, p. 373), whereas Mega-Moses illusion relies on both semantic and phonological similarities (e.g., “The 1868 impeachment trial involving former vice president Lyndon Johnson [instead of Andrew Johnson] followed what major American war?” as opposed to “The 1868 impeachment trial involving former vice president James Madison [instead of Andrew Johnson] followed what major American war?” Shafto & MacKay, 2000, p. 377). Recently, a study by Davis and Abrams (2016) supported the node structure theory in the visual domain. Their findings showed that when general knowledge questions about celebrities were asked in the illusion task, visual similarity between the original and the impostor celebrities increased the illusion rate (e.g., “Which movie has Keira Knightley [instead of Natalie Portman] playing a ballet dancer who slowly loses her mind?”, p. 90). They argued that facial

features are represented in nodes thus, similarities in these features work just as semantic and phonological similarities in creating the illusion.

According to Mata, Ferreira, and Reis (2013), single process models such as partial match hypothesis are insufficient to explain the semantic illusion phenomenon because they focus only on the role of automatic processing. Mata et al. (2013) proposed that while automatic processing makes it easier to overlook the semantic illusion, controlled processing enables the detection of the illusion after careful matching of illusory sentences with knowledge in memory. Their results supported their hypothesis by showing that high cognitive load condition led to higher illusion rate compared to low cognitive load (Mata et al., 2013). In another experiment, they attempted to measure the effect of automatic processing, separate from controlled processing. In order to increase the effect of automatic processing, participants in the experimental condition were presented with paired words to be remembered for a subsequent recall test (e.g., “Moses – Ark, wool – sheep” Mata et al., 2013, p. 437). These pairs were from illusory and control sentences that were presented in the illusion task following the “paired-associate learning phase” (Mata et al., 2013, p. 437). Although initial results appeared to be showing that when enhancing automatic processing through paired-associate learning, illusion rates increased as predicted by Mata et al. (2013), when only looking at items whose correct answer participants knew, the effect disappeared. Typically, in semantic illusion studies, a knowledge check test is administered after the illusion task to identify the items which participants did not know to begin with (e. g., someone who is not familiar with monotheistic texts might not even know about the story of the Noah’s Ark, hence any illusion-like behavior would not really correspond to a semantic

illusion). More detailed information about knowledge check test will be given in “1.4 Temporary False Memory Effect” section.

Similar to Mata et al. (2013), Hannon (2014) proposed that single process models are insufficient to fully explain mechanisms involved in the processing of semantic illusions based on research showing that cognitive functions and individual differences play a role in the detection of semantic illusions. In 2001, Hannon and Daneman showed that “knowledge access” ability and “working memory” capacity had distinct effects on the illusion rates (p. 451). In a later study, Büttner (2012) showed that when a semantic illusion task is accompanied by a concurrent task of “articulatory suppression” or “random number generation”, illusion rate increased (p. 884). Finally, Raposo and Marques (2013) proposed that semantic illusions can be successfully detected if one recognizes the distortion and suppresses his/her tendency to respond as if the statement/question was undistorted. They showed that processing semantic illusion sentences took longer compared to “true” and “clearly false” sentences. They also found that during successful detection of the distortions, “right dorsolateral prefrontal cortex”, “anterior cingulate cortex”, “right orbitofrontal cortex”, and “right insula/putamen” were activated (Raposo & Marques, 2013, p. 435). Authors suggested that these regions were involved in conflict monitoring and inhibition of pragmatic inferences, which might play a key role in the detection of semantic illusions (Raposo & Marques, 2013).

## 1.2 Processing fluency

Previous research and theories on semantic illusion suggest that people are susceptible to illusion mostly because they do not process information carefully. Therefore, the ease of processing may be an important factor that makes it easier to fall prey to semantic

illusions. Nevertheless, research on processing fluency in general shows mixed results on its effects on performance.

According to Fiske and Taylor (2008), humans are “cognitive misers” and they prefer to process information with minimal effort (p. 13). Alter (2013) suggested that to overcome this problem, “cognitive roadblocks” such as changing the font type should be used in tasks (Alter, 2013, p. 437). These cognitive roadblocks will serve to make the information disfluent, shifting the automatic processing to effortful, controlled processing. As Alter (2013) summarized, previous research suggests that disfluent processing leads to better performances in different tasks including the semantic illusion.

In their 2008 study, Song and Schwarz, found that illusion rate was lower (53%) in a difficult-to-read font condition compared to an easy-to-read font condition (88%). This finding supported their prediction that disfluency would lead to deeper processing compared to fluent condition. In the same study, participants answered the undistorted (control) question more correctly in the easy-to-read condition (88%) than in the difficult-to-read condition (53%). This was also in line with their prediction that familiarity impression induced by ease of processing will make participants answer questions without giving much thought; on the other hand, participants in the difficult-to-read condition are expected to be more skeptical.

In a recent study Geipel, Hadjichristidis, and Surian (2015) investigated the effect of language (foreign vs. native language) in moral judgements. Prior research showed that foreign language creates an emotional distance from the test items (e.g., words, scenarios, etc.) and leads to more systematic processing, preventing biased thinking (Caldwell-Harris, 2014; Keysar, Hayakawa, & An, 2012). Therefore, Geipel et al., (2015) predicted less severe moral judgments in foreign language context. They

proposed two hypotheses. According to controlled processing hypothesis, foreign language would inhibit intuitive judgements and lead to more objective processing of scenarios. On the other hand, automatic processing hypothesis predicted that foreign language would not completely inhibit intuition; nevertheless participants would be less critical to the scenario compared to native language context. In order to better understand which hypothesis is more successful in predicting the processes involved in foreign language condition separate from emotional context, they also conducted a semantic illusion experiment based on Song and Schwarz (2008). According to controlled-processing hypothesis, foreign language would facilitate detection through careful analysis. On the other hand, automatic processing hypothesis did not predict any improvement in detection in foreign language context, even a decline in performance is expected due to increase in cognitive load. Participants received two questions either in a foreign language (German) or in their native language (Italian). Results showed that more participants detected the illusion in the native language condition (35.1%) than in the foreign language condition (16.2%), contrary to Song and Schwarz's (2008) findings and controlled processing hypothesis. For the undistorted question, no difference between languages in correct response rate was observed.

Taken together, these two studies showed conflicting results as to how disfluency influences semantic illusion rate. Therefore, from the difference in the means of their main manipulations, it would be reasonable to propose that perceptual and conceptual disfluencies may have different effects on semantic illusion. As findings of Geipel et al., (2015) suggest, processing semantic illusion questions in a foreign language induces a conceptual disfluency which seems more demanding than processing them in a difficult-to-read font type. Since the semantic illusion task itself is demanding by its dual nature,



(i.e., answering general knowledge questions and detecting distortions; Büttner, 2007), processing in a foreign language might have increased cognitive load. On the other hand, perceptual disfluency induced by font manipulation might have facilitated detection by creating a need to re-read the text, thus increasing the chances to detect the distortion. Note that both studies (Geipel et al., 2015; Song & Schwarz, 2008) were in paper-pencil format, and reading times were not measured. Moreover, both studies had a between-subjects design in which each participant is exposed to only one level of the independent variable (i.e., font type and language, respectively) and answered only two questions (i.e., one distorted, one undistorted). Although there is no consensus on the literature as to the ideal number of questions to be asked in a semantic illusion task, in most of the studies number of questions asked is above fifty (e.g., Davis & Abrams, 2016; Reder & Kusbit, 1991). Another important weakness of these two studies is that they lacked a knowledge check test in which participants' knowledge about the items were tested.

### 1.3 Metamemory

While semantic illusion appears to be a robust effect, to our knowledge no study to date has investigated the relationship between the semantic illusion rate and confidence in knowledge. Recently, Cantor and Marsh's (2017) study showed that less illusion occurred when questions fall within participants' areas of expertise.

“Metamemory is the study of what people know and understand about their own memory and memorial processes.” (Benjamin, Bjork, & Schwartz, 1998, p. 55).

Measures that are generally used in metamemory research are feeling of knowing (FOK), confidence judgments, and judgements of learning. According to metamemory theory of confidence (Brewer & Sampaio, 2012), when computing confidence

judgments in a semantic memory test, people make use of “metamemory beliefs” about “experiential information” and “explicit reasoning strategies” and their relationship with memory accuracy (p. 61). They explained experiential information as one’s awareness of knowing something, and it has been considered to be parallel to feeling of knowing. They have reasoned that when a person lacks sufficient direct knowledge about the topic in question, s/he uses explicit reasoning strategies to come up with a rational answer.

Brewer and Sampaio (2012) looked at the relationship between confidence judgements and accuracy on a semantic memory task using “deceptive” and “nondeceptive” true/false questions about geography (e.g., “Mexico City, Mexico is south of St. Paul, Minnesota”, p. 64). They predicted that the same mechanisms would be used in generating confidence judgements for both deceptive and nondeceptive questions. The relationship between confidence and accuracy was expected to be positive for nondeceptive items and negative for deceptive items because authors assumed that participants would not realize the deception in questions and generate confidence judgements as if their answers were accurate. Findings confirmed their expectations.

#### 1.4 Temporary false memory effect

A standard procedure in semantic illusion research is to administer a knowledge check test to participants after the illusion task and to calculate the illusion rate only based on the questions answered correctly in that test. The main reason to have a knowledge check is to ensure that participants know the correct answer to begin with. But another interesting phenomenon is observed when using such knowledge check tests. Inspired by previous research showing that exposure to counterfactual information in a story context

or a multiple-choice test may distort knowledge about the facts in a later knowledge test, Bottoms, Eslick, and Marsh (2010) suspected that exposure to distorted questions in the Moses illusion paradigm may also influence answers to knowledge check questions which in return may lead to the underestimation of the illusion rate due to incorrect answers in the knowledge check test. In their study, they found a positive relationship between failing to detect the illusion and answering its knowledge check counterpart incorrectly (e.g., answering “Who took two animals of each kind to the Ark?” with “Moses” after failing to notice the Moses illusion), suggesting a methodological problem in calculating the illusion rate. Following studies found that although older adults also failed to notice distortions in questions or stories, their answers in later knowledge check tests were less influenced by exposure to misinformation compared to younger adults (Umanath, Dolan, & Marsh, 2014; Umanath & Marsh, 2012). Marsh and Umanath’s (2014) explanation for this effect was that when people fail to notice the distortion in a question, they temporarily store the distorted form which then becomes more accessible during the knowledge check test. Hence it would be a better practice to double-check participants’ knowledge with an additional test.

### 1.5 Present study

The aim of this study is to better understand how processing fluency influences semantic illusion. Studies reported so far revealed conflicting findings; some also had a few methodological issues. We conducted two experiments. In the first experiment, language of the text was manipulated to induce a *conceptual* disfluency as Geipel et al. (2015) did, but with a within-subjects design, increased number of distorted and undistorted questions, and an additional knowledge check test. Additionally, we administered a

Stroop task in order to investigate whether inhibitory control ability would influence illusion rate similar to working memory capacity (Hannon & Daneman, 2001). In the second experiment, the *perceptual* disfluency was investigated by manipulating the sound clarity of auditorily presented questions. The second experiment had two versions: 2A and 2B. In Experiment 2A disfluency was created by a background white noise. In Experiment 2B, instead of the white noise, 100-ms silences were inserted onto the audio file to disrupt processing. In all experiments, an extra fact check form was administered after the knowledge check test to have a more accurate measure of participants' knowledge. Finally, in order to examine whether semantic illusion rate is related to confidence in one's knowledge, confidence ratings were taken after each response in the knowledge and fact check tests.

In general, it is expected that the results of the first experiment be in parallel with Geipel et al. (2015), showing diminished performance in foreign language. In the second experiment, manipulation of the sound clarity would induce a perceptual disfluency which may lead to improved detection rates as Song and Schwarz (2008) showed. On the other hand, taking into account insufficient research in the literature and methodological weaknesses both studies had one might expect to see the opposite results. We are also curious to see whether correct response rates for undistorted questions will vary depending on language or sound clarity. Geipel et al. (2015) did not find a difference based on language whereas Song and Schwarz (2008) observed a drop in performance in the difficult-to-read condition. However, both studies had some limitations as mentioned before; hence it is difficult to know how robust their findings are.

Based on Brewer and Sampaio's (2012) findings, a positive relationship between correct response rates for the undistorted questions and confidence ratings is expected. Due to insufficient research, clear predictions cannot be made regarding the relationship between the illusion rate and confidence ratings. Therefore, we posit two hypotheses that are plausible: (1) Assuming that high confidence rating indicates better, more accessible knowledge for that information, participants may be more susceptible to illusion for questions they have less knowledge and confidence, which would result in a negative correlation between illusion rate and confidence judgements (cf. Cantor & Marsh, 2017); (2) The opposite is also possible, participants may be more susceptible to illusion for items they have high confidence due to shallow processing or false impression of correctness that may come from high feeling of knowing, and accessibility of the knowledge. Therefore, a positive correlation is expected between the illusion rate and confidence judgements.

## CHAPTER 2

### EXPERIMENT 1

#### 2.1 Method

##### 2.1.1 Participants

Fifty-nine Boğaziçi University undergraduate students (39 females,  $M_{age} = 20.39$ ,  $SD = 1.68$ ) participated in the study in exchange of course credit. All participants were native speakers of Turkish and have been taught English as a second language. The mean age at which they began learning English was 9.64 ( $SD = 1.81$ ). Participants rated their reading comprehension ability in English on a 5-point Likert scale, higher scores indicating better comprehension ( $M = 3.78$ ,  $SD = 0.69$ ). Sample size was determined after a pilot study conducted with the same design<sup>1</sup>.

Four participants were excluded from the analyses because they did not comply with the instructions while responding to the illusion task. Since the aim of the present study was to investigate the effects of disfluency by manipulating language competence, it was assumed that participants would be less fluent in English than Turkish. Four participants who started to learn English at an earlier age and reported high English proficiency scores (e. g., on TOEFL, IELTS or similar tests) were excluded from the analyses for this reason.

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<sup>1</sup> Nine students from Boğaziçi University (5 females,  $M_{age} = 24.22$ ) volunteered to participate in the pilot study. Although sample size was small, results showed that illusion rate was significantly higher for questions presented in English than Turkish,  $F(1, 8) = 7.30$ ,  $MSE = .12$ ,  $p = .03$ ,  $\eta_p^2 = .48$ .

### 2.1.2 Design

The experiment was a 2 (language: Turkish as native language, English as foreign language) X 2 (language order: Turkish-English, English-Turkish) X 2 (list order: List 1-List 2, List 2 – List 1) mixed design analysis of variance. Language was a within-subjects variable, whereas language order and list order were between-subjects variables. Dependent measures were illusion rate, correct response rate, and reading time. Correlational measures were confidence and difficulty ratings.

### 2.1.3 Materials

#### 2.1.3.1 Illusion task

The illusion task consisted of 72 general knowledge questions (see Appendix A). Twenty-four of these questions were distorted (e.g., “When did the September 11 terrorist attack to the Twin Towers in Washington happen?”), the remaining 48 questions were undistorted questions (e.g., “Which ancient Greek warrior was killed by an arrow shot into his heel?”). All distorted questions were created by replacing a critical word in a general knowledge question with a semantically related but incorrect term as stated in Park and Reder (2004). Additional 10 questions (6 undistorted) served as practice questions. General knowledge questions used in the study were either originally constructed for this study or adapted from previous studies (Büttner, 2007; Davis & Abrams, 2016; Erickson & Mattson, 1981; Hannon & Daneman, 2001; Kan et al., 2010; Mata, Ferreira & Reis, 2013; Reder & Kusbit 1991; Umanath, Dolan & Marsh 2014), and general knowledge quizzes available online. In a pilot study, a total of 104 general knowledge questions were tested with 16 undergraduate students (14 females,  $M_{age} = 18.8$ ) in a multiple choice format. Each question had a “don’t know” option to eliminate

any guesses. Questions that were not answered correctly by more than half of the sample were either modified or excluded from the list.

All 72 questions used in the study had a Turkish and English version. We divided them into two lists of 36 questions so as to present them in different languages with a blocked design. Thus, by counterbalancing language order and list order of the questions, we created four sets (i.e., experiment files). A set consisted of two lists, each having 36 questions (12 distorted, 24 undistorted). In a given list, the order of distorted and undistorted questions was pseudo-randomized so that no more than three distorted questions were presented consecutively. Participants were randomly assigned to one of the four sets. The order of the lists (List 1 – List 2, List 2 – List 1) and the order of languages (English-Turkish, Turkish-English) were counterbalanced across sets. The task was prepared and run using E-Prime 2.0 Software (Psychology Software Tools, Pittsburgh, PA).

#### 2.1.3.2 Stroop task

A Stroop task measures the effect of interference due to extra information present in the stimulus that is conflicting with the task demands. Typically, this conflict is created when a color name was presented in a color that is different from the color name (i.e., word “red” is presented in green color.). The Stroop task used in the presented study was modified and translated from Stroop (1935/1992), which was available online (STEP E-Prime Scripts, 2016). The colors used were blue, green, yellow, and red. The task consisted of four parts, namely “naming color” (NC), “reading color names where color print and color word are different” (RCNd), “naming color of word test where color print and color word are different” (NCWd), and “reading color names printed in black”



(RCNb) (Stroop, 1935/1992, p. 16 – 17). In NC, the task was to identify the color of the meaningless stimulus “@@@@@”. In RCNd, the task was to identify/read the presented color name where the color of the word and the presented color name were different. In NCWd, the task was to identify the color of the presented color name where the color and the color name were different. In RCNb, the task was to identify/read the color name presented in black. These four parts were randomly ordered across participants. There were 12 trials in each part. Each stimulus was presented on a silver-colored background. After the execution of the correct response by pressing the first letter of the correct color in the keyboard, a blank silver screen appeared for 500 ms before the new stimulus was presented. At the beginning of the task, four practice trials for each part were completed. During the practice trials, each response was followed by a feedback screen showing the response time and whether the response was correct or incorrect. In the experimental trials, instead of the feedback screen, participants were allowed to respond until they gave the correct response. The task was prepared and run using E-Prime 2.0 Software (Psychology Software Tools, Pittsburgh, PA).

#### 2.1.3.3 Demographic form

Participants were asked to respond to questions regarding their year at the university, educational background, and foreign language competence (see Appendix B). The form was created and filled in via Google Forms.

#### 2.1.3.4 Knowledge check test

In the knowledge check form participants were asked to answer 72 multiple choice questions (see Appendix C). These questions were modified versions of the questions in

the illusion task. All questions were modified such that this time the critical/distorted term was asked for in question format (e.g., “Which city in US hosted the Twin Towers that were attacked on September 11, 2001?”). In order to eliminate the possible effects of prior exposure (cf. Bottoms et al., 2010), participants were instructed to answer each question as if they have not participated in the illusion task. Each question had three options and a “don’t know” option to eliminate guessing. After each response, participants were also asked to give confidence rating on a 5-point Likert scale (1 = *not confident at all*, 5 = *very confident*). The form is created and filled in via Google Forms.

#### 2.1.3.5 Fact check form

In the fact check form, correct forms of all 24 distorted questions were presented as facts (e.g. “The Twin Towers that were attacked by terrorists on September 11, 2001 were in New York.”) (see Appendix D). For each fact, participants were asked whether they were familiar with the fact presented to them before their participation in the experiment. Responses were given on a 6-point Likert scale (1 = *No, I certainly didn’t know*, 6 = *Yes, I certainly knew*). The form is created and filled in via Google Forms.

#### 2.1.3.6 Semantic association form

In the semantic association form, participants were asked to rate the semantic relatedness and confusability of the original and impostor terms in 24 distorted questions (see Appendix E). Ratings were given on a 5-point Likert scale (1 = *not related at all*, 5 = *very related and confusable*). The form was created and filled in via Google Forms.

#### 2.1.3.7 Difficulty rating form

In the difficulty rating form, participants were asked to rate the difficulty of all 72 questions in the illusion task on a 5-point Likert scale (1= *very easy*, 5 = *very difficult*). Distorted questions in the illusion task were presented in their correct form (e.g., “When did the September 11 terrorist attack to the Twin Towers in Washington happen?”, see Appendix F). The form is created and filled in via Google Forms.

#### 2.1.4 Procedure

All data were collected after the IRB approval of Boğaziçi University. The experiment took place in Cognitive Processes Laboratory at Boğaziçi University. All participants were asked to sign the informed consent form upon arrival. Each participant was taken to a separate cubicle and all tasks and forms were completed on computers. Participants were instructed to read the instructions of each task carefully and respond accordingly. The experiment started with the illusion task, which took about 25 minutes. The instructions (see Appendix G) informed the participants about how to respond to questions: when they knew the answer to a question, they had to write the answer; when they did not know the answer to a question, they had to write “don’t know”; when they thought they knew the answer but were unable to recall it, they had to write “don’t remember”; and they were informed that during the task they might encounter some questions that contain erroneous information, when they read such questions, they had to write “wrong” as an answer. The illusion task was made up of two sessions changing in the presentation language (English and Turkish). In both sessions, participants were instructed to give their answers spontaneously in whichever of the two languages.

Each session started with five practice questions (3 undistorted, 2 distorted). After responding, participants saw the correct answers and explanations. No feedback was provided in the experimental phase. A typical experimental trial started with an untimed “Press any key to start when you are ready” screen. Participants were able to move to the question screen by pressing any key. The question screen was also untimed. Participants were asked to press enter key to move to the response screen. The response screen consisted of a text box in which participants wrote their responses using the keyboard and pressed enter key to submit them. After the illusion task, the Stroop task was administered. The task started with practice trials, and the task took about 5 minutes in total. Then, online forms were administered in the following order: demographic, knowledge check, fact check, semantic-association, and difficulty rating. Participants were instructed to respond questions as if they had not participated in the illusion task. In the difficulty rating form, participants were instructed to rate how difficult they found the item when they encountered it during the illusion task. The experimental session took about 50 minutes.

## 2.2 Results

### 2.2.1 Data analysis

Illusion rates were calculated by taking into account the fact check rather than knowledge check questions since they were expected to be less vulnerable to exposure effects from the illusion task (cf. Bottoms et al., 2010). A response was coded as illusion, when participants answered a distorted question as if it was undistorted and proved that they knew the correct answer in the fact check test (rating 6 = *Yes, I certainly knew* to 4 = *I think I knew*). A response was coded as detection, when

participants identified a distorted question as distorted (writing “wrong”) and similarly showed that they knew the correct answer. For each participant, the illusion rate was calculated by the formula [illusion count / (illusion count + detection count)] (Erickson & Mattson, 1981; Izaute, Paire-Ficout, & Bacon, 2004). Detection rate (Det. Rate) was equal to (1 – illusion rate). This way, participants were not held responsible for items they were not knowledgeable about.

When calculating false alarm rates, responses to knowledge check questions were taken into account. A response was coded as false alarm, when a participant responded an undistorted question as if it was distorted (writing “wrong”), and gave a correct response in the knowledge check. A response was coded as correct, when a participant responded an undistorted question correctly, and gave a correct response in the knowledge check. False alarm rate (F.A. Rate) was calculated by the formula: [(false alarm count) / (false alarm count + correct count)]. Correct response rate only consisted of undistorted questions and was calculated with the formula: [(correct count / total number of undistorted questions)].

Response sensitivity was calculated with  $A'$  and bias was calculated with  $B''_D$  as Kamas, Reder, and Ayers (1996) and Izaute et al. (2004) did. The formulas were adapted from Donaldson (1992, p. 275):

$$A' = \frac{1}{2} + \frac{[(Det. Rate - F.A. Rate) \times (1 + Det. Rate - F.A. Rate)]}{[4 \times Det. Rate \times (1 - F.A. Rate)]} \quad (1)$$

$$B''_D = \frac{[(1 - Det. Rate) \times (1 - F.A. Rate) - Det. Rate \times F.A. Rate]}{[(1 - Det. Rate) \times (1 - F.A. Rate) + Det. Rate \times F.A. Rate]} \quad (2)$$

### 2.2.2 Illusion rate

Participants' performance according to conditions is presented in Table 1.

Table 1. The Distribution of Participants According to Their Response Patterns in Each Set

Performance	List 1 – List 2		List 2 – List 1	
	TR – EN	EN– TR	TR – EN	EN – TR
Turkish > English	3 (23%)	7 (58.3%)	5 (38.5%)	3 (23%)
Turkish = English	0 (0%)	1 (8.3%)	3 (23%)	0 (0%)
English > Turkish	10 (77%)	4 (33.3%)	5 (38.5%)	10 (77%)
Total	13	12	13	13

A 2 (language: Turkish, English) x 2 (language order: Turkish-English, English-Turkish) x 2 (list order: List 1-List 2, List2-List 1) mixed design ANOVA was conducted on illusion rate. A significant effect of language was observed,  $F(1, 47) = 4.47$ ,  $MSE = 284.90$ ,  $p = .04$ ,  $\eta_p^2 = .09$  (see Figure 1). Illusion rate was higher for questions presented in English ( $M = 59.76$ ,  $SD = 25.14$ ) compared to Turkish ( $M = 52.61$ ,  $SD = 23.07$ ). There was no effect of language order,  $F(1, 47) = 1.06$ ,  $p > .10$ ,  $\eta_p^2 = .02$  or list order on the illusion rate,  $F(1, 47) = 2.07$ ,  $MSE = 856.63$ ,  $p = .16$ ,  $\eta_p^2 = .04$ . Three-way interaction of language, language order, and list order was significant,  $F(1, 47) = 5.32$ ,  $MSE = 284.90$ ,  $p = .03$ ,  $\eta_p^2 = .10$ .

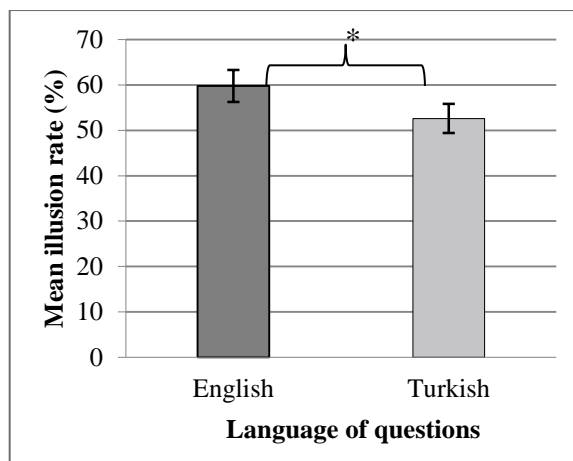


Figure 1. Mean percent illusion rate for questions presented in English and Turkish with error bars representing standard error of the means

Two 2 (language: Turkish, English) x 2 (language order: Turkish-English, English-Turkish) ANOVAs were conducted for each list order as follow-up analyses. The analyses revealed a significant interaction between language and language order only in List 2 – List 1 order [ $F(1, 24) = 5.05$ ,  $MSE = 268.56$ ,  $p = .03$ ,  $\eta_p^2 = .17$ ]. To explain this interaction, two paired-samples t-test analyses were conducted, which showed that the illusion rate in English ( $M = 70.62$ ,  $SD = 27.70$ ) was significantly higher than Turkish ( $M = 53.92$ ,  $SD = 21.96$ ) only in English-Turkish order of List 2 – List 1 condition,  $t(12) = 2.41$ ,  $p = .03$  (see Figure 2). Additionally, two 2 (language: Turkish, English) x 2 (list order: List 1 – List 2, List 2 – List 1) mixed design ANOVAs were conducted, which showed that only in English - Turkish order, the effect of language was marginally significant, irrespective of list order [ $F(1, 23) = 4.08$ ,  $MSE = 280.20$ ,  $p = .06$ ,  $\eta_p^2 = .15$ ]. Illusion rate in English ( $M = 64.21$ ,  $SD = 25.97$ ) was higher compared to Turkish ( $M = 54.36$ ,  $SD = 22.70$ ).

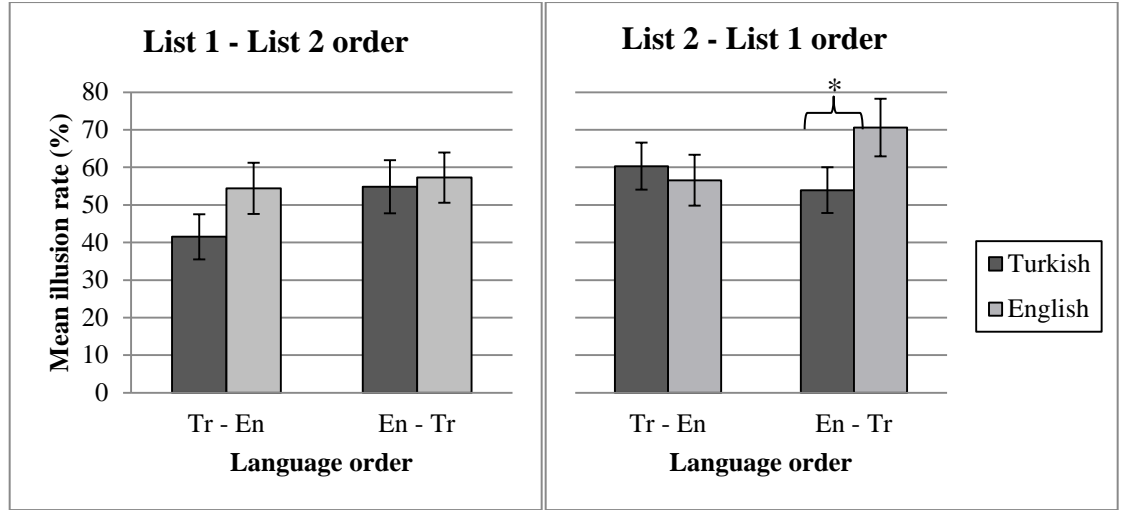


Figure 2. Mean percent illusion rate for Turkish and English as a function of language order. List order was represented separately. Error bars represent standard error of the means

### 2.2.3 Correct response rate

A 2 (language: Turkish, English) x 2 (language order: Turkish-English, English-Turkish) x 2 (list order: List 1-List 2, List2-List 1) mixed design ANOVA was conducted on correct response rate for undistorted questions. Levene's test of equality of error variances was observed to be slightly significant at  $p = .04$ . Therefore, data from one participant (who scored 2 standard deviations below the mean) was excluded from the analysis. There was a significant effect of language on the performance for undistorted questions,  $F(1, 46) = 6.14$ ,  $MSE = 70.11$ ,  $p = .02$ ,  $\eta_p^2 = .12$  (see Figure 3). Correct response rate was higher in questions presented in Turkish ( $M = 52.92$ ,  $SD = 14.73$ ) compared to English ( $M = 48.83$ ,  $SD = 12.83$ ). There was no effect of language order,  $F(1, 46) = 1.66$ ,  $MSE = 307.26$ ,  $p > .10$ ,  $\eta_p^2 = .03$  or list order on correct response rate,  $F$



$(1, 46) < 1, p > .10, \eta_p^2 = .02$ . Three-way interaction of language, language order, and list order was marginally significant,  $F(1, 46) = 3.87, MSE = 70.11, p = .06, \eta_p^2 = .08$ .

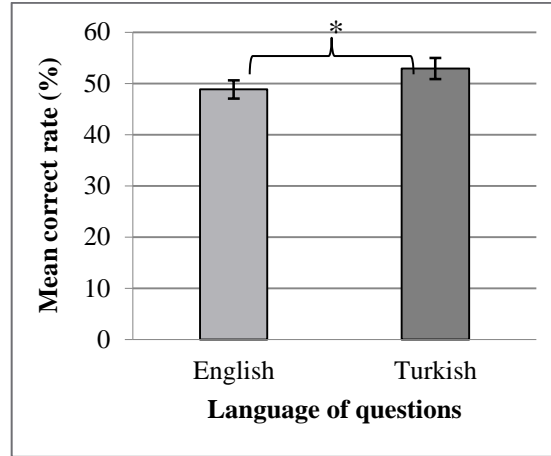


Figure 3. Mean percent correct response rate for undistorted questions in English and Turkish with error bars representing standard error of the means

In order to better understand this interaction follow-up analyses were conducted. A 2 (language: Turkish, English) x 2 (language order: Turkish-English, English-Turkish) mixed design ANOVA showed that only in List 1 – List 2 order, correct response rate in Turkish ( $M = 55.56, SD = 15.03$ ) was significantly higher compared to English ( $M = 49.65, SD = 14.00$ ),  $F(1, 22) = 7.08, MSE = 59.05, p = .01, \eta_p^2 = .24$  (see Figure 4). Additionally, in List 1 – List 2 order, the interaction between language and language order was marginally significant,  $F(1, 22) = 4.14, MSE = 59.05, p = .05, \eta_p^2 = .16$ . Further analysis revealed that correct response rate in Turkish ( $M = 61.46, SD = 15.60$ ) was significantly higher than English ( $M = 51.04, SD = 16.77$ ) only in Turkish-English order of List 1 – List 2 order [ $t(11) = -2.68, p = .02$ ]. Additionally, another 2 (language: Turkish, English) x 2 (list order: List 1 – List 2, List 2 – List 1) mixed design ANOVA

revealed that only in Turkish - English order, the effect of language was significant, [ $F(1, 23) = 4.41, MSE = 81.49, p < .05, \eta_p^2 = .16$ ] and a marginally significant interaction was observed between language and list order, [ $F(1, 23) = 3.90, MSE = 81.49, p = .06, \eta_p^2 = .15$ ]. Further analyses revealed that correct response rate in Turkish ( $M = 61.46, SD = 15.60$ ) was significantly higher than English ( $M = 51.04, SD = 16.77$ ) only in List 1 – List 2 order of Turkish-English order, [ $t(11) = -2.68, p = .02$ ].

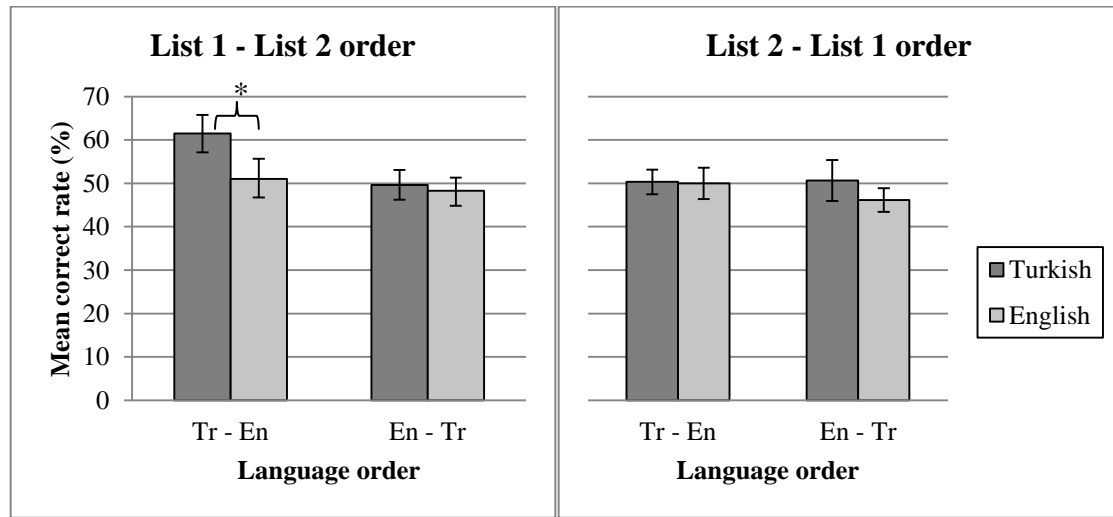


Figure 4. Mean percent correct response rate in undistorted questions for Turkish and English as a function of language order. List order was represented separately. Error bars represent standard error of the means

Results for either illusion or correct response rates did not differ much after eliminating trials with reading times that were 2.5 SD above or below the mean value<sup>2</sup>.

<sup>2</sup> Three-way interaction of language, language order and list order on the correct response rate has disappeared,  $F(1, 47) = 2.23, MSE = 88.72, p = .14, \eta_p^2 = .05$ .

#### 2.2.4 Response sensitivity and bias

Two paired-samples t-tests were conducted to see whether participants' sensitivity and response bias differed between questions in English and Turkish. There was no significant difference in the sensitivity degrees ( $A'$ ) for questions in English ( $M = 0.81$ ,  $SD = 0.10$ ) and Turkish ( $M = .82$ ,  $SD = .10$ ),  $t(42) = -.95$ ,  $p > .10$ . Participants' response biases ( $B''_D$ ) did not differ between English ( $M = .81$ ,  $SD = .34$ ) and Turkish ( $M = .77$ ,  $SD = .39$ ),  $t(50) = .58$ ,  $p > .10$ .

#### 2.2.5 Confidence ratings

In order to investigate the relationships of confidence judgements in the *knowledge check test* with illusion rate and correct response rate for each item, separate Kendall's Tau correlations were run. Illusion rate was negatively associated with confidence ratings, for items presented in Turkish,  $r_t = -.41$ ,  $p < .01$  (see Figure 5); and approached significance for items presented in English,  $r_t = -.23$ ,  $p = .11$ . For items in both Turkish and English, the illusion rates increased as confidence ratings decreased. Correct response rate was positively associated with confidence ratings, for items presented in Turkish,  $r_t = .59$ ,  $p < .001$ ; and for items presented in English,  $r_t = .53$ ,  $p < .001$  (see Figure 6). In both languages, as confidence ratings increased, correct response rates increased<sup>3</sup>.

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<sup>3</sup> Since confidence judgments used in these analyses were taken during the knowledge check test, we replicated these analyses with the illusion rates (which were originally calculated according to the fact check test) that were calculated according to only knowledge check responses. No correlation was observed between illusion rate and confidence ratings for questions presented in English,  $r_t = -.12$ ,  $p > .10$ .

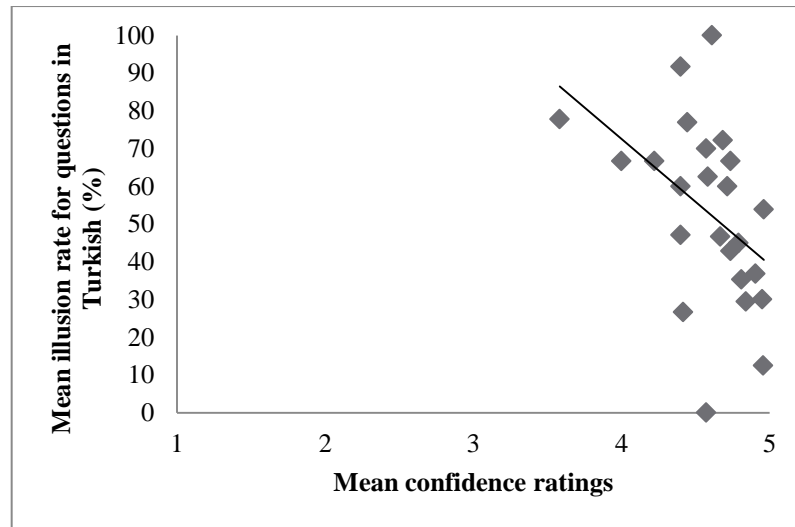


Figure 5. The relationship of mean percent illusion rate for questions presented in Turkish and mean confidence ratings

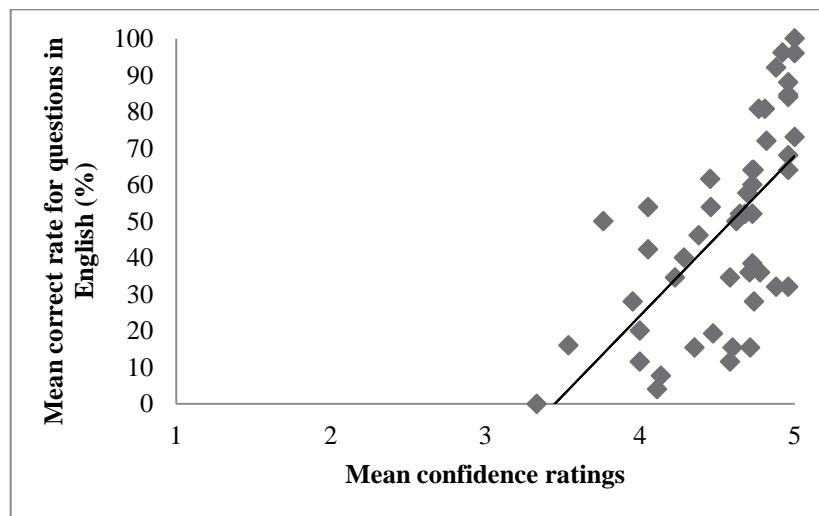


Figure 6. The relationship of mean percent correct response rate for questions presented in English and mean confidence ratings

The same analyses were also run with confidence judgements in the *fact check test*. There was a marginally significant negative relationship between illusion rate and

confidence for items presented in Turkish,  $r_{\tau} = -.28, p = .06$ . As confidence ratings increased, illusion rate decreased. No relationship was observed for items presented in English,  $r_{\tau} = -.18, p > .10$ .

#### 2.2.6 Difficulty ratings

In order to examine any relationship between difficulty rate ratings with illusion and correct response rates, separate Kendall's tau correlations were run for items in Turkish and English. Correct response rate was negatively correlated with difficulty ratings for items in both Turkish,  $r_{\tau} = -.75, p < .001$  (see Figure 7); and English,  $r_{\tau} = -.78, p < .001$ . For both languages, as the correct response rate increased, difficulty ratings decreased. No relationship was observed between illusion rate and difficulty ratings (Turkish:  $r_{\tau} = .15, p > .10$  (see Figure 8); English:  $r_{\tau} = .07, p > .10$ ), i.e., participants showed neither more nor less illusions depending on item difficulty.

Since both confidence and difficulty ratings were correlated with correct response rate in undistorted questions, we also conducted correlation analyses to investigate whether confidence and difficulty ratings were correlated. Results showed that there was a negative correlation between confidence and difficulty ratings (Turkish:  $r_{\tau} = -.55, p < .001$ ; English:  $r_{\tau} = -.48, p < .001$ ).

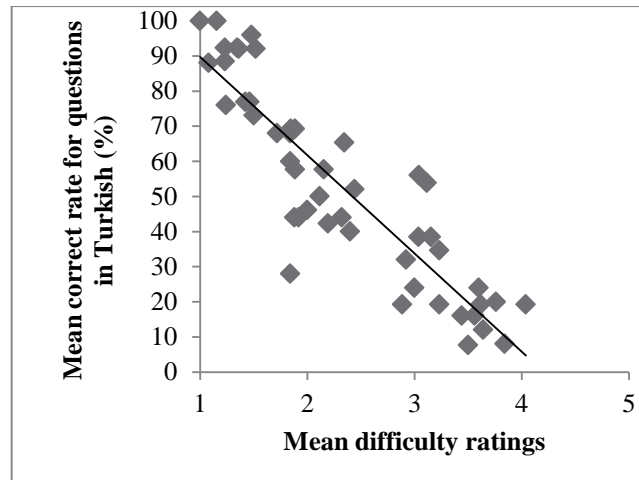


Figure 7. The relationship of mean percent correct response rate for questions presented in Turkish and mean difficulty ratings

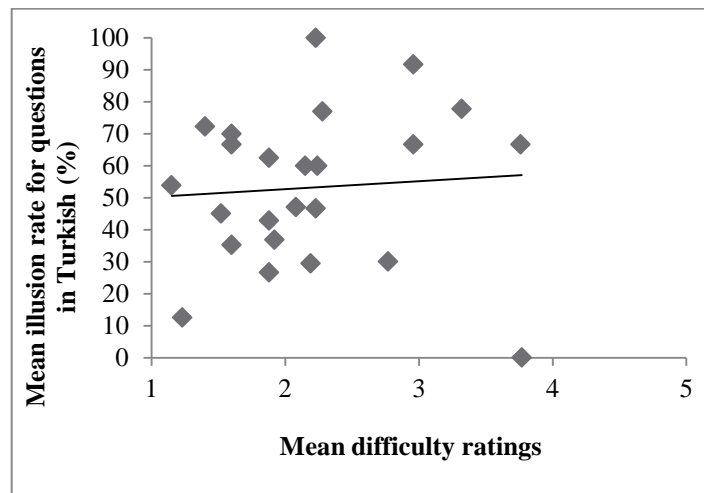


Figure 8. The relationship of mean percent illusion rate for questions presented in Turkish and mean difficulty ratings

### 2.2.7 Other correlation analyses

Two Kendall's Tau correlation analyses were conducted to examine a potential relationship between semantic association ratings and illusion rates for each distorted

item. Results showed a positive correlation between semantic association ratings and illusion rate (Turkish:  $r_t = .49, p < .01$ , see Figure 9; English:  $r_t = .36, p = .02$ ). Illusion rate increased as semantic association ratings increased.

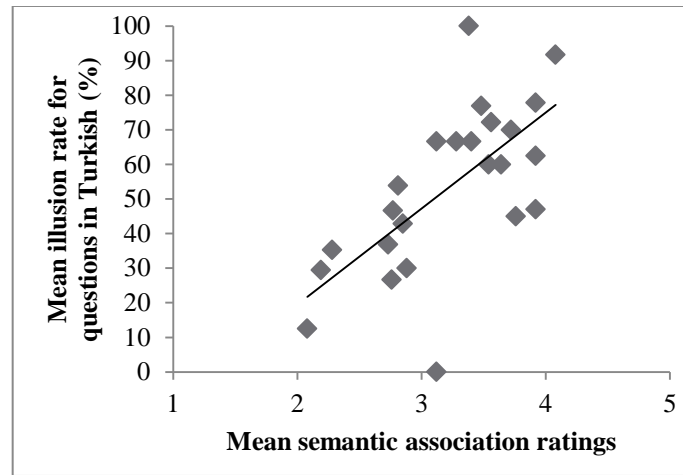


Figure 9. The relationship of mean percent illusion rate for questions presented in Turkish and mean difficulty ratings

Separate Pearson's correlation analyses showed that reading time was not associated with word count in questions both in Turkish ( $r = .19, p > .10$ ) and in English ( $r = .04, p > .10$ )<sup>4</sup>.

In order to examine a potential relationship between performance in Stroop task and illusion rate, two Pearson's correlation analyses were carried out for items in English and Turkish. There was no correlation between illusion rate and interference scores measured in the Stroop task (Turkish:  $r = .15, p > .10$ ; English:  $r = .13, p > .10$ ).

<sup>4</sup> In the data we used for these analyses, trials with reading times that were 2.5 SD above and below the mean were excluded. The results were not significantly different when we ran the same analyses with raw reaction time data.

## CHAPTER 3

### EXPERIMENT 2

The aim of the second experiment was to investigate the effect not of *conceptual* fluency, as in Experiment 1, but of *perceptual* fluency on semantic illusion rate. For this purpose, all questions were recorded as audio files and their sound clarity were changed either by superimposing background noise (Experiment 2A) or by sporadically inserting 100-ms silence sections into words within each question (Experiment 2B). Prior to conducting the second experiment, we tested three manipulation methods in a pilot survey, created using Survey Gizmo: (1) background noise, (2) adding 100-ms silent intervals into words, (3) creating silent intervals, by deleting 100-ms sections. Ratings from six participants showed that inserting 100-ms silences into words (i.e., the method in Experiment 2B) was perceived as the most distorted version compared to the other two, which received about equal ratings. The survey is accessible at <http://www.surveygizmo.com/s3/3437594/New-Survey>.

#### 3.1 Experiment 2A

##### 3.1.1 Method

###### 3.1.1.1 Participants

Sixty-one Boğaziçi University students (34 females,  $M_{age} = 20.18$ ,  $SD = 2.03$ ) participated in exchange of partial course credit. All participants were native speakers of Turkish. The data of two participants were excluded from the analyses due to a technical problem or noncompliance with the instructions.



### 3.1.1.2 Design

The experiment was a 2 (condition: noise, no noise) X 2 (condition order: noise - no noise, no noise - noise) X 2 (list order: List 1 - List 2, List 2 - List 1) mixed design analysis of variance. Condition was a within-subjects variable, whereas condition order and list order were between-subjects variables. Dependent measures were illusion rate and correct response rate. Correlational measures were confidence and difficulty ratings.

### 3.1.1.3 Materials

General knowledge questions were the same as in Experiment 1<sup>5</sup> but instead of presenting them visually, they were this time presented auditorily. All questions were read by a native speaker and recorded as .wav audio files. The experiment was created and run on computers using E-Prime 2.0 Software (Psychology Software Tools, Pittsburgh, PA). A “noise” version was created by for all 72 audio files by superimposing background white noise using MATLAB R2016b (MathWorks, Inc.). Signal-to-noise ratio for these were set at 10 dB (Dragojevic & Giles, 2016). To ensure equal listening times a fixed 9-sec question screen was created, which was followed by an untimed response screen, just as in Experiment 1<sup>6</sup>.

Other materials were demographic<sup>7</sup>, knowledge check, fact check and difficulty rating forms, which were the same as in Experiment 1. In addition, a noise/no noise manipulation check questionnaire was prepared based on Dragojevic and Giles (2016) to be administered as part of the illusion task. The questionnaire consisted of four questions

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<sup>5</sup> In few questions wording changes were necessary due to recent changes in names or facts.

<sup>6</sup> The duration of the questions varied between 3-to-8 seconds. Since we constructed the experiment in blocks, we had to set a fixed duration that would apply to all questions. That is why, we used 9 seconds.

<sup>7</sup> Different from Experiment 1, questions regarding foreign language competence were excluded.

about the comprehensibility of the speaker's diction, the distortion level in the audio files, the effort they put into to comprehend the questions, and the average difficulty of the questions each presented with a 7-point Likert scale (see Appendix H). The difficulty question was a control question, since we did not expect to see a difference in the difficulty levels of the questions in each part.

#### 3.1.1.4 Procedure

The procedure was the same as in Experiment 1, but adjusted to an auditory setting. Each participant sat in separate cubicles and listened to the experimental questions via a headset. After each list, participants answered manipulation check questions. The illusion task was followed by demographic form, knowledge check, fact check and difficulty rating forms.

#### 3.1.2 Results

##### 3.1.2.1 Manipulation check

A Wilcoxon signed-rank test showed that speaker's diction was perceived to be significantly worse in the noise condition compared to the no noise condition,  $Mdn_{noise} = 6$  vs.  $Mdn_{no\ noise} = 7$ ,  $Z = -4.19$ ,  $p < .001$ . Perceived distortion in the audio files was also significantly higher in the noise compared to no noise condition,  $Mdn_{noise} = 4$  vs.  $Mdn_{no\ noise} = 1$ ,  $Z = -5.13$ ,  $p < .001$ . Likewise, amount of reported effort during listening was significantly higher in the noise than no noise condition,  $Mdn_{noise} = 3$  vs.  $Mdn_{no\ noise} = 2$ ,  $Z = -3.96$ ,  $p < .001$ . Ratings on the difficulty of the questions, on the other hand, were similar in both conditions, as expected, ( $Mdn_{noise} = 4$  vs.  $Mdn_{no\ noise} = 4$ ,  $Z = -.40$ ,  $p > .10$ ).

### 3.1.2.2 Illusion rate

Participants' performance according to conditions is presented in Table 2.

Table 2. Distribution of Participants According to Their Performance Depending on List Order and Condition Order

Performance	List 1 – List 2		List 2 – List 1	
	¬Noise – Noise	Noise – ¬Noise	¬Noise – Noise	Noise – ¬Noise
¬Noise > Noise	9 (75%)	10 (62.5%)	12 (80%)	3 (18.8%)
¬Noise = Noise	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Noise > ¬Noise	3 (25%)	6 (37.5%)	3 (20%)	13 (81.3%)
Total	12	16	15	16

A 2 (condition: noise, no noise) x 2 (condition order: noise-no noise, no noise, noise) x 2 (list order: List 1-List 2, List2-List 1) mixed design ANOVA was conducted on illusion rate. Levene's test was significant for illusion scores in the noise condition. Therefore, 20% of data were trimmed<sup>8</sup>. There was no effect of condition,  $F(1, 37) < 1, p > .10$ ,  $\eta_p^2 = .02$ , condition order,  $F(1, 37) < 1, p > .10$ ,  $\eta_p^2 = .02$  or list order on the illusion rate,  $F(1, 37) < 1, p > .10$ ,  $\eta_p^2 = .01$ . The interaction of condition and condition order was significant, [ $F(1, 37) = 8.44, MSE = 229.84, p = .01, \eta_p^2 = .19$ ], however follow-up analyses that were conducted to understand the cause of this interaction did not reveal any significant effect. The three-way interaction of condition, condition order,

<sup>8</sup> In order to overcome the significance in Levene's test, we first performed a natural logarithm transformation on the data; however, Levene's test still remained significant. Therefore, trimming was performed by deleting 20% of the participants on the highest and lowest end with respect to illusion rates. No major changes occurred in the results, except that the three way interaction was marginally significant at  $p = .059$  prior to trimming.

and list order was also significant,  $F(1, 37) = 6.34$ ,  $MSE = 229.84$ ,  $p = .02$ ,  $\eta_p^2 = .15$ .

Several follow-up analyses showed this three-way interaction was mainly brought about by the large difference in illusion rates between noise vs. no noise, when noise was the first condition in the List 2- List 1 order condition ( $M = 58.84$ ,  $SD = 21.57$  vs.  $M = 31.35$ ,  $SD = 22.81$ ,  $t(5) = -3.26$ ,  $p = .02$ ; see Fig. 10).

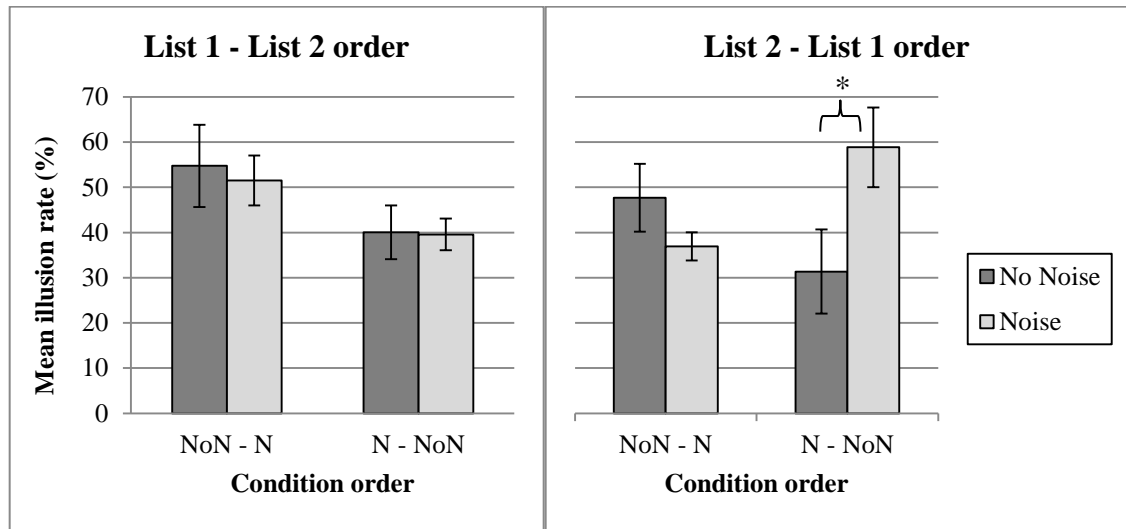


Figure 10. Mean percent illusion rates for noise and no noise conditions as a function of condition order. List order was represented separately. Error bars represent standard error of the means

### 3.1.2.3 Correct response rates in undistorted questions

A 2 (condition: noise, no noise) x 2 (condition order: noise - no noise, no noise - noise) x 2 (list order: List 1 - List 2, List 2 - List 1) mixed design ANOVA was conducted on correct response rate for undistorted questions. There was no effect of list order,  $F(1, 55) = 2.26$ ,  $MSE = 380.08$ ,  $p = .14$ ,  $\eta_p^2 = .04$  or condition order on the correct response rate,  $F(1, 55) < 1$ ,  $p > .10$ ,  $\eta_p^2 = .01$ . There was a slight trend of better performance in

the no noise ( $M = 53.88$ ,  $SD = 15.49$ ) than noise condition ( $M = 51.55$ ,  $SD = 14.98$ ),  $F(1, 55) = 3.80$ ,  $MSE = 59.03$ ,  $p = .06$ ,  $\eta_p^2 = .07$ . However, a significant interaction of condition and list order [ $F(1, 55) = 6.55$ ,  $MSE = 59.03$ ,  $p = .01$ ,  $\eta_p^2 = .11$ ] revealed that only in List 1- List 2 order the correct response rate in no noise condition ( $M = 52.68$ ,  $SD = 15.68$ ) was significantly higher than noise condition [ $M = 46.73$ ,  $SD = 12.90$ ,  $t(27) = 2.67$ ,  $p = .01$ ; see Figure 11]. There was a marginally significant interaction between condition and condition order [ $F(1, 55) = 3.80$ ,  $MSE = 59.03$ ,  $p = .06$ ,  $\eta_p^2 = .07$ ] caused by a higher correct response rate in no noise condition ( $M = 53.55$ ,  $SD = 14.65$ ) compared to noise condition [ $M = 48.46$ ,  $SD = 13.28$ ,  $t(26) = 2.41$ ,  $p = .02$ ].

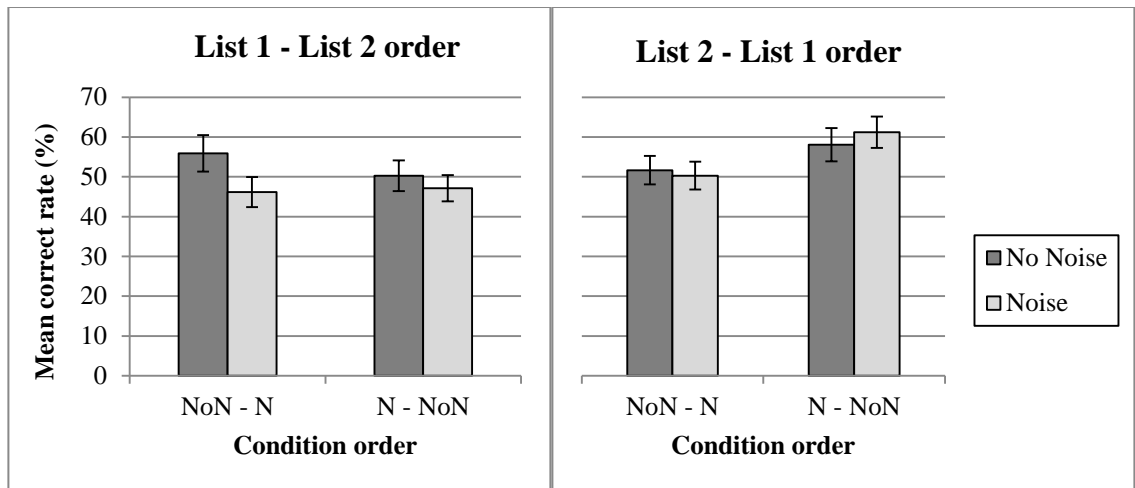


Figure 11. Mean percent correct response rates for noise and no noise conditions as a function of condition order. List order was represented separately. Error bars represent standard error of the means

#### 3.1.2.4 Response sensitivity and bias

Two paired-samples t-tests were conducted to see whether participants' sensitivity and response bias differed between questions in noise and no noise conditions. There was no significant difference in the sensitivity degrees ( $A'$ ) for questions in noise condition ( $M = 0.85$ ,  $SD = 0.10$ ) and no noise ( $M = .86$ ,  $SD = .09$ ),  $t(51) = .61$ ,  $p > .10$ . Participants' response biases ( $B''_D$ ) did also not differ between noise ( $M = .68$ ,  $SD = .47$ ) and no noise ( $M = .76$ ,  $SD = .45$ ),  $t(57) = 1.11$ ,  $p > .10$ .

#### 3.1.2.5 Confidence ratings

In order to investigate the relationships of confidence judgements in the *knowledge check test* with illusion rate and correct response rate for each item, separate Kendall's Tau correlations were run. Illusion rate was negatively associated with confidence ratings, for items presented in both no noise,  $r_\tau = -.42$ ,  $p < .01$ ; and noise conditions,  $r_\tau = -.46$ ,  $p < .01$  (see Figure 12). Illusion rates increased as confidence ratings decreased. On the other hand, correct response rates were positively associated with confidence ratings, in both no noise ( $r_\tau = .51$ ,  $p < .001$ ; see Figure 13) and noise conditions ( $r_\tau = .49$ ,  $p < .001$ ). In both conditions, as confidence ratings increased, correct response rates increased.

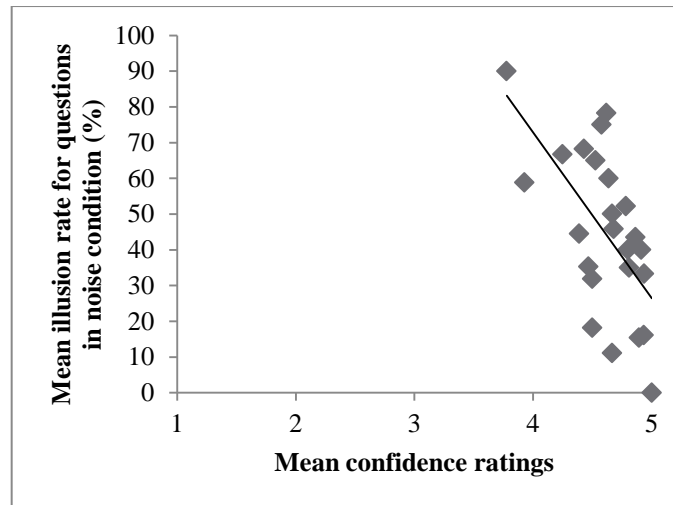


Figure 12. The relationship of mean percent illusion rate for questions in noise condition and mean confidence ratings

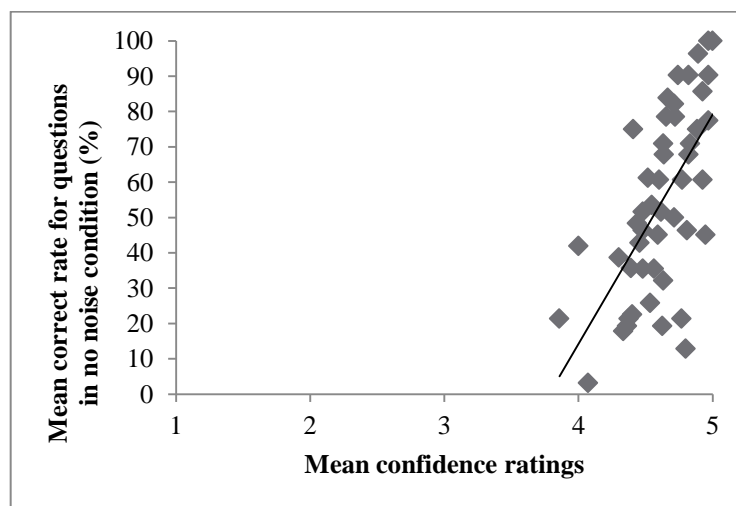


Figure 13. The relationship of mean percent correct response rate for questions in no noise condition and mean confidence ratings

### 3.1.2.6 Difficulty ratings

In order to examine whether there were any relationships between difficulty ratings, illusion rates and correct response rates, separate Kendall's tau correlations were run for

items in noise and no noise conditions. Correct response rate was negatively correlated with difficulty ratings for items in both no noise,  $r_t = -.75, p < .001$ ; and noise,  $r_t = -.74, p < .001$  (see Figure 14). In both conditions, for each undistorted question, as the correct response rate increased, difficulty ratings decreased. Correlation analyses conducted between illusion rate and difficulty ratings produced different results in different conditions. While illusion rate in the no noise condition and difficulty ratings were positively correlated,  $r_t = .33, p = .03$  (see Figure 15); in the noise condition, there was no relationship between them,  $r_t = .06, p > .10$ .

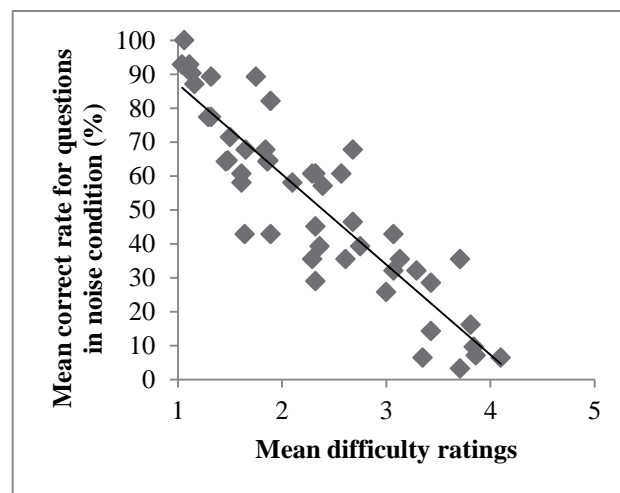


Figure 14. The relationship of mean percent correct response rate for questions in noise condition and mean difficulty ratings

Since both confidence and difficulty ratings were correlated with correct response rate in undistorted questions, we also conducted correlation analyses to investigate whether confidence and difficulty ratings were correlated. Results showed



that there was a negative correlation between confidence and difficulty ratings (No noise:  $r_t = -.41, p < .001$ ; Noise:  $r_t = -.40, p < .001$ ).

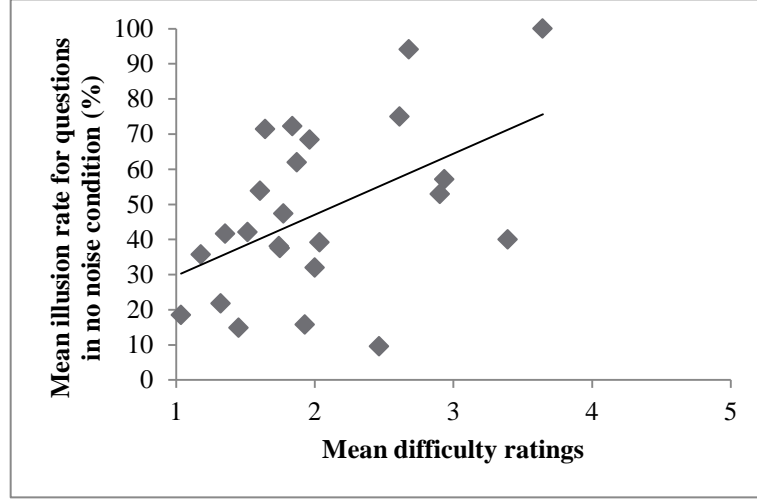


Figure 15. The relationship of mean illusion rate for questions in no noise condition and mean difficulty ratings

## 3.2 Experiment 2B

### 3.2.1 Method

#### 3.2.1.1 Participants

Sixty-seven Boğaziçi University students (41 females,  $M_{age} = 20.04, SD = 1.42$ ) served as participants in exchange of partial course credit. All participants were native speakers of Turkish. The data of five participants were excluded from the analyses due to (1) not following instructions and (2) not being native speakers of Turkish.

### 3.2.1.2 Design

The design was identical to Experiment 2A except for the disfluent condition which we labeled “inserted silence” condition.

### 3.2.1.3 Materials

The illusion task was same with Experiment 2A in all but one respect. Instead of adding white noise to background to create perceptual disfluency, an inserted silence method was employed. Inspired by Besken (2016), 100-ms-silences per each second of the questions were inserted, using version 2.1.2 of Audacity ® software.

All other materials were the same with Experiment 2A.

### 3.2.1.4 Procedure

The procedure was the same as in Experiment 2A.

## 3.2.2 Results

### 3.2.2.1 Manipulation check

The same manipulation check questions in Experiment 2A were used in order to determine whether the inserted silence manipulation worked. The speaker’s diction was perceived to be significantly worse in the inserted silence condition, compared to the no inserted silence condition ( $Mdn_{silence} = 6$  vs.  $Mdn_{no\ silence} = 7$ ),  $Z = -5.23$ ,  $p < .001$ . The perceived distortion in the audio files were significantly higher in the inserted silence condition, compared to the no inserted silence condition ( $Mdn_{silence} = 3$  vs.  $Mdn_{no\ silence} = 1$ ),  $Z = -6.14$ ,  $p < .001$ . The amount of participant’s efforts were significantly higher in inserted silence condition, compared to no inserted silence condition ( $Mdn_{silence} = 3$  vs.

$Mdn_{no\ silence} = 2$ ),  $Z = -4.92$ ,  $p < .001$ . Difficulty ratings for each condition did not differ, ( $Mdn_{silence} = 4$ ,  $Mdn_{no\ silence} = 4$ ),  $Z = -.09$ ,  $p > .10$ .

### 3.2.2.2 Illusion rate

Participants' performance according to conditions is presented in Table 3.

Table 3. The Distribution of Participants According to Their Response Patterns in Each Set

Performance	List 1 – List 2		List 2 – List 1	
	¬IS – IS	IS – ¬IS	¬IS – IS	IS – ¬IS
¬IS > Inserted Silence	3 (21.4%)	7 (50%)	15 (93.8%)	8 (44.4%)
¬IS = Inserted Silence	0 (0%)	0 (0%)	0 (0%)	2 (11.1%)
Inserted Silence > ¬IS	11 (78.6%)	7 (50%)	1 (6.3%)	8 (44.4%)
Total	14	14	16	18

A 2 (condition: inserted silence, no inserted silence) x 2 (condition order: no inserted silence – inserted silence, inserted silence – no inserted silence) x 2 (list order: List 1 - List 2, List2 - List 1) mixed design ANOVA was conducted on illusion rate. Levene's test was significant for illusion scores in noise condition. Therefore, natural logarithms of the actual scores were used<sup>9</sup>. There was no effect of condition,  $F(1, 58) < 1$ ,  $p > .10$ ,  $\eta_p^2 = .02$  (see Figure 16), condition order,  $F(1, 58) < 1$ ,  $p > .10$ ,  $\eta_p^2 = .01$  or

<sup>9</sup> Since Box's test of equality of covariance matrices is significant, Greenhouse-Geisser correction results were presented above.

list order on the illusion rate,  $F(1, 58) < 1, p > .10, \eta_p^2 < .01$ . None of the interaction terms were significant (all  $ps > .10$ ).

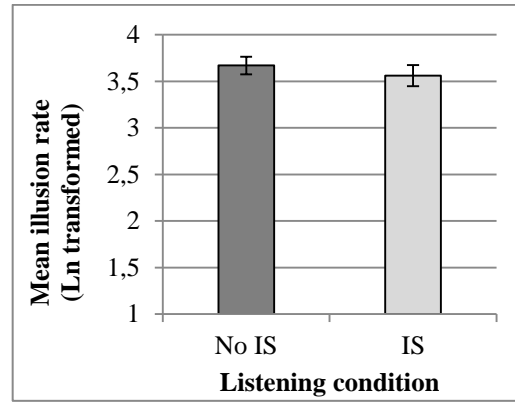


Figure 16. Mean illusion rate after natural logarithm transformation for inserted silence and no inserted silence conditions with error bars representing standard error of the means

### 3.2.2.3 Correct response rate in undistorted questions

A 2 (condition: inserted silence, no inserted silence) x 2 (condition order: inserted silence - no inserted silence, no inserted silence - inserted silence) x 2 (list order: List 1 - List 2, List 2 - List 1) mixed design ANOVA revealed no significant results (all  $ps > .10$ , see Figure 17).

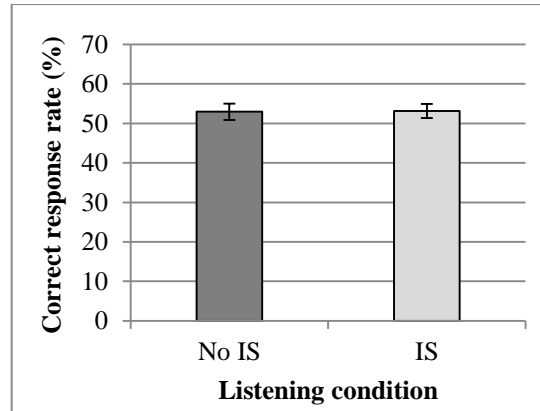


Figure 17. Mean percent correct response rate for inserted silence and no inserted silence conditions with error bars representing standard error of the means

#### 3.2.2.4 Response sensitivity and bias

Two paired-samples t-tests were conducted to see whether participants' sensitivity and response bias differed between questions in inserted silence and no inserted silence conditions. There was no significant difference in the sensitivity degrees ( $A'$ ) for questions in inserted silence ( $M = 0.87$ ,  $SD = 0.08$ ) and no inserted silence ( $M = .85$ ,  $SD = .11$ ) conditions,  $t(50) = -1.50$ ,  $p > .10$ . Participants' response biases ( $B''_D$ ) did not differ between inserted silence ( $M = .82$ ,  $SD = .34$ ) and no inserted silence ( $M = .76$ ,  $SD = .38$ ) conditions,  $t(60) = -1.02$ ,  $p > .10$ .

#### 3.2.2.5 Confidence ratings

In order to investigate the relationships of confidence judgements in the *knowledge check test* with illusion rate and correct response rate for each item, separate Kendall's Tau correlations were run. Illusion rate was negatively associated with confidence ratings, for items presented in both no inserted silence,  $r_t = -.30$ ,  $p = .04$ ; and inserted

silence conditions,  $r_t = -.52$ ,  $p < .001$  (see Figure 18). The illusion rates increased as confidence ratings decreased. On the other hand, correct response rates were positively associated with confidence ratings, in both no inserted silence ( $r_t = .40$ ,  $p < .001$ ; see Figure 19) and inserted silence conditions ( $r_t = .41$ ,  $p < .001$ ). In both conditions, as confidence ratings increased, correct response rates increased.

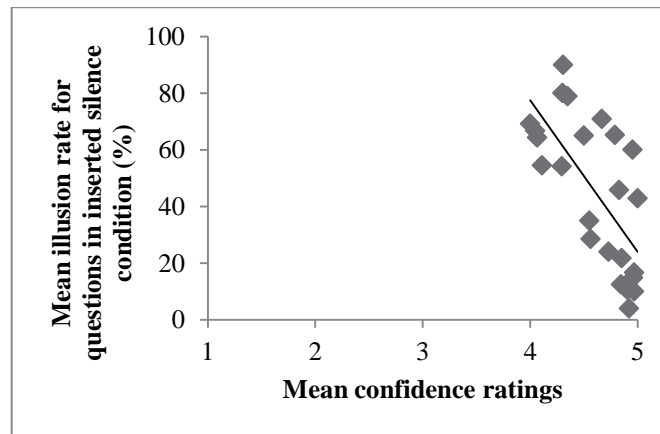


Figure 18. The relationship of mean percent illusion rate for questions in inserted silence condition and mean confidence ratings

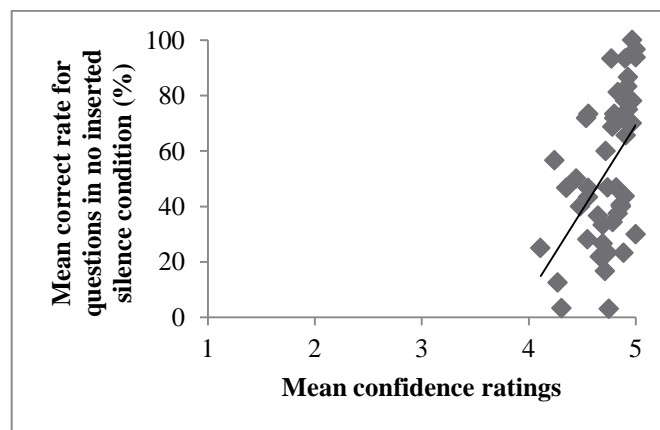


Figure 19. The relationship of mean percent correct response rate for questions in no inserted silence condition and mean confidence ratings

### 3.2.2.6 Difficulty ratings

In order to examine the relationship between difficulty rate ratings with illusion and correct response rates, separate Kendall's tau correlations were run for items in inserted silence and no inserted silence conditions. Correct response rate was negatively correlated with difficulty ratings for items in both no inserted silence,  $r_{\tau} = -.76, p < .001$ ; and inserted silence conditions,  $r_{\tau} = -.75, p < .001$  (see Figure 20). For both conditions, as the correct response rate increased, difficulty ratings decreased. No relationship was observed between illusion rate and difficulty ratings in both conditions (no inserted silence:  $r_{\tau} = .14, p > .10$ ; inserted silence:  $r_{\tau} = .05, p > .10$ , see Figure 21).

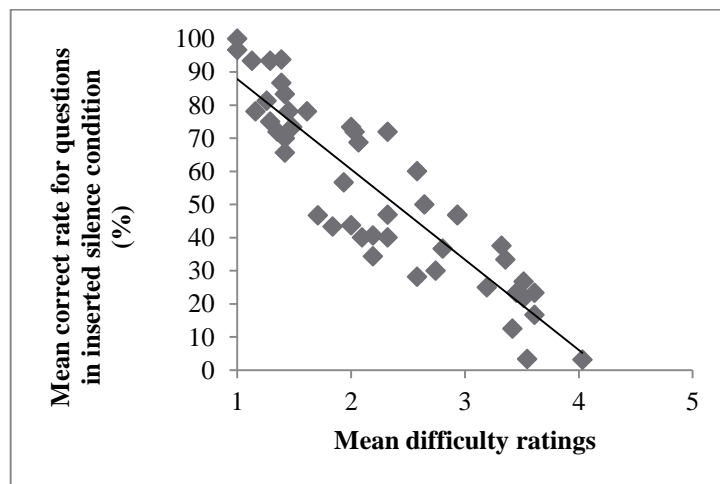


Figure 20. The relationship of mean percent correct response rate for questions in inserted silence condition and mean difficulty ratings

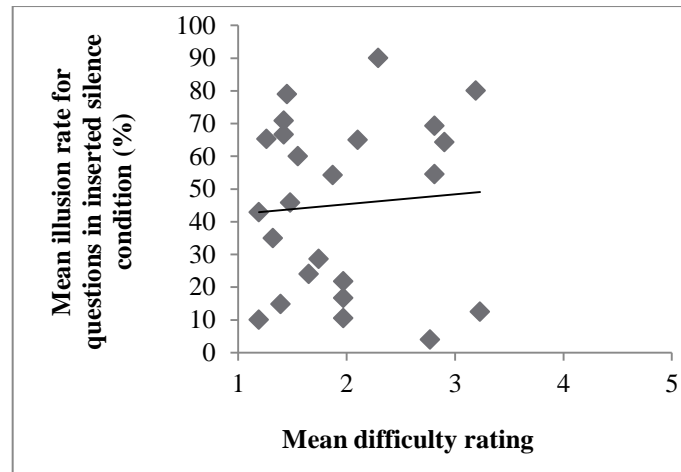


Figure 21. The relationship of mean percent illusion rate for questions in inserted silence condition and mean difficulty ratings

Since both confidence and difficulty ratings were correlated with correct response rate in undistorted questions, we also conducted correlation analyses to investigate whether confidence and difficulty ratings were correlated. Results showed that there was a negative correlation between confidence and difficulty ratings (no inserted silence:  $r_{\tau} = -.38, p < .001$ ; inserted silence:  $r_{\tau} = -.39, p < .001$ ).



## CHAPTER 4

### GENERAL DISCUSSION

The main goal of this study was to better understand the conflicting results of two studies which both looked at the effect of processing fluency on semantic illusion rates. Geipel et al. (2015) reported no effect of fluency, which they manipulated by providing a distorted and an undistorted question in the native or foreign language. Song and Schwarz (2008), on the other hand, found worse performance in detecting illusions when a distorted question was presented in an easy- than difficult-to-read font. However, this difference in findings could have been due to the fact that while the language manipulation is one of *conceptual* fluency, font manipulation is one of *perceptual* fluency. We decided to use the same manipulation as Geipel et al. (2015) to manipulate conceptual processing fluency, and a different one from Song and Schwarz to manipulate perceptual processing fluency. Moreover, in terms of generalizability of findings, it was of concern that the two studies employed only a single distorted and a single undistorted question.

The results of the first experiment supported our hypothesis by showing higher illusion rates in questions presented in a foreign language (English) compared to native language (Turkish). Even though Geipel et al. (2015) report no effect of native versus foreign language on illusion rate, a more careful look at their data does hint to a strong trend in that direction (~35% vs. ~16% of participants detecting the illusion in the native vs. foreign language,  $p = .06$ ). Given that they only used a single distorted and a single undistorted sentence, we can easily predict that with just a few more participants their chi-square value would have reached statistical significance. Our finding suggests that

disfluency --in the form of processing items in a foreign language-- impairs performance in detecting semantic illusions. A possible reason can be that task demands of understanding a general knowledge question and answering it, while checking for a possible semantic distortion is harder to do in a foreign language, thus leading to higher illusion rates in the foreign than native language (Büttner, 2007; Geipel et al., 2015). Another possible explanation can be that general semantic interrelatedness between ‘correct’ elements (e. g., Noah – ark – animals) in a sentence or question may be stronger in the language in which the information is first acquired, hence leading to better detection rates when a distorted element is introduced (e. g. Moses); whereas in the foreign language it may be harder due to both weaker connection between elements and shallower processing as mentioned above.

In order to see whether perceptual disfluency, on the other hand, would *increase* detection of illusions, as in Song and Schwarz (2008), we conducted a second experiment using the same extended set of distorted and undistorted questions as in Experiment 1. Instead of using easy- as opposed to hard-to-read fonts we decided to alter the sound quality of the stimuli questions as a perceptual disfluency manipulation. Although manipulation check results showed that participants perceived our experimental manipulations as more disfluent compared to the control condition<sup>10</sup>, in both experiments results showed no difference in illusion rate between experimental (in 2A: background noise, in 2B: inserted silence) and control conditions. The only significant difference between conditions was observed in a three-way interaction in Experiment 2A due to unexpected order effects. Given that participants had practice

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<sup>10</sup> Some participants reported that white noise manipulation in Experiment 2A did not worsen the sound quality of the questions much.

trials to familiarize themselves with the setup and were randomly assigned to the different order groups; and also given that such order effects have so far not been reported in the literature and were not replicated in Experiment 2B, it is likely that this result is coincidental.

An explanation for Song and Schwarz's (2008) finding can be that in their study, participants were allowed to read the printed questions in a self-paced manner, and their reading durations were not measured. Therefore, participants might have spent more time reading in the difficult-to-read (i.e., disfluent) condition, which in turn might have led to a better semantic processing and facilitated detection of illusions. In our case, however, in Experiments 2A and 2B, questions were presented auditorily and participants were allowed to listen to each question only once, which prevented them from spending more time on processing questions in the disfluent condition.

Additionally, based on previous research (e.g., Glass, 2007; Rhodes & Castel, 2008) on the effects of perceptual disfluency on performance in various memory tasks, Yue, Castel and Bjork (2013) suggested that disfluency does not always improve performance. If task demands are within the limits of working memory, performance in disfluent condition may not be impaired and even improve; however, if task demands transcend working memory limits, then performance will be impaired (Yue et al., 2013). Therefore, it is possible that our disfluent conditions in the second experiment did not create any effect on performance neither for distorted nor undistorted items because the task demands were within the limits of the working memory. Song and Schwarz (2008), for instance, observed decreased performance in the undistorted item when presented in difficult-to-read script, which could be seen as a sign for working memory overload. In most of the previous studies, disfluencies were created by manipulations on visually

presented test items, which might have worked better in increasing semantic processing compared to our auditory manipulations. This working memory account is also compatible with previous findings by Büttner (2012), which showed higher illusion rates when the task was accompanied by a secondary task (i.e., either articulatory suppression or random number generation) and Hannon and Daneman's (2001) findings showing that working memory capacity predicts detection rates. Therefore, it is possible that the differences in working memory capacities of our participants may account for the variability observed in our participants' response patterns. In our first experiment, we administered a Stroop task as a measure of individual differences in executive functions. However, results did not reveal any relationship between Stroop score and illusion rate. The Stroop task is typically seen as a measure of the inhibitory component of executive function (Stroop, 1935/1992) but apparently "falling into" the illusion does not seem to be related to having low inhibitory control.

We also looked at whether processing fluency influenced performance in *undistorted* questions. In Experiment 1, results showed that correct response rate was higher in questions presented in native language (Turkish) compared to foreign language (English). This result differed from those by Geipel et al. (2015), who found no difference between languages. In Experiments 2A and 2B, on the other hand, we were not able to show meaningful differences in correct response rates depending on fluency. It is possible that disfluency induced by them did not disrupt processing at a desired level.

Another aim of the present study was to investigate whether there is a relationship between illusion rate and confidence in one's knowledge. For each question, we calculated a confidence rating score, an illusion rate (for distorted questions) and a

correct response rate (for undistorted questions) by averaging scores across participants. Since illusion and correct response rates were calculated based on questions that were correctly answered in the later knowledge check and fact check tests, confidence ratings were generally high, ranging between 3-to-5. Results showed that illusion rate of a question decreased as the confidence in that knowledge increased. With this, we supported Cantor and Marsh's (2017) finding that participants were less likely to fall into the illusion when the questions were from their areas of expertise. We also showed that correct response rate was positively associated with confidence ratings. This shows that participants had a metacognitive awareness about their knowledge. We also analyzed difficulty rating scores to determine whether there was a relationship between difficulty of a question and its average illusion and correct response rates. Results showed a negative relationship between difficulty ratings and correct response rate. This means that participants gave more correct responses to undistorted questions which they rated as easier. Since this finding was in parallel with confidence results, we also looked at whether confidence and difficulty ratings in undistorted questions were correlated. Results showed a negative correlation between difficulty and confidence ratings. This suggests that questions that were answered with more confidence were perceived as easier. Going back to difficulty and illusion rates, we could not find a relationship between illusion rate and difficulty ratings except for the control condition in Experiment 2A. There was a negative correlation between illusion rate and difficulty rating scores, which suggests that the more difficult the question was, the less often a semantic illusion effect occurred. However, we need to be cautious interpreting this finding because this correlation was only observed in the control condition and it was not replicated in Experiment 2B, in which the control condition was identical to that of

2A. Finally, we showed that the degree of semantic relatedness between the impostor and the original terms is positively correlated with the illusion rate. Illusion rate was higher in questions with a more semantically related impostor-original word pair, which supports both partial match hypothesis and node structure theory.

The present study was the first semantic illusion study conducted with Turkish items and we were able successfully replicate this effect by showing 48% illusion rate on average. Moreover, to our knowledge this is the first study to show a relationship between semantic illusion rate and confidence in knowledge. There are some general drawbacks to the method used to calculate illusion and correct response rates. Since one can only take into account the questions that were correctly answered by participants in knowledge check and fact check forms, the more the number of successfully answered questions varied, the more did the total number of questions that the calculations were based vary across participants. For example, if a participant correctly answered 2 out of 12 distorted questions in a given condition and failed to detect the illusion in both questions, his/her illusion rate became 100%. On the other hand, another participant who failed to detect the illusion in only two questions might have a 20% illusion rate because s/he correctly answered 10 distorted questions, which certainly would be a better representation of her/his performance. A way to improve the accuracy of these calculations is to replace questions that were known by a few with better known ones so as to minimize the effect of knowledge gap between participants. Another problem we came across, which might be closely related to this issue of fluctuations in knowledge, was the individual differences we observed in participants' response patterns. In this study, we could not attribute these differences to any source. It is also difficult to predict whether these patterns are due to genuine individual differences that one would

potentially observe again and again across various replication studies, or whether they reflect an inconsistency in the effectiveness of our perceptual fluency manipulation.

Future research should focus on explaining individual differences in processing semantic illusion questions to see whether adopting different processing styles (e.g., controlled and automatic processing) can be responsible for the variability observed in results. Additionally, since we could not show an effect of perceptual disfluency on semantic illusion rate with our auditory manipulations, replicating Song and Schwarz's (2008) script font manipulation study with more test items and a stronger design like ours would enable us to draw a more accurate conclusion about whether *perceptual* disfluency influences semantic illusion rate just as conceptual disfluency seems to do. Finally, another point that deserves further research is to investigate the *mechanism* through which language of the questions affects illusion rates in Experiment 1.

APPENDIX A

QUESTIONS IN THE ILLUSION TASK

English Version

List 1 items

In Pokemon, which team tries to kidnap Pikachu and has a speaking cat as a member?

Which law of physics did Archimedes (Newton) supposedly discover when an apple fell from the tree he was sitting under?

For his performance in which movie did actor Leonardo DiCaprio win his long-awaited Oscar in 2016?

Which medical doctor is famous in social media due to her opposition to the carbohydrate consumption?

Assassination of whom in Serbia lead to the beginning of the Second (First) World War?

In which movie series does Marty McFly travel in time using Dr. Brown's time machine?

In the movie Ratatouille, what kind of animal is Remy who does the cooking?

Which country's flag consists of a red circle on a white background?

Which adopted daughter of Atatürk is the first Turkish female pilot whose name was given to an airport?

To increase awareness for which disease did celebrities pour ice water over their heads and challenge each other?

In which city is the Louvre museum that hosts Michelangelo's (Leonardo DaVinci) portrait of Mona Lisa?

Which detective from Sir Conan Arthur Doyle's novels lives in 221B Baker Street?

Which country was known as "the empire on which the sun never rises (sets)" in 19th century?

With which song did Sertab Erener win the Eurovision Song Contest?

Which superhero from the planet Krypton is also known as the journalist Peter Parker (Clark Kent)?



Which building at Boğaziçi University South Campus hosts classical music concerts and has a clock on it?

Which pop music band was the soccer player David Beckham's wife Victoria a member of?

What sport uses a four-holed (three) ball for knocking down ten white pins?

Which movie did Eddie Redmayne win the Oscar with, performing as Stephen Hawking?

Which actor performed the character Cedric Diggory, who Voldemort murdered in the movie "Harry Potter and the Order of the Phoenix" (Goblet of Fire)?

What peace treaty did Turkey sign in Switzerland after the War of Independence?

Which body part did the famous Dutch artist van Gogh supposedly cut off?

In which novel of Reşat Nuri Güntekin do Feride go to Anatolia to become a teacher?

In which TV series that took place in Nişantaşı, Gülse Birsal was Ata Demirer's sister?

Which festival gives the most prestigious movie award in Turkey, the Golden Orange?

Which ancient Greek warrior was killed by an arrow shot into his heel?

Which scientist, inspired by dogs' salivation in response to ringing bell, discovered operant (classical) conditioning?

Who had kidnapped Hugo's wife and children in Tolga Gariboğlu's game show?

What country was Margaret Thatcher, also known as "The Iron Lady", president (prime minister) of ?

Where did her wicked stepmother give Cinderella (Snow White) the poisoned apple?

What is the name of the yellow chick (canary) that Sylvester the cat aims to catch?

Which movie tells the story of Mark Zuckerberg's founding of Facebook while studying at Harvard?

Where did Mustafa Kemal Atatürk die on November 10 of 1938 at five to (past) nine?

What is the title of the real-time TV series in which Agent Jack Bauer works to prevent terrorist attacks?

What invention of Alexander Graham Bell enabled people to talk to each other over long distances?

What is the title of the movie in which Russell Crowe plays the mathematician John Nash, famous for his Game Theory?

List 2 items

Which black and white bear is nearly extinct because it eats only palm leaves (bamboo)?

The Statue of Liberty in New York is a gift from which country to United States?

In which animation movie, does Anna (Elsa) build a talking snowman named Olaf?

What did The Little Prince ask the aviator to draw him in the desert?

Who is the British secret service agent, also known as 001 (007) recently performed by Daniel Craig?

How many questions are there in YGS (University Entrance Exam) where every three (four) wrong answers cancel the score of one right answer?

What marathon organized every year in Istanbul has the Bosphorus Bridge on its route?

Which actor played the captain of the ship Black Pearl Jack Sparrow in "Pirates of the Caribbean"?

Which movie tells the adventures of a clown fish looking for his lost son and his forgetful friend Dory?

Which video game character eats mushrooms to gain power in order to rescue the princess?

Which elf did Orlando Bloom play in both "The Hobbit" and "The Lord of the Rings" movie series?

What geometric shape's area is calculated with the formula " $\pi r^2$  (pi-r-squared)"?

Who lives in the Swiss Alps with her grandmother (grandfather) and is friends with Peter?

When did the September 11 terrorist attack to the Twin Towers in Washington (New York) happen?

What species does the first cloned mammal Dolly belong to?

Which cartoon character has a starfish called Patrick as a close friend and a snail called Gary as a pet?

What is the name of the gray donkey who is always pessimistic and depressed in the cartoon "Winnie the Pooh"?

Who is the writer of the tragedy that is famous for its balcony scene and tells the love of Romeo and Juliet from enemy families?

Who has a red suit, a long white beard, and brings presents to children at Christmas?

In which movie do George Clooney and his friends rob Andy Garcia's casino?

Which Ottoman Sultan that conquered Istanbul was the father of Cem Sultan and Bayezid II?

Which character in the "X-Men" movie series did Australian actor Hugh Jackman play?

Who is the producer of the "Survivor" that national diver (swimmer) Derya Büyükcuncu win?

Which member of The Beatles was stabbed (shot) to death by his fan?

Who is the first female prime minister of Turkey, who once was a professor of Economics at Boğaziçi University?

How many atoms of oxygen does a water molecule contain along with 2 atoms of hydrogen?

Which poet had started "The Garip Movement" in poetry together with his close friends Oktay Rıfat and Melih Cevdet?

What words follow "To be or not to be" in Shakespeare's famous play Macbeth (Hamlet)?

What large white animal lives near the South (North) Pole?

Which Formula 1 pilot was hospitalized for a long time after a serious skiing accident?

Which celestial body that has craters on its surface completes its rotation around the Earth in one (29,5) day?

Who is the Turkish scientist that won the 2015 Nobel Prize in chemistry?

Who said the famous line "Luke, I am your father" to Luke Skywalker in Star Wars?

The Matrix quote "Follow the gray (white) rabbit" is a reference to which book?

What villain character did Heath Ledger win the Oscar with after his death?

Which classical music composer, famous for his Moonlight Sonata, became deaf near the end of his life?

#### Turkish Version

#### List 1 items

Pokemon'da Pikachu'yu kaçırmak isteyen ve bir üyesi konuşan bir kedi olan takım hangisidir?

Altında oturduğu ağaçtan kafasına elma düşüncü bilimadamı Arşimet'in (Newton) hangi fizik kanununu bulduğu söylenir?

Aktör Leonardo DiCaprio uzun süredir beklediği Oscar ödülünü 2016'da hangi filmdeki performansı için almıştır?

Hangi tıp doktoru karbonhidrat tüketimine karşı olmasıyla sosyal medyada ünlüdür?

İkinci (Birinci) Dünya Savaşı kimin Sırbistan'da suikastinin ardından başladı?

Marty McFly'ın Dr.Brown'ın zaman makinesiyle zamanda yolculuk yaptığı film serisi hangisidir?

Ratatouille fiminde Remy adlı, aşçılık yapan hayvanın türü nedir?

Hangi ülkenin bayrağı beyaz arkaplan üstüne kırmızı bir daireden oluşur?

Atatürk'ün hangi manevi kızı adı bir havaalanına verilen ilk Türk kadın pilottur?

Hangi hastalığa farkındalığı artırmak için ünlüler başlarından aşağı buzlu su dökerek birbirlerine meydan okumuştur?

Michelangelo'nun (Leonardo DaVinci) Mona Lisa portresinin bulunduğu Louvre Müzesi hangi şehirdedir?

Sir Conan Arthur Doyle'un romanlarındaki hangi dedektif 221B Baker Sokağı'nda yaşar?

19. yüzyılda "üzerinde güneş doğmayan (batmayan) imparatorluk" olarak bilinen ülke hangisidir?

Sertab Erener Eurovision Şarkı Yarışması'nı hangi şarkıyla kazanmıştır?

Kripton gezegeninden gelen hangi süper kahraman gazeteci Peter Parker (Clark Kent) olarak bilinir?

Boğaziçi Üniversitesi Güney Kampüs'te klasik müzik konserlerine ev sahipliği yapan ve üzerinde saat olan bina hangisidir?

Futbolcu David Beckham'ın eşi Victoria hangi pop grubunun üyesiydi?

Hangi sporda on lobutu devirmek için dört (üç) delikli büyük bir top kullanılır?

Eddie Redmayne hangi filmdeki Stephen Hawking performansı ile Oscar kazanmıştır?

Harry Potter ve Zümrüdüanka Yoldaşlığı (Ateş Kadehi) filminde Voldemort'un öldürdüğü Cedric Diggory karakterini hangi aktör canlandırmıştır?

Türkiye, Kurtuluş Savaşı'ndan sonra İsviçre'de hangi barış antlaşmasını imzalamıştır?

Hollandalı ünlü ressam van Gogh'un vücudunun hangi bölgesini kestiği söylenir?

Reşat Nuri Güntekin'in hangi romanında Feride Anadolu'ya öğretmenlik yapmaya gider?

Nişantaşı'nda geçen hangi televizyon dizisinde Gülse Birsal Ata Demirel'in kız kardeşiydi?

Türkiye'nin en prestijli film ödülü Altın Portakal'ı hangi festival verir?

Hangi antik Yunan savaşçısı topuğuna atılan bir okla öldürülmüştür?

Köpeklerin zil sesine tepki olarak salya akıtmasından ilham alarak edimsel (klasik) koşullanmayı bulan bilimadamı kimdir?

Tolga Gariboğlu'nun oyun programında Hugo'nun karısını ve çocuklarını kim kaçırmıştı?

Demir Leydi olarak da bilinen Margaret Thatcher hangi ülkenin devlet başkanıydı (başbakan)?

Kötü kalpli üvey annesi Sindirella'ya (Pamuk Prenses) zehirli elmayı nerede vermiştir?

Kedi Sylvester'ın yakalamayı amaçladığı sarı civcivin (kanarya) adı nedir?

Mark Zuckerberg'in Harvard'da okurken Facebook'u kurma hikayesini anlatan filmin adı nedir?

Mustafa Kemal Atatürk 10 Kasım 1938'de 9'a 5 kala (geçe) nerede ölmüştür?

Ajan Jack Bauer'ın terörist saldırılarını engellemek için çalıştığı gerçek zamanlı dizinin adı nedir?

Alexander Graham Bell'in hangi icadı insanların uzun mesafeden birbirleriyle konuşmasını sağladı?

Russell Crowe'un Oyun Teorisiyle ünlü matematikçi John Nash'i canlandırdığı filmin adı nedir?

List 2 items

Hangi siyah beyaz ayı türü sadece palmiye yaprakları (bamboo) yediği için nesli tükenmek üzeredir?

New York'ta bulunan Özgürlük Anıtı'nı Amerika Birleşik Devletleri'ne hangi ülke hediye etmiştir?

Hangi animasyon filminde Anna (Elsa), Olaf adında konuşan bir kardan adam yapar?

Küçük Prens çölde pilottan ona ne çizmesini ister?

En son Daniel Craig'in canlandırdığı 001 (007) olarak da bilinen İngiliz gizli servis ajanı kimdir?

Üç (dört) yanlışın bir doğruyu götürdüğü YGS'de (Yükseköğretime Geçiş Sınavı) kaç soru vardır?

Her yıl İstanbul'da düzenlenen hangi maratonun rotasına Boğaziçi Köprüsü dahildir?

Karayip Korsanları'nda Siyah İnci gemisinin kaptanı Jack Sparrow'u hangi aktör canlandırmıştır?

Hangi filmde kayıp oğlunu arayan bir palyaço balığı ve onun unutkan arkadaşı Dory'nin maceraları anlatılır?

Prencesi kurtarmak için mantar yiyerek güç kazanan video oyun karakteri kimdir?

“Hobbit” ve “Yüzüklerin Efendisi” film serilerinde Orlando Bloom'un canlandırdığı elfin adı nedir?

Alanı " $\pi r^2$  (pi-r-kare)" formülüyle hesaplanan geometrik şekil hangisidir?

İsviçre Alplerinde büyükannesiyle (büyükbabası) yaşayan ve Peter'le arkadaş olan kimdir?

11 Eylül'de Washington'da (New York) bulunan İkiz Kuleler'e yapılan terör saldırıları hangi yıl gerçekleşmiştir?

Klonlanan ilk memeli olan Dolly'nin türü nedir?

Hangi çizgifilm karakteri Patrick adlı bir deniz yıldızıyla yakın arkadaştır ve evcil hayvanı Gary adlı bir salyangozdur?

Winnie the Pooh çizgi filminde her zaman kötümser ve depresif olan gri eşeğin adı nedir?

Balkon sahnesiyle ünlü, düşman ailelerden Romeo ve Juliet'in aşkının anlatıldığı trajedinin yazarı kimdir?

Kimin kırmızı giysisi, uzun beyaz sakalı vardır ve Noel'de çocuklara hediye dağıtır?

Hangi filmde George Clooney ve arkadaşları Andy Garcia'nın kumarhanesini soyarlar?

Cem Sultan ve II. Bayezid'in babası olan hangi Osmanlı padişahı İstanbul'u fethetmiştir?

Avustralyalı aktör Hugh Jackman "X-Men" film serisinde hangi karakteri canlandırmıştır?

Milli dalgıç (yüzücü) Derya Büyükuncu'nun kazandığı "Survivor"ın yapımcısı kimdir?

The Beatles'ın hangi üyesi bir hayranı tarafından bıçaklanarak (vurularak) öldürülmüştür?

Bir dönem Boğaziçi Üniversitesi'nde Ekonomi profesörü olan Türkiye'nin ilk kadın başbakanı kimdir?

Bir su molekülü iki hidrojen atomuyla birlikte kaç oksijen atomundan oluşur?

Yakın arkadaşları Oktay Rıfat ve Melih Cevdet'le şiirde Garip Akımını başlatan şair kimdir?

Shakespeare'in ünlü oyunu Machbeth'te (Hamlet) "Olmak ya da olmamak"ı hangi söz takip eder?

Hangi büyük beyaz hayvan Güney (Kuzey) kutbuna yakın yaşar?

Hangi Formula 1 pilotu kayak yaparken ciddi bir kaza geçirdikten sonra uzun süre hastanede kalmıştır?

Yüzeyinde kraterler olan hangi gök cismi Dünya'nın etrafındaki dönüşünü bir (29,5) günde tamamlar?

2015 Nobel Kimya Ödülü'nü alan Türk bilim adamı kimdir?

Star Wars'da Luke Skywalker'a ünlü "Luke, ben senin babanım" sözünü kim söylemiştir?

Matrix'teki "Gri (beyaz) tavşanı takip et" sözü ile hangi kitaba gönderme yapılmıştır?

Heath Ledger'ın oynadığı hangi kötü adam karakteri ona ölümünden sonra Oscar kazandırmıştır?

Ayıışığı Sonatı ile ünlü hangi klasik müzik bestecisi ölümüne yakın sağır olmuştur?



APPENDIX B  
DEMOGRAPHIC FORM

Bu ankette sizden eğitim ve yabancı dil bilginizle ilgili soruları cevaplamanızı rica ediyoruz. Burada paylaştığınız bilgiler isminizle kesinlikle eşleştirilmeyecek ve sadece bu çalışmada kullanılmak üzere toplu olarak değerlendirilecektir.

*(In this questionnaire, we ask you to answer questions about your education and your knowledge of foreign language. The information you share here will not be matched with your name and will be evaluated collectively for the use of this study only.)*

Katılımcı numarası (*Participant number*)

Yaşınız (*Age*)

Cinsiyetiniz (*Gender*)

Bölümünüz (*Department*)

Okuduğunuz bölümde kaçınıcı döneminiz? (*What year of study are you in?*)

Anadiliniz (Birden fazla ise lütfen belirtiniz.)

*(Native language [Please indicate if it is more than one])*

Bildiğiniz diğer dilleri yetkinlik dereceniz en iyi olandan başlayarak sıralayınız.  
*(Please rank other languages that you know, starting with the one you are most competent in.)*

En son bitirdiğiniz okulun adı (Örn; Xxx Lisesi)

*(The last school you have graduated from [e.g., Xxx High School])*

İngilizce öğrenmeye başladığınız yaş

*(The age at which you have started learning English)*

Boğaziçi Üniversitesi'nde hazırlık okudunuz mu? Okuduysanız hangi seviyede?

*(Have you studied at English Preparatory Division at Boğaziçi University? If yes, at what level?)*

Boğaziçi Üniversitesi'nde İngilizce yeterliliği hangi sınavla ve hangi puanı/notu alarak geçtiniz?

*(With which exam and grade/points have you fulfilled the English proficiency requirements at Boğaziçi University?)*

Hiç yurtdışında bulundunuz mu? Bulunduysanız ne kadar süre ile ve hangi dilde iletişim kurdunuz?

*(Have you ever been to abroad? If yes, how long and what language have you used to communicate?)*

Sizce İngilizce okuduğunuzu anlama düzeyiniz nedir? 1'den 5'e kadar bir ölçekte değerlendiriniz.

*(According to you, what level is your reading comprehension in English? Indicate your answer on a scale from 1 to 5.)*

Sizce İngilizce okuma hızınız ne düzeydedir? 1'den 5'e kadar bir ölçekte değerlendiriniz.

*(According to you, what level is your reading speed in English? Indicate your answer on a scale from 1 to 5.)*

Sizin dil yetkinliğinizle ilgili ya da genel olarak çalışmamızla ilgili önemli olduğunu düşündüğünüz, eklemek istediğiniz bir bilgi varsa buraya yazabilirsiniz.

*(If there is anything important you would like to add about your language competence or about our experiment in general, you may write it here.)*

## APPENDIX C

### KNOWLEDGE CHECK TEST

Lütfen aşağıdaki bilgi sorularını ilk katıldığınız görevde size yöneltilen sorulardan tamamen bağımsız olarak, o deneye hiç katılmamışsınız gibi cevaplandırınız. Doğru cevabı bilmiyorsanız lütfen rasgele bir şık seçmeyin, “BİLMİYORUM” seçeneğini işaretleyiniz!

*Please answer the following questions independent of the questions you were asked in the first task as if you have never participated in the experiment. In case you do not know the correct answer to a question, please do not mark a random option but mark “BİLMİYORUM (I do not know)”.*

Katılıcı numarası (*Participant number*)

Set numarası (*Set number*)

1. Pokemon'da Roket Takımı'nın kaçırmak istediği pokemon hangisidir?

(*In Pokemon, which pokemon did the Team Rocket wanted to kidnap?*)

- ☐ Pikachu
- ☐ Charmander
- ☐ Psyduck
- ☐ Bilmiyorum (*I do not know*)

1. Cevabınızın doğruluğundan ne kadar eminsiniz?

(*How confident are you that your answer is correct?*)

1 2 3 4 5

(*Not confident at all*) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (*Very confident*)

2. Hangi bilimadaminin ağacın altında otururken kafasına düşen elma sayesinde Yerçekimi Kanununu bulduğu söylenir?

(*Which scientist was said to have discovered the Law of Gravitation thanks to a falling apple while he was sitting under a tree?*)

- ☐ Arşimet (*Archimedes*)
- ☐ Newton
- ☐ Galileo
- ☐ Bilmiyorum (*I do not know*)

2. Cevabınızın doğruluğundan ne kadar eminsiniz?

(*How confident are you that your answer is correct?*)

1 2 3 4 5

(*Not confident at all*) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (*Very confident*)

3. Diriliş (The Revenant) filmiyle 2016'da uzun süredir beklediği Oscar'ı alan oyuncu kimdir?

(Which actor win his long-awaited Oscar in 2016, with the movie The Revenant?)

- ☐ Ben Affleck
- ☐ Leonardo DiCaprio
- ☐ Jim Carrey
- ☐ Bilmiyorum (*I do not know*)

3. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

4. Doktor Canan Karatay neyin tüketilmesine karşıdır?

(Medical Doctor Canan Karatay is opposed to consumption of what?)

- ☐ Balık (*Fish*)
- ☐ Karbonhidrat (*Carbohydrates*)
- ☐ Protein
- ☐ Bilmiyorum (*I do not know*)

4. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

5. Franz Ferdinand'ın Sırbistan'da suikasti hangi savaşın başlamasına yol açmıştır?

(The assassination of Franz Ferdinand led to the beginning of which war?)

- ☐ Bosna Savaşı (*Bosnian War*)
- ☐ Birinci Dünya Savaşı (*First World War*)
- ☐ İkinci Dünya Savaşı (*Second World War*)
- ☐ Bilmiyorum (*I do not know*)

5. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

6. "Geleceğe Dönüş (Back to the Future)" film serisinde Marty McFly kimin zaman makinesini kullanır?

(In Back to the Future movie series, whose time machine does Marty McFly use?)

- ☐ Dr. Brown
- ☐ Prof. Oak
- ☐ Dr. Walter Bishop
- ☐ Bilmiyorum (*I do not know*)

6. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

7. Aşçılık yapan bir sıçanın olduğu animasyon filmi hangisidir?

(Which animation movie features a rat as a cook?)

- ☐ Kung Fu Panda
- ☐ Ratatouille
- ☐ Buz Devri (Ice Age)
- ☐ Bilmiyorum (I do not know)

7. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

8. Japonya'nın bayrağında beyaz arkaplan üstünde ne renk daire vardır?

(In the flag of Japan, what color is the disc on the white background?)

- ☐ Mavi (Blue)
- ☐ Siyah (Black)
- ☐ Kırmızı (Red)
- ☐ Bilmiyorum (I do not know)

8. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

9. Atatürk'ün manevi kızı Sabiha Gökçen ilk Türk kadın ne olmuştur?

(Atatürk's adopted daughter Sabiha Gökçen was first Turkish woman in which occupation?)

- ☐ Avukat (Lawyer)
- ☐ Ulaştırma Bakanı (Minister of Transport)
- ☐ Pilot
- ☐ Bilmiyorum (I do not know)

9. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

10. ALS'ye farkındalığı artırmak için ünlüler başlarından aşağı ne dökmüşlerdir?

(What did celebrities pour over their heads in order to increase awareness to ALS?)

- ☐ Tuzlu su (Salty water)
- ☐ Süt (Milk)
- ☐ Buzlu su (Ice water)
- ☐ Bilmiyorum (I do not know)

10. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

11. Paris'teki Louvre Müzesi'nde bulunan Mona Lisa portresi hangi sanatçının eseridir?

(Which artist's painting is the portait of Mona Lisa, which is located in the Louvre Museum in Paris?)

- ☐ Michelangelo
- ☐ Leonardo Da Vinci
- ☐ Salvador Dali
- ☐ Bilmiyorum (I do not know)

11. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

12. Dedektif Sherlock Holmes'un Londra'daki evinin adresi hangisidir?

(What is the address of the Detective Sherlock Holmes' in London?)

- ☐ 221B Baker Sokağı (221B Baker Street)
- ☐ Grimmauld Meydanı 12 Numara (Number 12 Grimmauld Place)
- ☐ Kaldırımtaş Sokak No: 323 Taşyatağı (Cobblestone Way Number 323 Bedrock)
- ☐ Bilmiyorum (I do not know)

12. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

13. 19. yüzyılda İngiltere hangi isimle anılırdı?

(In 19<sup>th</sup> century, what was United Kingdom known as?)

- ☐ Üzerinde güneş doğmayan imparatorluk (The empire on which the sun never rises)
- ☐ Üzerinde gece olmayan imparatorluk (The empire on which night never falls)
- ☐ Üzerinde güneş batmayan imparatorluk (The empire on which the sun never sets)
- ☐ Bilmiyorum (I do not know)

13. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

14. "Everyway that I can" şarkısıyla Eurovision Şarkı Yarışması'nı kazanan şarkıcı kimdir?

(Which singer won the Eurovision Song Contest with the song "Everyway that I can"?)

- ☐ Şebnem Paker
- ☐ Sertab Erener
- ☐ Hadise
- ☐ Bilmiyorum (*I do not know*)

14. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

15. Kripton gezegeninden gelen Superman günlük hayatında hangi isimle bilinir?

(What was the name Superman, who came from the planet Krypton, known in daily life?)

- ☐ Clark Kent
- ☐ Peter Parker
- ☐ Bruce Wayne
- ☐ Bilmiyorum (*I do not know*)

15. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

16. Boğaziçi Üniversitesi'nde üzerinde saat olan Albert Long Hall binası hangi kampüstedir?

(The building Albert Long Hall, which has a clock on it, is in which campus at Boğaziçi University?)

- ☐ Kuzey (North)
- ☐ Güney (South)
- ☐ Kandilli
- ☐ Bilmiyorum (*I do not know*)

16. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

17. Hangi eski Spice Girls üyesi, futbolcu David Beckham'la evlidir?

(Which former Spice Girls member is married to soccer player David Beckham?)

- ☐ Melanie B.
- ☐ Geri
- ☐ Victoria
- ☐ Bilmiyorum (*I do not know*)

17. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

18. Bowling topunda kaç delik olur?

(How many holes are there in a bowling ball?)

☐ 3

☐ 4

☐ 5

☐ Bilmiyorum (I do not know)

18. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

19. "Her Şeyin Teorisi (The Theory of Everything)" filminde Stephen Hawking'i kim canlandırmıştır?

(Who played the role of Stephen Hawking in the movie "The Theory of Everthing"?)

☐ Christian Bale

☐ Eddie Redmayne

☐ Oscar Isaac

☐ Bilmiyorum (I do not know)

19. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

20. Voldemort, Robert Pattinson'ın canlandırdığı Cedric Diggory karakterini hangi filmde öldürmüştür?

(In which movie, did Voldemenrt murder the character Cedric Diggory, which was played by Robert Pattinson?)

☐ Harry Potter ve Felsefe Taşı (Harry Potter and the Sorcerer's Stone)

☐ Harry Potter ve Ateş Kadehi (Harry Potter and the Goblet of Fire)

☐ Harry Potter ve Zümrüdüanka Yoldaşlığı (Harry Potter and the Order of Phoenix)

☐ Bilmiyorum (I do not know)

20. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)



21. Lozan Barış Antlaşması hangi ülkede imzalanmıştır?  
(*In which country was the Treaty of Lausanne signed?*)

- Norveç (*Norway*)
- İsviçre (*Switzerland*)
- Hollanda (*The Netherlands*)
- Bilmiyorum (*I do not know*)

21. Cevabınızın doğruluğundan ne kadar eminsiniz?  
(*How confident are you that your answer is correct?*)

1 2 3 4 5

(*Not confident at all*) Hiç emin değilim ○ ○ ○ ○ ○ Çok eminim (*Very confident*)

22. Kulağını kestiği söylenen Hollandalı ünlü ressam kimdir?  
(*Which famous Dutch artist is said to have cut off his ear?*)

- Vincent van Gogh
- Claude Monet
- Salvadore Dali
- Bilmiyorum (*I do not know*)

22. Cevabınızın doğruluğundan ne kadar eminsiniz?  
(*How confident are you that your answer is correct?*)

1 2 3 4 5

(*Not confident at all*) Hiç emin değilim ○ ○ ○ ○ ○ Çok eminim (*Very confident*)

23. Öğretmen olarak Anadolu'ya giden Feride'nin hikayesinin anlatıldığı Çalıkuşu romanının yazarı kimdir?  
(*Who is the author of the novel Çalıkuşu [The Wren], which tells the story of Feride as she goes to Anatolia as a teacher?*)

- Yakup Kadri Karaosmanoğlu
- Reşat Nuri Güntekin
- Ayşe Kulin
- Bilmiyorum (*I do not know*)

23. Cevabınızın doğruluğundan ne kadar eminsiniz?  
(*How confident are you that your answer is correct?*)

1 2 3 4 5

(*Not confident at all*) Hiç emin değilim ○ ○ ○ ○ ○ Çok eminim (*Very confident*)

24. Gülse Birsal ve Ata Demirel'in kardeş olduğu "Avrupa Yakası" dizisi nerede geçer?  
(*Where does the TV series Avrupa Yakası [European Side], in which Gülse Birsal and Ata Demirel are siblings, take place?*)

- Cihangir
- Nişantaşı
- Suadiye
- Bilmiyorum (*I do not know*)

24. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

25. Antalya Film Festivali'nde hangi ödül verilir?

(Which award is given in the Antalya Film Festival?)

- ☐ Altın Ayı (Golden Bear)
- ☐ Altın Üzüm (Golden Grape)
- ☐ Altın Portakal (Golden Orange)
- ☐ Bilmiyorum (I do not know)

25. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

26. Antik Yunan dönemi savaşçısı Achilles topuğundan neyle öldürülmüştür?

(Which weapon killed ancient Greek warrior Achilles' by hitting his heel?)

- ☐ Kılıç (Sword)
- ☐ Hançer (Dagger)
- ☐ Ok (Arrow)
- ☐ Bilmiyorum (I do not know)

26. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

27. Pavlov, köpeğin zil sesine tepki olarak salya akıtmasıyla neyi bulmuştur?

(What did Pavlow discover with the help of dogs' salivation to ringing bell?)

- ☐ Klasik koşullanma (Classical conditioning)
- ☐ Edimsel koşullanma (Operant conditioning)
- ☐ Duyarsızlaşma (Desensitization)
- ☐ Bilmiyorum (I do not know)

27. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

28. Hugo'nun karısı ve çocuklarını Cadı Sila'dan kurtarmaya çalıştığı oyun programının sunucusu kimdi?

(Who was the host of the game show in which Hugo tried to rescue his wife and children from evil witch Scylla?)

- Beyazıt Öztürk
- Tolga Gariboğlu
- Acun Ilıcalı
- Bilmiyorum (*I do not know*)

28. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ○ ○ ○ ○ ○ Çok eminim (Very confident)

29. "Demir Leydi (The Iron Lady)" olarak da bilinen Margaret Thatcher İngiltere'de hangi görevi yapmıştır?

(At which position did Margaret Thatcher, aslo known as "The Iron Lady" work in United Kingdom?)

- Devlet Başkanı (*President*)
- Başbakan (*Prime Minister*)
- Dış İşleri Bakanı (*Minister of Foreign Affairs*)
- Bilmiyorum (*I do not know*)

29. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ○ ○ ○ ○ ○ Çok eminim (Very confident)

30. Hangi masal karakterine üvey annesi zehirli bir elma vermiştir?

(Which fairy tale character was given a poisoned apple by her stepmother?)

- Sindirella (*Cinderella*)
- Kırmızı Başlıklı Kız (*Little Red Riding Hood*)
- Pamuk Prenses (*Snow White*)
- Bilmiyorum (*I do not know*)

30. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ○ ○ ○ ○ ○ Çok eminim (Very confident)

31. Kedi Sylvester'ın yakalamak istediği Tweety'nin türü nedir?

(What species does Tweety, which Sylvester the cat aims to catch, belong to?)

- Papağan (*Parrot*)
- Cıvıv (*Chick*)
- Kanarya (*Canary*)
- Bilmiyorum (*I do not know*)

31. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

32. "Sosyal Ağ (The Social Network)" filminde anlatıldığı üzere Mark Zuckerberg Facebook'u nerede okurken kurmuştur?

(As told in the movie "The Social Network", Mark Zuckerberg found Facebook while studying at which university?)

- ☐ Princeton
- ☐ Harvard
- ☐ Oxford
- ☐ Bilmiyorum (I do not know)

32. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

33. Mustafa Kemal Atatürk 10 Kasım 1938'de Dolmabahçe Sarayı'nda saat kaçta ölmüştür?

(What was the time when Mustafa Kemal Atatürk died at Dolmabahçe Palace on November 10, 1938?)

- ☐ 8:55
- ☐ 12:00
- ☐ 9:05
- ☐ Bilmiyorum (I do not know)

33. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

34. 24 dizisinde terör saldırılarını önlemekle görevli ajanın adı nedir?

(What was the name of the agent, who was responsible for preventing terrorist attacks in TV series 24?)

- ☐ Jack Bauer
- ☐ Fox Mulder
- ☐ Charles Bartowski
- ☐ Bilmiyorum (I do not know)

34. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

35. Telefonu kim icat etmiştir?

(Who invented telephone?)

- ☐ Alexander Graham Bell
- ☐ Thomas Edison
- ☐ Nikola Tesla
- ☐ Bilmiyorum (*I do not know*)

35. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

36. "Akıl Oyunları (A Beautiful Mind)" filminde Russell Crowe Oyun Teorisi'yle ünlü hangi matematikçiyi canlandırmıştır?

(In the movie "A Beautiful Mind", which mathematician that is famous for his Game Theory was performed by Russell Crowe?)

- ☐ Steve Jobs
- ☐ Alan Turing
- ☐ John Nash
- ☐ Bilmiyorum (*I do not know*)

36. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

37. Pandalar ne yedikleri için soyları tükenmek üzeredir?

(What do pandas eat that is the cause of their being in danger of extinction?)

- ☐ Palmiye (*Palm tree*)
- ☐ Bambu (*Bamboo*)
- ☐ Orkide (*Orchid*)
- ☐ Bilmiyorum (*I do not know*)

37. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

38. Fransa'nın Amerika Birleşik Devletleri'ne hediyesi Özgürlük Anıtı hangi şehirde bulunur?

(In which city is the Statue of Liberty, which is a gift of France to the United States, located?)

- ☐ Los Angeles
- ☐ Florida
- ☐ New York
- ☐ Bilmiyorum (*I do not know*)

38. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

39. Animasyon filmi Karlar Ülkesi (Frozen)'nde konuşan kardan adam Olaf'ı kim yapmıştır?

(In the animation movie Frozen, who built the talking snowman Olaf?)

- ☐ Elsa
- ☐ Anna
- ☐ Jack Frost
- ☐ Bilmiyorum (I do not know)

39. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

40. Küçük Prens çölde kimden bir koyun çizmesini ister?

(Whom does the Little Prince ask to draw a sheep?)

- ☐ Kral (King)
- ☐ Pilot
- ☐ Polis (Police)
- ☐ Bilmiyorum (I do not know)

40. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

41. Gizli servis ajanı James Bond'un kod numarası nedir?

(What is the code number of secret service agent James Bond?)

- ☐ 001
- ☐ 009
- ☐ 007
- ☐ Bilmiyorum (I do not know)

41. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

42. Yükseköğretime Geçiş Sınavı (YGS) puanı hesaplanırken kaç yanlış bir doğruyu götürür?

(How many wrong answers cancel the score of one correct answer in YGS [University Entrance Exam]?)

- ☐ 3
- ☐ 4
- ☐ 5
- ☐ Bilmiyorum (*I do not know*)

42. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

43. Avrasya Maratonu'nun rotasında hangi köprü vardır?

(Which bridge is on the route of the Euroasian Marathon?)

- ☐ Boğaziçi Köprüsü (*Bosphorus Bridge*)
- ☐ Fatih Sultan Mehmet Köprüsü (*Fatih Sultan Mehmet Bridge*)
- ☐ Galata Köprüsü (*Galata Bridge*)
- ☐ Bilmiyorum (*I do not know*)

43. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

44. "Karayip Korsanları (The Pirates of Carribbean)"nda Johnny Depp'in canlandığı Kaptan Jack Sparrow'un gemisi hangisidir?

(Which ship belongs to Captain Jack Sparrow, who was performed by Johnny Depp in "The Pirates of Carribbean"?)

- ☐ Atılgan (*Enterprise*)
- ☐ Tardis
- ☐ Siyah İnci (*Black Pearl*)
- ☐ Bilmiyorum (*I do not know*)

44. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

45. "Kayıp Balık Nemo (Finding Nemo)"da Nemo'yu arayan unutkan balığın adı nedir?

(What is the name of the forgetful fish that is looking for Nemo in Finding Nemo?)

- ☐ Clara
- ☐ Dory
- ☐ Marlin
- ☐ Bilmiyorum (*I do not know*)

45. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

46. "Süper Mario" oyununda Mario ne yiyerek güç kazanır?

(In the video game Super Mario, what does Mario eat in order to gain power?)

- ☐ Kaplumbağa (Turtle)
- ☐ Mantar (Mushroom)
- ☐ Yosun (Seaweed)
- ☐ Bilmiyorum (I do not know)

46. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

47. Hangi aktör "Hobbit" ve "Yüzüklerin Efendisi (The Lord of the Rings)" film serilerinde elf Legolas karakterini canlandırmıştır?

(Which famous actor played Legolas the elf in "The Hobbit" and "The Lord of the Rings" movie series?)

- ☐ Elijah Wood
- ☐ Leonardo DiCaprio
- ☐ Orlando Bloom
- ☐ Bilmiyorum (I do not know)

47. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

48. Geometride " $\pi r^2$  (pi-r-kare)" formülü dairenin hangi ölçüsünü bulmaya yarar?

(In geometry, what size of a circle is found with the formula " $\pi r^2$  [pi-r-squared] ")?

- ☐ Çevresi (Circumference)
- ☐ Alanı (Area)
- ☐ Çapı (Diameter)
- ☐ Bilmiyorum (I do not know)

48. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)



49. Heidi İsviçre Alplerinde kiminle yaşar?

(Whom does Heidi live with in Swiss Alps?)

- Büyükbabası (Her grandfather)
- Büyükannesi (Her grandmother)
- Teyzesi (Her aunt)
- Bilmiyorum (I do not know)

49 Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ○ ○ ○ ○ ○ Çok eminim (Very confident)

50. 11 Eylül 2001'de teröristlerin saldırdığı İkiz Kuleler Amerika'nın hangi şehirdedir?

(In which city of the United States were the Twin Towers that were attacked by terrorists on September 11, 2001?)

- Washington
- Miami
- New York
- Bilmiyorum (I do not know)

50. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ○ ○ ○ ○ ○ Çok eminim (Very confident)

51. Klonlanan ilk koyunun adı nedir?

(What is the name of the first cloned sheep?)

- Mary
- Daisy
- Dolly
- Bilmiyorum (I do not know)

51. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ○ ○ ○ ○ ○ Çok eminim (Very confident)

52. Sünger Bob (SpongeBob SquarePants) çizgi filminde Sünger Bob'un en yakın arkadaşı kimdir?

(In the cartoon SpongeBob SquarePants, who is the best friend of Sponge Bob?)

- Gary
- Sandy
- Patrick
- Bilmiyorum (I do not know)

52. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ○ ○ ○ ○ ○ Çok eminim (Very confident)

53. "Winnie the Pooh" çizgi filmindeki kötümser ve depresif Eeyore'un türü nedir?  
(*In the cartoon Winnie the Pooh, what species does pessimist and depressed Eeyore belong to?*)

- At (*Horse*)
- Eşek (*Donkey*)
- Zebra
- Bilmiyorum (*I do not know*)

53. Cevabınızın doğruluğundan ne kadar eminsiniz?

(*How confident are you that your answer is correct?*)

1 2 3 4 5

(*Not confident at all*) Hiç emin değilim ○ ○ ○ ○ ○ Çok eminim (*Very confident*)

54. Romeo ve Juliet'in yazarı kimdir?

(*Who is the author of Romeo and Juliet?*)

- Dante
- Shakespeare
- Çehov (*Chekhov*)
- Bilmiyorum (*I do not know*)

54 Cevabınızın doğruluğundan ne kadar eminsiniz?

(*How confident are you that your answer is correct?*)

1 2 3 4 5

(*Not confident at all*) Hiç emin değilim ○ ○ ○ ○ ○ Çok eminim (*Very confident*)

55. Noel baba çocuklara ne zaman hediye dağıtır?

(*When does Santa Claus bring presents to children?*)

- Doğumgünü (*Birthday*)
- Dünya Çocuk Günü (*Children's day*)
- Noel (*Christmas*)
- Bilmiyorum (*I do not know*)

55. Cevabınızın doğruluğundan ne kadar eminsiniz?

(*How confident are you that your answer is correct?*)

1 2 3 4 5

(*Not confident at all*) Hiç emin değilim ○ ○ ○ ○ ○ Çok eminim (*Very confident*)

56. Ocean's 11 filminde hangi aktör ve arkadaşları Andy Garcia'nın kumarhanesini soymuştur?

(*In the movie Ocean's 11, which actor and his friends robbed the casino of Andy Garica?*)

- Al Pacino
- George Clooney
- Johnny Depp
- Bilmiyorum (*I do not know*)

56. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

57. Fatih Sultan Mehmet hangi padişahın babasıdır?

(Mehmed the Conqueror was the father of which Ottoman sultan?)

- o 2. Bayezid (Bayezid II)
- o Yavuz Sultan Selim (Selim the Grim)
- o 2. Mahmut (Mahmud II)
- o Bilmiyorum (I do not know)

57. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

58. "X-Men" film serisinde Wolverine karakterini hangi aktör canlandırmıştır?

(In X-Men movie series, which actor played the role of Wolverine?)

- o Hugh Jackman
- o Robert Downey Jr.
- o Elijah Wood
- o Bilmiyorum (I do not know)

58. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

59. Acun Ilıcalı'nın yapımcısı olduğu Survivor yarışmasını kazanan Derya Büyükuncu hangi dalda milli sporcu olmuştur?

(In what sports was Derya Büyükuncu, the winner of Acun Ilıcalı's Survivor competition, a national sportsman?)

- o Dalış (Diving)
- o Yüzme (Swimming)
- o Basketbol (Basketball)
- o Bilmiyorum (I do not know)

59. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

60. The Beatles üyesi John Lennon nasıl öldürülmüştür?  
(How did The Beatles member John Lennon get killed?)

- Silahla vurularak (Shot with a gun)
- Bıçakla (Stabbed )
- Boğularak (Choked)
- Bilmiyorum (I do not know)

60. Cevabınızın doğruluğundan ne kadar eminsiniz?  
(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ○ ○ ○ ○ ○ Çok eminim (Very confident)

61. Tansu Çiller hangi üniversitede profesörlük yapmıştır?  
(At what university did Tansu Çiller work as a professor?)

- Boğaziçi Üniversitesi (Boğaziçi University)
- İTÜ (İstanbul Technical University)
- Koç Üniversitesi (Koç University)
- Bilmiyorum (I do not know)

61. Cevabınızın doğruluğundan ne kadar eminsiniz?  
(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ○ ○ ○ ○ ○ Çok eminim (Very confident)

62. Su, oksijen ve hangi elementin birleşmesinden oluşur?  
(Water is made of the combination of oxygen with what element?)

- Karbon (Carbon)
- Helyum (Helium)
- Hidrojen (Hydrogen)
- Bilmiyorum (I do not know)

62. Cevabınızın doğruluğundan ne kadar eminsiniz?  
(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ○ ○ ○ ○ ○ Çok eminim (Very confident)

63. Oktay Rıfat ve Melih Cevdet yakın arkadaşları Orhan Veli ile şiirde hangi akımı başlatmışlardır?  
(What movement in poetry did Orhan Veli start with his close friends Oktay Rıfat and Melih Cevdet?)

- Garip (meaning peculiar)
- Beş Hececiler ( meaning five syllabists)
- İkinci Yeni (meaning second new)
- Bilmiyorum (I do not know)

63. Cevabınızın doğruluğundan ne kadar eminsiniz?  
(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ○ ○ ○ ○ ○ Çok eminim (Very confident)

64. "Olmak ya da olmamak, işte bütün mesele bu" sözü Shakespeare'in hangi ünlü oyunundandır?

(Which famous play of Shakespeare does the quote "To be, or not to be, that is the question" belong to?)

- ☐ Hamlet
- ☐ Kral Lear (*King Lear*)
- ☐ Macbeth
- ☐ Bilmiyorum (*I do not know*)

64. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

65. Kutup ayıları nereye yakın yaşar?

(Polar bears live near to where?)

- ☐ Kuzey Kutbu (*North Pole*)
- ☐ Güney Kutbu (*South Pole*)
- ☐ İzlanda (*Iceland*)
- ☐ Bilmiyorum (*I do not know*)

65. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

66. Formula 1 pilotu Michael Schumacher ne yaparken ciddi bir kaza geçirmiş ve uzun süre hastanede kalmıştır?

(While doing what sport did Formula 1 driver Michael Schumacher have a serious accident and hospitalized for a long time?)

- ☐ Dalış (*Diving*)
- ☐ Yarış (*Racing*)
- ☐ Kayak (*Skiing*)
- ☐ Bilmiyorum (*I do not know*)

66. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

67. Ay, Dünya'nın etrafında dönüşünü kaç günde tamamlar?

(In how many days does the Moon complete its rotation around the Earth?)

- ☐ 1
- ☐ 29,5
- ☐ 365
- ☐ Bilmiyorum (*I do not know*)

67. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

68. Aziz Sancar hangi alanda Nobel Ödülü kazanmıştır?

(In which category did Aziz Sancar win a Nobel Prize?)

- ☐ Biyoloji (Biology)
- ☐ Edebiyat (Literature)
- ☐ Kimya (Chemistry)
- ☐ Bilmiyorum (I do not know)

68. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

69. Star Wars (Yıldız Savaşları)'da Darth Vader Luke Skywalker'a hangi akrabası olduğunu söyler?

(In Star Wars, which relative of Luke Skywalker did Darth Vader tell that he was?)

- ☐ Babası (Father)
- ☐ Dayısı (Uncle)
- ☐ İkizi (Twin)
- ☐ Bilmiyorum (I do not know)

69 Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

70. Matrix'te yer alan, Alice Harikalar Diyarı (Alice in Wonderland)'ndan alıntılanmış mesajda hangi tavşanın takip edilmesi istenir?

(In Matrix, which rabbit was to-be-followed, according to the message quoted from Alice in Wonderland?)

- ☐ Gri (Gray)
- ☐ Beyaz (White)
- ☐ Kahverengi (Brown)
- ☐ Bilmiyorum (I do not know)

70. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim o o o o o Çok eminim (Very confident)

71. Hangi aktör Joker performansı ile ölümünden sonra Oscar kazanmıştır?  
(Which actor won an Oscar after his death for his performance as Joker?)

- ☐ Heath Ledger
- ☐ Bradley Cooper
- ☐ Will Smith
- ☐ Bilmiyorum (*I do not know*)

71. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

72. Ayışığı Sonatı (Moonlight Sonata) ile ünlü Beethoven ölümüne yakın hangi duyusunu yitirmiştir?

(Which sense did Beethoven, who is famous for his Moonlight Sonata, lose near the end of his life?)

- ☐ İşitme (*Hearing*)
- ☐ Görme (*Vision*)
- ☐ Koku (*Olfaction*)
- ☐ Bilmiyorum (*I do not know*)

72. Cevabınızın doğruluğundan ne kadar eminsiniz?

(How confident are you that your answer is correct?)

1 2 3 4 5

(Not confident at all) Hiç emin değilim ☐ ☐ ☐ ☐ ☐ Çok eminim (Very confident)

## APPENDIX D

### FACT CHECK FORM

Lütfen aşağıda size verilen bilgileri bu deneye katılmadan önce ne kadar iyi bildiğinizi belirtiniz. 1 (kesinlikle bilmiyordum), 2 (bilmiyordum), 3 (sanırım bilmiyordum), 4 (sanırım biliyordum), 5 (biliyordum), 6 (kesinlikle biliyordum) anlamındadır.

*Please indicate how well you knew the facts presented below before you participated in this experiment. The meanings of each point in the scale are as follows: 1 (No, I certainly didn't know), 2 (I didn't know), 3 (I guess I didn't know), 4 (I guess I knew), 5 (I knew), 6 (Yes, I certainly knew).*

Katılımcı numarası (*Participant number*)

1. Kedi Sylvester'in yakalamak istediği Tweety bir kanaryadır.  
(*Tweety, who Sylvester the cat aims to catch, is a canary.*)

	1	2	3	4	5	6	
Hayır, kesinlikle bilmiyordum							Evet, kesinlikle biliyordum
( <i>No, I certainly didn't know</i> )							( <i>Yes, I certainly knew</i> )

2. Voldemort, Cedric Diggory karakterini Harry Potter ve Ateş Kadehi (Harry Potter and the Goblet of Fire) filminde öldürmüştür.  
(*Voldemort murdered the character Cedric Diggory in the movie Harry Potter and the Goblet of Fire.*)

	1	2	3	4	5	6	
Hayır, kesinlikle bilmiyordum							Evet, kesinlikle biliyordum
( <i>No, I certainly didn't know</i> )							( <i>Yes, I certainly knew</i> )

3. 11 Eylül 2001'de teröristlerin saldırdığı İkiz Kuleler New York'tadır.  
(*The Twin Towers, which were attacked by terrorists on September 11, 2001, were located in New York.*)

	1	2	3	4	5	6	
Hayır, kesinlikle bilmiyordum							Evet, kesinlikle biliyordum
( <i>No, I certainly didn't know</i> )							( <i>Yes, I certainly knew</i> )

4. Atatürk 10 Kasım 1938'de saat 9'u 5 geçte ölmüştür.  
(*Atatürk died on November 10, 1938 at five past nine.*)

	1	2	3	4	5	6	
Hayır, kesinlikle bilmiyordum							Evet, kesinlikle biliyordum
( <i>No, I certainly didn't know</i> )							( <i>Yes, I certainly knew</i> )



5. Pamuk Prenses'in üvey annesi ona zehirli bir elma vermiştir.  
(*The stepmother of Snow White gave her a poisoned apple.*)

	1	2	3	4	5	6	
Hayır, kesinlikle bilmiyordum	o	o	o	o	o	o	Evet, kesinlikle biliyordum
( <i>No, I certainly didn't know</i> )							( <i>Yes, I certainly knew</i> )

6. Paris'teki Louvre Müzesi'nde bulunan Mona Lisa portresini Leonardo Da Vinci yapmıştır.  
(*The portrait of Mona Lisa, located in the Louvre Museum in Paris, was painted by Leonardo Da Vinci.*)

	1	2	3	4	5	6	
Hayır, kesinlikle bilmiyordum	o	o	o	o	o	o	Evet, kesinlikle biliyordum
( <i>No, I certainly didn't know</i> )							( <i>Yes, I certainly knew</i> )

7. Kutup ayıları Kuzey kutbuna yakın yaşarlar.  
(*Polar bears live near the North Pole.*)

	1	2	3	4	5	6	
Hayır, kesinlikle bilmiyordum	o	o	o	o	o	o	Evet, kesinlikle biliyordum
( <i>No, I certainly didn't know</i> )							( <i>Yes, I certainly knew</i> )

8. "Demir Leydi" lakaplı Margaret Thatcher İngiltere'de başbakanlık yapmıştır.  
(*Margaret Thatcher, also known as "The Iron Lady", served as the prime minister of United Kingdom.*)

	1	2	3	4	5	6	
Hayır, kesinlikle bilmiyordum	o	o	o	o	o	o	Evet, kesinlikle biliyordum
( <i>No, I certainly didn't know</i> )							( <i>Yes, I certainly knew</i> )

9. İngiliz gizli servis ajanı James Bond'un kod numarası 007'dir.  
(*British secret service agent James Bond's code number is 007.*)

	1	2	3	4	5	6	
Hayır, kesinlikle bilmiyordum	o	o	o	o	o	o	Evet, kesinlikle biliyordum
( <i>No, I certainly didn't know</i> )							( <i>Yes, I certainly knew</i> )

10. Franz Ferdinand'ın suikasti Birinci Dünya Savaşı'nın başlamasına yol açmıştır.  
(*The assassination of Franz Ferdinand led to the beginning of the First World War.*)

	1	2	3	4	5	6	
Hayır, kesinlikle bilmiyordum	o	o	o	o	o	o	Evet, kesinlikle biliyordum
( <i>No, I certainly didn't know</i> )							( <i>Yes, I certainly knew</i> )

11. Pandalar bambu yedikleri için nesilleri tükenmek üzeredir.  
(*Pandas are nearly extinct because they eat bamboo.*)

	1	2	3	4	5	6	
Hayır, kesinlikle bilmiyordum	o	o	o	o	o	o	Evet, kesinlikle biliyordum
( <i>No, I certainly didn't know</i> )							( <i>Yes, I certainly knew</i> )

12. Ağaçtan düşen elmadan ilham alarak Yerçekimi Kanunu'nu bulduğu söylenen Newton'dır.  
(*Newton was said to have discovered the Law of Gravitation inspired by an apple that fell from a tree.*)

	1	2	3	4	5	6	
Hayır, kesinlikle bilmiyordum	o	o	o	o	o	o	Evet, kesinlikle biliyordum
( <i>No, I certainly didn't know</i> )							( <i>Yes, I certainly knew</i> )

13. Karlar Ülkesi (Frozen)'nde kardan adam Olaf'ı Elsa yapmıştır.  
(*In Frozen, Olaf the snowman was built by Elsa.*)

	1	2	3	4	5	6	
Hayır, kesinlikle bilmiyordum	o	o	o	o	o	o	Evet, kesinlikle biliyordum
( <i>No, I certainly didn't know</i> )							( <i>Yes, I certainly knew</i> )

14. Pavlov köpeğin zil sesine salya akıtmasından yola çıkarak klasik koşullanmayı bulmuştur.  
(*Pavlov discovered classical conditioning inspired by dogs' salivation to ringing bell.*)

	1	2	3	4	5	6	
Hayır, kesinlikle bilmiyordum	o	o	o	o	o	o	Evet, kesinlikle biliyordum
( <i>No, I certainly didn't know</i> )							( <i>Yes, I certainly knew</i> )

15. 19. yüzyılda İngiltere "üzerinde güneş batmayan imparatorluk" olarak bilinirdi.  
(*In 19<sup>th</sup> century, British Empire was known as "the empire on which sun never sets".*)

	1	2	3	4	5	6	
Hayır, kesinlikle bilmiyordum	o	o	o	o	o	o	Evet, kesinlikle biliyordum
( <i>No, I certainly didn't know</i> )							( <i>Yes, I certainly knew</i> )

16. Kripton gezegeninden gelen Superman gazeteci Clark Kent olarak bilinir.  
(*Superman, who came from the planet Krypton, is known as the journalist Clark Kent.*)

	1	2	3	4	5	6	
Hayır, kesinlikle bilmiyordum	o	o	o	o	o	o	Evet, kesinlikle biliyordum
( <i>No, I certainly didn't know</i> )							( <i>Yes, I certainly knew</i> )

17. Survivor yarışmasını kazanan Derya Büyükuncu milli yüzücüdür.  
(Survivor winner Derya Büyükuncu is a national swimmer.)

	1 2 3 4 5 6	
Hayır, kesinlikle bilmiyordum	o o o o o o	Evet, kesinlikle biliyordum
(No, I certainly didn't know)		(Yes, I certainly knew)

18. John Lennon bir hayranı tarafından silahla vurularak öldürülmüştür.  
(John Lennon was shot to death by his fan.)

	1 2 3 4 5 6	
Hayır, kesinlikle bilmiyordum	o o o o o o	Evet, kesinlikle biliyordum
(No, I certainly didn't know)		(Yes, I certainly knew)

19. Heidi, İsviçre Alplerinde büyükbabasıyla yaşar.  
(Heidi lives in Swiss Alps with her grandfather.)

	1 2 3 4 5 6	
Hayır, kesinlikle bilmiyordum	o o o o o o	Evet, kesinlikle biliyordum
(No, I certainly didn't know)		(Yes, I certainly knew)

20. Ay'ın Dünya'nın etrafında dönüşünü tamamlaması 29,5 gün sürer.  
(Moon completes its rotation around the Earth in 29.5 days.)

	1 2 3 4 5 6	
Hayır, kesinlikle bilmiyordum	o o o o o o	Evet, kesinlikle biliyordum
(No, I certainly didn't know)		(Yes, I certainly knew)

21. YGS'de 4 yanlış 1 doğruyu götürür.  
(In YGS [University Entrance Exam], four wrong answers cancel the score of one correct answer.)

	1 2 3 4 5 6	
Hayır, kesinlikle bilmiyordum	o o o o o o	Evet, kesinlikle biliyordum
(No, I certainly didn't know)		(Yes, I certainly knew)

22. Matrix'teki "Beyaz tavşanı takip et." sözü Alice Harikalar Diyarında'ya göndermedir.  
(The quote "Follow the white rabbit." in Matrix is a reference to Alice in Wonderland.)

	1 2 3 4 5 6	
Hayır, kesinlikle bilmiyordum	o o o o o o	Evet, kesinlikle biliyordum
(No, I certainly didn't know)		(Yes, I certainly knew)

23. "Olmak ya da olmamak, işte bütün mesele bu" sözü Hamlet'tendir.  
(The quote "To be, or not to be: that is the question" is from Hamlet.)

	1 2 3 4 5 6	
Hayır, kesinlikle bilmiyordum	o o o o o o	Evet, kesinlikle biliyordum
(No, I certainly didn't know)		(Yes, I certainly knew)

24. Bowling'de lobutları devirmek için kullanılan top 3 deliklidir.  
(*A three-hole ball is used for knocking down pins in bowling.*)

	1	2	3	4	5	6	
Hayır, kesinlikle bilmiyordum	o	o	o	o	o	o	Evet, kesinlikle biliyordum
( <i>No, I certainly didn't know</i> )							( <i>Yes, I certainly knew</i> )

## APPENDIX E

### SEMANTIC ASSOCIATION FORM

Aşağıdaki sorularda parantez içindeki kelime veya isim ikililerinin size sorulan sorulardaki kullanımları açısından birbirleri ile anlamsal ilişkileri ve karıştırılabilirliklerini 1'den 5'e kadar bir ölçekte değerlendirmenizi rica ediyoruz. Örneğin, "Unvanı kar (kaplanı / leoparı) olan AKUT'un kurucusu ünlü dağcı kimdir?" sorusunda kaplan ve leopar kelimelerinin bu soruda kullanılış açısından anlam olarak birbirine yakın ve birbiriyle karıştırılabilir olduğunu düşünüyorsanız 4 ya da 5'i işaretleyin. Eğer bu iki kelimeyi birbirleriyle ilişkili bulmuyorsanız daha düşük 1 ya da 2'yi işaretlemelisiniz.

*We ask you to rate the semantic relatedness and confusability of the two terms in parenthesis in the context of the questions they were given on a scale from 1 to 5. For example, in the question "Who is the famous mountaineer that is the founder of AKUT and has the title snow (leopard / tiger)?" if you think that tiger and leopard are semantically related and confusable in this context, then you need to mark 4 or 5. If you think that they are not semantically related, then you need to mark 1 or 2.*

Katılımcı numarası (*Participant number*)

1. 19. yüzyılda "üzerinde güneş (doğmayan / batmayan) imparatorluk" olarak bilinen ülke hangisidir?  
(*Which country was known as "the empire on which the sun never [rises /sets]" in 19th century?*)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(*Not related at all*) (*Very related and confusable*)

2. En son Daniel Craig'in canlandırdığı (001 / 007) olarak da bilinen İngiliz gizli servis ajanı kimdir?  
(*Who is the British secret service agent, also known as [001 / 007] recently performed by Daniel Craig?*)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(*Not related at all*) (*Very related and confusable*)

3. Hangi animasyon filminde (Anna / Elsa), Olaf adında konuşan bir kardan adam yapar?  
(*In which animation movie, does [Anna / Elsa] build a talking snowman named Olaf?*)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(*Not related at all*) (*Very related and confusable*)

4. Hangi sporda on lobutu devirmek için (dört / üç) delikli büyük bir top kullanılır?  
(*What sport uses a [four / three] holed ball for knocking down ten white pins?*)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(*Not related at all*) (*Very related and confusable*)

5. (İkinci / Birinci) Dünya Savaşı kimin Sırbistan'da suikastinin ardından başladı?  
(*Assassination of whom in Serbia lead to the beginning of the [Second / First] World War?*)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(*Not related at all*) (*Very related and confusable*)

6. Kedi Sylvester'ın yakalamayı amaçladığı sarı (civcivin / kanarya) adı nedir?  
(*What is the name of the yellow [chick / canary] that Sylvester the cat aims to catch?*)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(*Not related at all*) (*Very related and confusable*)

7. Kripton gezegeninden gelen hangi süper kahraman gazeteci (Peter Parker / Clark Kent) olarak bilinir?  
(*Which superhero from the planet Krypton is also known as the journalist [Peter Parker / Clark Kent]?*)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(*Not related at all*) (*Very related and confusable*)

8. Kötü kalpli üvey annesi (Pamuk Prenses / Sindirella)'ya zehirli elmayı nerede vermiştir?  
(*Where did her wicked stepmother give [Cinderella / Snow White] the poisoned apple?*)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(*Not related at all*) (*Very related and confusable*)

9. Matrix'teki “(Gri / Beyaz) tavşanı takip et” sözü ile hangi kitaba gönderme yapılmıştır?  
(The Matrix quote "Follow the [gray / white] rabbit" is a reference to which book?)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(Not related at all) (Very related and confusable)

10. (Leonardo Da Vinci / Michelangelo)'nun Mona Lisa portresinin bulunduğu Louvre Müzesi hangi şehirdedir?  
(In which city is the Louvre museum that hosts [Michelangelo's / Leonardo DaVinci's] portrait of Mona Lisa?)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(Not related at all) (Very related and confusable)

11. Mustafa Kemal Atatürk 10 Kasım 1938'de 9'a 5 (kala / geç) nerede ölmüştür?  
(Where did Mustafa Kemal Atatürk die on November 10, 1938 at five [to / past] nine?)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(Not related at all) (Very related and confusable)

12. Shakespeare'in ünlü oyunu (Machbeth / Hamlet)'te "Olmak ya da olmamak"ı hangi söz takip eder?  
(What words follow "To be or not to be" in Shakespeare's famous play [Macbeth / Hamlet])?

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(Not related at all) (Very related and confusable)

13. Yüzeyinde kraterler olan hangi gök cismi Dünya'nın etrafındaki dönüşünü (bir / yirmi dokuz) günde tamamlar?  
(Which celestial body that has craters on its surface completes its rotation around the Earth in [one / twenty-nine] day/s?)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(Not related at all) (Very related and confusable)

14. İsviçre Alplerinde (büyükannesiyle / büyükbabasıyla) yaşayan ve Peter'le arkadaş olan kimdir?  
(Who lives in the Swiss Alps with her [grandmother / grandfather] and is friends with Peter?)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(Not related at all) (Very related and confusable)

15. The Beatles'ın hangi üyesi bir hayranı tarafından (bıçaklanarak / vurularak) öldürülmüştür?  
(Which member of The Beatles was [stabbed / shot] to death by his fan?)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(Not related at all) (Very related and confusable)

16. Milli (dalğış / yüzücü) Derya Büyükuncu'nun kazandığı "Survivor"ın yapımcısı kimdir?  
(Who is the producer of the "Survivor" that national [diver / swimmer] Derya Büyükuncu win?)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(Not related at all) (Very related and confusable)

17. (Üç / Dört) yanlışın bir doğruyu götürdüğü YGS'de kaç soru vardır?  
(How many questions are there in YGS [University Entrance Exam] where every [three / four] wrong answers cancel the score of one right answer?)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(Not related at all) (Very related and confusable)

18. Harry Potter ve (Zümrüdüanka Yoldaşlığı / Ateş Kadehi) filminde Voldemort'un öldürdüğü Cedric Diggory karakterini hangi aktör canlandırmıştır?  
(Which actor performed the character Cedric Diggory, who Voldemort murdered in the movie [Harry Potter and the Order of the Phoenix / Goblet of Fire]?)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(Not related at all) (Very related and confusable)



19. Hangi siyah beyaz ayı türü sadece (palmiye / bambu) yaprakları yediği için nesli tükenmek üzeredir?  
(Which black and white bear is nearly extinct because it eats only [palm leaves / bamboo]?)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(Not related at all) (Very related and confusable)

20. Hangi büyük beyaz hayvan (Güney / Kuzey) kutbuna yakın yaşar?  
(What large white animal lives near the [South / North] Pole?)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(Not related at all) (Very related and confusable)

21. Köpeklerin zil sesine tepki olarak salya akıtmasından ilham alarak (edimsel koşullanmayı / klasik koşullanmayı) bulan bilimadamı kimdir?  
(Which scientist, inspired by dogs' salivation in response to ringing bell, discovered [operant / classical] conditioning?)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(Not related at all) (Very related and confusable)

22. Altında oturduğu ağaçtan kafasına elma düşünce bilimadamı (Arşimet / Newton)'in hangi fizik kanununu bulduğu söylenir?  
(Which law of physics did [Archimedes / Newton] supposedly discover when an apple fell from the tree he was sitting under?)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(Not related at all) (Very related and confusable)

23. 11 Eylül'de (Washington / New York)'da bulunan ikiz kulelere yapılan terör saldırıları hangi yıl gerçekleşmiştir?  
(When did the September 11 terrorist attack to the Twin Towers in [Washington / New York] happen?)

1 2 3 4 5  
Hiç ilişkili değil o o o o o Çok ilişkili ve karıştırılabilir  
(Not related at all) (Very related and confusable)

24. "Demir Leydi" olarak da bilinen Margaret Thatcher hangi ülkenin (devlet başkanı / başbakan)ydı?  
(*What country was Margaret Thatcher, also known as "The Iron Lady", [president / prime minister] of?*)

1 2 3 4 5  
Hiç ilişkili değil   o   o   o   o   o   Çok ilişkili ve karıştırılabilir  
(*Not related at all*)                      (*Very related and confusable*)

## APPENDIX F

### DIFFICULTY RATING FORM

Lütfen aşağıdaki 72 sorunun size göre zorluk derecesini 1 (çok kolay), 3 (ne zor ne kolay), 5 (çok zor) olacak şekilde işaretleyiniz. Zorluk derecesini işaretlerken deneyin en başında katıldığınız görevde bu sorularla ilk karşılaştığınız durumu göz önünde bulundurun.

*Please indicate the difficulty levels of 72 questions below according to you, based on the scaling: 1 (very easy), 3 (neither easy nor difficult), 5 (very difficult). While marking the degree of difficulty, take into consideration the first time you encounter these questions in task at the beginning of the experiment.*

Katılımcı numarası (*Participant number*)

Pokemon'da Pikachu'yu kaçırmak isteyen ve bir üyesi konuşan bir kedi olan takım hangisidir?

*(In Pokemon, which team tries to kidnap Pikachu and has a speaking cat as a member?)*

1 2 3 4 5

(*Very easy*) Çok kolay o o o o o Çok zor (*Very difficult*)

Altında oturduğu ağaçtan kafasına elma düşünce bilimadamı Newton'ın hangi fizik kanununu bulduğu söylenir?

*(Which law of physics did Newton supposedly discover when an apple fell from the tree he was sitting under?)*

1 2 3 4 5

(*Very easy*) Çok kolay o o o o o Çok zor (*Very difficult*)

Aktör Leonardo DiCaprio uzun süredir beklediği Oscar ödülünü 2016'da hangi filmdeki performansı için almıştır?

*(For his performance in which movie did actor Leonardo DiCaprio win his long-awaited Oscar in 2016?)*

1 2 3 4 5

(*Very easy*) Çok kolay o o o o o Çok zor (*Very difficult*)

Hangi tıp doktoru karbonhidrat tüketimine karşı olmasıyla sosyal medyada ünlüdür?  
(Which medical doctor is famous in social media due to her opposition to the carbohydrate consumption?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Birinci Dünya Savaşı kimin Sırbistan'da suikastinin ardından başladı?  
(Assassination of whom in Serbia lead to the beginning of the First World War?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Marty McFly'in Dr. Brown'ın zaman makinesiyle zamanda yolculuk yaptığı film serisi hangisidir?  
(In which movie series does Marty McFly travel in time using Dr. Brown's time machine?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Ratatouille fiminde Remy adlı, aşçılık yapan hayvanın türü nedir?  
(In the movie Ratatouille, what kind of animal is Remy who does the cooking?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Hangi ülkenin bayrağı beyaz arkaplan üstüne kırmızı bir daireden oluşur?  
(Which country's flag consists of a red circle on a white background?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Atatürk'ün hangi manevi kızı adı bir havaalanına verilen ilk Türk kadın pilottur?  
(Which adopted daughter of Atatürk is the first Turkish female pilot whose name was given to an airport?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Hangi hastalığa farkındalığı artırmak için ünlüler başlarından aşağı buzlu su dökerek birbirlerine meydan okumuştur?  
(To increase awareness for which disease did celebrities pour ice water over their heads and challenge each other?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Leonardo Da Vinci'nin Mona Lisa portresinin bulunduğu Louvre Müzesi hangi şehirdedir?  
(*In which city is the Louvre museum that hosts Leonardo DaVinci's portrait of Mona Lisa?*)

1 2 3 4 5  
(*Very easy*) Çok kolay o o o o o Çok zor (*Very difficult*)

Sir Conan Arthur Doyle'un romanlarındaki hangi dedektif 221B Baker Sokağı'nda yaşar?  
(*Which detective from Sir Conan Arthur Doyle's novels lives in 221B Baker Street?*)

1 2 3 4 5  
(*Very easy*) Çok kolay o o o o o Çok zor (*Very difficult*)

19. yüzyılda "üzerinde güneş batmayan imparatorluk" olarak bilinen ülke hangisidir?  
(*Which country was known as "the empire on which the sun never sets" in 19<sup>th</sup> century?*)

1 2 3 4 5  
(*Very easy*) Çok kolay o o o o o Çok zor (*Very difficult*)

Sertab Erener Eurovision Şarkı Yarışması'nı hangi şarkıyla kazanmıştır?  
(*With which song did Sertab Erener win the Eurovision Song Contest?*)

1 2 3 4 5  
(*Very easy*) Çok kolay o o o o o Çok zor (*Very difficult*)

Kripton gezegeninden gelen hangi süper kahraman gazeteci Clark Kent olarak bilinir?  
(*Which superhero from the planet Krypton is also known as the journalist Clark Kent?*)

1 2 3 4 5  
(*Very easy*) Çok kolay o o o o o Çok zor (*Very difficult*)

Boğaziçi Üniversitesi Güney Kampüs'te klasik müzik konserlerine ev sahipliği yapan ve üzerinde saat olan bina hangisidir?  
(*Which building at Boğaziçi University South Campus hosts classical music concerts and has a clock on it?*)

1 2 3 4 5  
(*Very easy*) Çok kolay o o o o o Çok zor (*Very difficult*)

Futbolcu David Beckham'ın eşi Victoria hangi pop grubunun üyesiydi?  
(*Which pop music band was the soccer player David Beckham's wife Victoria a member of?*)

1 2 3 4 5  
(*Very easy*) Çok kolay o o o o o Çok zor (*Very difficult*)

Hangi sporda on lobutu devirmek için üç delikli büyük bir top kullanılır?  
(What sport uses a three-holed ball for knocking down ten white pins?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Eddie Redmayne hangi filmdeki Stephen Hawking performansı ile Oscar kazanmıştır?  
(Which movie did Eddie Redmayne win the Oscar with, performing as Stephen Hawking?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Harry Potter ve Ateş Kadehi filminde Voldemort'un öldürdüğü Cedric Diggory karakterini hangi aktör canlandırmıştır?  
(Which actor performed the character Cedric Diggory, who Voldemort murdered in the movie Harry Potter and the Goblet of Fire?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Türkiye, Kurtuluş Savaşı'ndan sonra İsviçre'de hangi barış antlaşmasını imzalamıştır?  
(What peace treaty did Turkey sign in Switzerland after the War of Independence?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Hollandalı ünlü ressam van Gogh'un vücudunun hangi bölgesini kestiği söylenir?  
(Which body part did the famous Dutch artist van Gogh supposedly cut off?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Reşat Nuri Güntekin'in hangi romanında Feride Anadolu'ya öğretmenlik yapmaya gider?  
(In which novel of Reşat Nuri Güntekin do Feride go to Anatolia to become a teacher?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Nişantaşı'nda geçen hangi televizyon dizisinde Gülse Birsal Ata Demirel'in kız kardeşiydi?  
(In which TV series that took place in Nişantaşı, Gülse Birsal was Ata Demirel's sister?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Türkiye'nin en prestijli film ödülü Altın Portakal'ı hangi festival verir?  
(Which festival gives the most prestigious movie award in Turkey, the Golden Orange?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Hangi antik Yunan savaşçısı topuğuna atılan bir okla öldürülmüştür?  
(Which ancient Greek warrior was killed by an arrow shot into his heel?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Köpeklerin zil sesine tepki olarak salya akıtmasından ilham alarak klasik koşullanmayı bulan bilimadamı kimdir?  
(Which scientist, inspired by dogs' salivation in response to ringing bell, discovered classical conditioning?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Tolga Gariboğlu'nun oyun programında Hugo'nun karısını ve çocuklarını kim kaçırmıştı?  
(Who had kidnapped Hugo's wife and children in Tolga Gariboğlu's game show?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

"Demir Leydi" olarak da bilinen Margaret Thatcher hangi ülkenin başbakanıydı?  
(What country was Margaret Thatcher, also known as "The Iron Lady", prime minister of?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Kötü kalpli üvey annesi Pamuk Prenses'e zehirli elmayı nerede vermiştir?  
(Where did her wicked stepmother give Snow White the poisoned apple?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Kedi Sylvester'ın yakalamayı amaçladığı sarı kanaryanın adı nedir?  
(What is the name of the yellow canary that Sylvester the cat aims to catch?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Mark Zuckerberg'in Harvard'da okurken Facebook'u kurma hikayesini anlatan filmin adı nedir?

*(Which movie tells the story of Mark Zuckerberg's founding of Facebook while studying at Harvard?)*

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Mustafa Kemal Atatürk 10 Kasım 1938'de 9'u 5 geçte nerede ölmüştür?

*(Where did Mustafa Kemal Atatürk die on November 10 of 1938 at five past nine?)*

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Ajan Jack Bauer'ın terörist saldırılarını engellemek için çalıştığı gerçek zamanlı dizinin adı nedir?

*(What is the title of the real-time TV series in which Agent Jack Bauer works to prevent terrorist attacks?)*

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Alexander Graham Bell'in hangi icadı insanların uzun mesafeden birbirleriyle konuşmasını sağladı?

*(What invention of Alexander Graham Bell enabled people to talk to each other over long distances?)*

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Russell Crowe'un Oyun Teorisiyle ünlü matematikçi John Nash'i canlandırdığı filmin adı nedir?

*(What is the title of the movie in which Russell Crowe plays the mathematician John Nash, famous for his Game Theory?)*

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Hangi siyah beyaz ayı türü sadece bambu yediği için nesli tükenmek üzeredir?

*(Which black and white bear is nearly extinct because it eats only bamboo?)*

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)



New York'ta bulunan Özgürlük Anıtı'nı Amerika Birleşik Devletleri'ne hangi ülke hediye etmiştir?

*(The Statue of Liberty in New York is a gift from which country to United States?)*

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Hangi animasyon filminde Anna, Olaf adında konuşan bir kardan adam yapar?

*(In which animation movie, does Elsa build a talking snowman named Olaf?)*

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Küçük Prens çölde pilottan ona ne çizmesini ister?

*(What did The Little Prince ask the aviator to draw him in the desert?)*

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

En son Daniel Craig'in canlandığı 007 olarak da bilinen İngiliz gizli servis ajanı kimdir?

*(Who is the British secret service agent, also known as 007 recently performed by Daniel Craig?)*

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Dört yanlışın bir doğruyu götürdüğü YGS'de (Yükseköğretime Geçiş Sınavı) kaç soru vardır?

*(How many questions are there in YGS [University Entrance Exam] where every four wrong answers cancel the score of one right answer?)*

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Her yıl İstanbul'da düzenlenen hangi maratonun rotasına Boğaziçi Köprüsü dahildir?

*(What marathon organized every year in Istanbul has the Bosphorus Bridge on its route?)*

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

"Karayip Korsanları"nda Siyah İnci gemisinin kaptanı Jack Sparrow'u hangi aktör canlandırmıştır?  
(Which actor played the captain of the ship Black Pearl Jack Sparrow in "Pirates of the Caribbean"?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Hangi filmde kayıp oğlunu arayan bir palyaço balığı ve onun unutkan arkadaşı Dory'nin maceraları anlatılır?  
(Which movie tells the adventures of a clown fish looking for his lost son and his forgetful friend Dory?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Prencesi kurtarmak için mantar yiyerek güç kazanan video oyun karakteri kimdir?  
(Which video game character eats mushrooms to gain power in order to rescue the princess?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

"Hobbit" ve "Yüzüklerin Efendisi" film serilerinde Orlando Bloom'un canlandırdığı elfin adı nedir?  
(Which elf did Orlando Bloom play in both "The Hobbit" and "The Lord of the Rings" movie series?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Alanı " $\pi r^2$  (pi-r-kare)" formülüyle hesaplanan geometrik şekil hangisidir?  
(What geometric shape's area is calculated with the formula " $\pi r^2$  (pi-r-squared)"?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

İsviçre Alplerinde büyükbabasıyla yaşayan ve Peter'le arkadaş olan kimdir?  
(Who lives in the Swiss Alps with her grandfather and is friends with Peter?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

11 Eylül'de New York'ta bulunan İkiz Kuleler'e yapılan terör saldırıları hangi yıl gerçekleşmiştir?  
(When did the September 11 terrorist attack to the Twin Towers in New York happen?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Klonlanan ilk memeli olan Dolly'nin türü nedir?  
(What species does the first cloned mammal Dolly belong to?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Hangi çizgifilm karakteri Patrick adlı bir deniz yıldızıyla yakın arkadaşdır ve evcil hayvanı Gary adlı bir salyangozdur?  
(Which cartoon character has a starfish called Patrick as a close friend and a snail called Gary as a pet?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

"Winnie the Pooh" çizgi filminde her zaman kötümser ve depresif olan gri eşeğin adı nedir?  
(What is the name of the gray donkey who is always pessimistic and depressed in the cartoon "Winnie the Pooh"?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Balkon sahnesiyle ünlü, düşman ailelerden Romeo ve Juliet'in aşkının anlatıldığı trajedinin yazarı kimdir?  
(Who is the writer of the tragedy that is famous for its balcony scene and tells the love of Romeo and Juliet from enemy families?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Kimin kırmızı giysisi, uzun beyaz sakalı vardır ve Noel'de çocuklara hediye dağıtır?  
(Who has a red suit, a long white beard, and brings presents to children at Christmas?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Hangi filmde George Clooney ve arkadaşları Andy Garcia'nın kumarhanesini soyarlar?  
(In which movie do George Clooney and his friends rob Andy Garcia's casino?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Cem Sultan ve II. Bayezid'in babası olan hangi Osmanlı padişahı İstanbul'u fethetmiştir?  
(Which Ottoman Sultan that conquered Istanbul was the father of Cem Sultan and Bayezid II?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Avustralyalı aktör Hugh Jackman "X-Men" film serisinde hangi karakteri canlandırmıştır?

(Which character in the "X-Men" movie series did Australian actor Hugh Jackman play?)

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Milli yüzücü Derya Büyükuncu'nun kazandığı "Survivor"ın yapımcısı kimdir?

(Who is the producer of the "Survivor" that national swimmer Derya Büyükuncu win?)

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

The Beatles'ın hangi üyesi bir hayranı tarafından silahla vurularak öldürülmüştür?

(Which member of The Beatles was shot to death by his fan?)

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Bir dönem Boğaziçi Üniversitesi'nde Ekonomi profesörü olan Türkiye'nin ilk kadın başbakanı kimdir?

(Who is the first female prime minister of Turkey, who once was a professor of Economics at Boğaziçi University?)

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Bir su molekülü iki hidrojen atomuyla birlikte kaç oksijen atomundan oluşur?

(How many atoms of oxygen does a water molecule contain along with 2 atoms of hydrogen?)

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Yakın arkadaşları Oktay Rıfat ve Melih Cevdet'le şiirde Garip Akımını başlatan şair kimdir?

(Which poet had started "The Garip Movement" in poetry together with his close friends Oktay Rıfat and Melih Cevdet?)

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Shakespeare'in ünlü oyunu Hamlet'te "Olmak ya da olmamak"ı hangi söz takip eder?

(What words follow "To be or not to be" in Shakespeare's famous play Hamlet?)

1 2 3 4 5

(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Hangi büyük beyaz hayvan Kuzey kutbuna yakın yaşar?  
(What large white animal lives near the North Pole?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Hangi Formula 1 pilotu kayak yaparken ciddi bir kaza geçirdikten sonra uzun süre hastanede kalmıştır?  
(Which Formula 1 pilot was hospitalized for a long time after a serious skiing accident?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Yüzeyinde kraterler olan hangi gök cismi Dünya'nın etrafındaki dönüşünü 29,5 günde tamamlar?  
(Which celestial body that has craters on its surface completes its rotation around the Earth in 29,5 day?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

2015 Nobel Kimya Ödülü'nü alan Türk bilim adamı kimdir?  
(Who is the Turkish scientist that won the 2015 Nobel Prize in chemistry?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Star Wars'da Luke Skywalker'a ünlü "Luke, ben senin babanım" sözünü kim söylemiştir?  
(Who said the famous line "Luke, I am your father" to Luke Skywalker in Star Wars?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Matrix'teki "Beyaz tavşanı takip et" sözü ile hangi kitaba gönderme yapılmıştır?  
(The Matrix quote "Follow the white rabbit" is a reference to which book?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

Heath Ledger'in oynadığı hangi kötü adam karakteri ona ölümünden sonra Oscar kazandırmıştır?  
(What villain character did Heath Ledger win the Oscar with after his death?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

AyışıĖı Sonatı ile ünlü hangi klasik müzik bestecisi ölümüne yakın saĖır olmuştur?  
(Which classical music composer, famous for his *Moonlight Sonata*, became deaf near the end of his life?)

1 2 3 4 5  
(Very easy) Çok kolay o o o o o Çok zor (Very difficult)

## APPENDIX G

### INSTRUCTIONS FOR THE ILLUSION TASK

Deneye Hoşgeldiniz. Bu görevde sizden istenen ekranda belirecek genel bilgi sorularını mümkün olduğunca hızlı cevaplandırmanız. Sorular ekranda teker teker belirecek. Soruyu okuduktan sonra cevap vermek için klavyeden ENTER tuşuna basınız. Cevabınızı yazarken klavyedeki tuşları kullanmalısınız. Cevabınızı yazdıktan sonra ENTER tuşuna basarak cevabınızı kaydedeceksiniz. Lütfen sadece bildiğiniz soruları cevaplayınız. Cevabını bilmediğiniz sorulara "BILMIYORUM/DONT KNOW" yazınız. Eger bir sorunun cevabını bildiğinizi düşünüyorsanız ama o an cevap aklınıza gelmiyorsa "HATIRLAMİYORUM/DONT REMEMBER" yazınız. Görev süresince ekrana gelen sorulardan bazılarında hatalı bilgi olabilir. Böyle sorularla karşılaşırsanız cevap olarak "HATALI/WRONG" yazmalısınız.

*Welcome to the experiment. In this task, you are asked to respond to the general knowledge questions that will appear on the screen as quickly as possible. The questions will appear one by one. After you read the question, you need to press ENTER in order to respond. You need to use the keys on the keyboard to type your answer. After you wrote your answer, you need to press ENTER to submit your response. Please answer only the questions you know the answer to. If you do not know the answer of a question, write "BILMIYORUM/DONT KNOW". If you think that you know the answer but you are unable to recall it at the moment write "HATIRLAMİYORUM/DONT REMEMBER". During the task, you may encounter some questions that contain erroneous information. If you come across such questions you should write "HATALI/WRONG" as an answer.*

Cevaplarınızı yazarken klavyedeki Türkçe karakterleri kullanmamaya dikkat ediniz. Cevabınızda anlamı bozmayacak şekilde harf hataları kabul edilebilir.

*While you are writing your answers please pay attention not to use the Turkish characters in the keyboard. Typos are acceptable as long as the meaning of your answer does not change.*

Bu görev iki kısımdan oluşmaktadır. İlk kısımda genel bilgi soruları Türkçe, ikinci kısımda İngilizce olacaktır. Siz cevap verirken Türkçe ya da İngilizce aklınıza ilk gelen dilde cevap verebilirsiniz. Her kısımdan önce 5'er soruluk birer alıştırma kısmı yapılacak ve daha sonra deney sorularına geçilecektir.

*This task consists of two parts. In the first part, general knowledge questions will be in Turkish, in the second part they will be in English. While answering, you may answer in the first language that comes to your mind, either Turkish or English. Before*

*each part, there will be practice sessions made of 5 questions and after practice you will continue with experimental questions.*

Birazdan deneyin Türkçe alıştırma kısmına başlayacaksınız. Bu kısımda 5 soru cevaplandırmanız istenecek. Siz her soruyu cevaplandırdıktan sonra ekranda doğru cevabı göreceksiniz. Deneyle ilgili sormak istediğiniz bir şey varsa başlamadan deney yürütücüsüne sorabilirsiniz.

*You will be starting with Turkish practice part of the experiment. In this part, you will be asked to answer 5 questions. Right after you respond each question, you will see the correct answer on the screen. If you have anything to ask about the experiment, you may ask to the experimenter before the experiment begins.*

Deneyin alıştırma kısmı sona erdi. Şimdi asıl deneye geçeceksiniz. Bu kısımda 36 Türkçe soru cevaplamanız istenecek. Soruları cevapladıktan sonra doğru cevapları görmeyeceksiniz. Sormak istediğiniz bir şey varsa deney yürütücüsüne sorabilirsiniz.

*The practice part has ended. Now you will continue with the actual experiment. In this part, you will be asked to answer 36 questions in Turkish. You will not be able to see the correct answers after you respond. If you have anything to ask about the experiment, you may ask to the experimenter.*

Deneyin Türkçe kısmı sona erdi. Şimdi İngilizce kısmına geçeceksiniz. Önce 5 tane alıştırma sorusu göreceksiniz. Her soruyu cevapladıktan sonra o sorunun doğru cevabını göreceksiniz. UNUTMAYIN sorular İngilizce olacak ama sizin cevaplarınız İngilizce ya da Türkçe olabilir. Bilmediğiniz bir kelime ile karşılaşırsanız lütfen deney yürütücüsüne sorunuz.

*The Turkish part of the experiment has ended. Now you will continue with the English part. First, you will see 5 practice questions. DON'T FORGET the questions will be in English, but your answers can be in English or Turkish. If you encounter a word you are not familiar with, please ask its meaning to the experimenter.*

Deneyin alıştırma kısmı sona erdi. Şimdi asıl deneye geçeceksiniz. Bu kısımda 36 İngilizce soru cevaplamanız istenecek. Soruları cevapladıktan sonra doğru cevapları görmeyeceksiniz. Sormak istediğiniz bir soru varsa deney yürütücüsüne sorabilirsiniz.

*The practice part of the experiment has ended. Now you will continue with the actual experimental questions. You will not be able to see the correct answers after you respond. If you have a question, you may ask to the experimenter.*

Deneyin bu kısmı sona ermiştir. Lütfen deney yürütücüsüne haber veriniz.

*This part of the experiment has ended. Please notify the experimenter.*



## APPENDIX H

### MANIPULATION CHECK QUESTIONS

Deneyin bu kısmındaki soruların ortalama zorluk derecesine 1 (çok kolay) ve 7 (çok zor) arasında bir değer veriniz.

*(Please indicate the average difficulty of questions in this part of the experiment with a value between 1 [very easy] and 7 [very difficult].)*

Deneyin bu kısmındaki soruları okuyan kişinin diksiyonunun anlaşılabilirlik düzeyine 1 (hiç anlaşılır değil) ve 7 (fazlasıyla anlaşılır) arasında bir değer veriniz.

*(Please indicate the comprehensibility of the speaker's diction in this part of the experiment with a value between 1 [not comprehensible at all] and 7 [very comprehensible].)*

Deneyin bu kısmındaki ses kayıtlarının bozukluk düzeyine 1 (hiç bozuk değil) ve 7 (çok bozuk) arasında bir değer veriniz.

*(Please indicate the distortion level in audio recordings in this part of the experiment with a value between 1 [not distorted at all] and 7 [very distorted].)*

Deneyin bu kısmında soruları anlamak için sarf ettiğiniz çabaya 1 (hiç çaba sarf etmedim) ve 7 (çok çaba sarf ettim) arasında bir değer veriniz.

*(Please indicate the effort you put into in order to comprehend questions in this part of the experiment with a value between 1 [no effort] and 7 [too much effort].)*

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