A STUDY OF ARGUMENTATION IN TURKISH WITHIN A BAYESIAN
REASONING FRAMEWORK: ARGUMENTS FROM IGNORANCE

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A STUDY OF ARGUMENTATION IN TURKISH WITHIN A BAYESIAN REASONING FRAMEWORK: ARGUMENTS FROM IGNORANCE

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ABSTRACT

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In this dissertation, a normative prescriptive paradigm, namely a Bayesian theory of content-dependent argument strength, was employed in order to investigate argumentation, specifically the classic fallacy of the "argument from ignorance" or "argumentum ad ignorantiam". The study was carried out in Turkish with Turkish participants. In the Bayesian framework, argument strength is determined by the interactions between three major factors: prior belief, polarity, and evidence reliability. In addition, topic effects are considered. Three experiments were conducted. The first experiment replicated Hahn et al.'s (2005) study in Turkish to investigate whether similar results would be obtained in a different linguistic and cultural community. We found significant main effects of three of the manipulated factors in Oaksford and Hahn (2004) and Hahn et al. (2005): prior belief, reliability and topic. With respect to the Bayesian analysis, the overall fit between the data and the model was very good. The second experiment tested the hypothesis that argument acceptance would not vary across different intelligence levels. There was no

significant main effect of prior belief, polarity, topic, and intelligence. We found a main effect of reliability only. However, further analyses on significant interactions showed that more intelligent subjects were less inclined to accept negative polarity items. Finally, the third experiment investigated the hypothesis that argument acceptance would vary depending on the presence of and the kind of evidentiality markers prevalent in Turkish, indicating the certainty with which events in the past have happened, marked with overt morpho-syntactic markers (–DI or –mIş). The experiment found a significant main effect of evidentiality as well as replicating the significant main effects of the two of the manipulated factors (prior belief and reliability) in Oaksford and Hahn (2004), Hahn et al. (2005) and in our first experiment. Furthermore, reliability and evidentiality interacted, indicating separate as well as combined effects of the two. With respect to the Bayesian analysis, the overall fit between the data and the model was lower than the one in the first experiment, but still acceptable. Overall, this study supported the normative Bayesian approach to studying argumentation in an interdisciplinary perspective, combining computation, psychology, linguistics, and philosophy.

Keywords: argumentation, Bayesian probability theory, arguments from ignorance, intelligence, evidentiality markers

ÖZ

TÜRKÇEDE SAVLAMANIN BAYES USLAMLAMA TEORİSİ ÇERÇEVESİNDE DEĞERLENDİRİLMESİ ÜZERİNE BİR ÇALIŞMA: BİLMEZLİK KANITI KUSURU

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Bu tezde, savlamayı "bilmezlik kanıtı" kusuru özelinde kuralcı bir model çerçevesinde incelemek üzere, sav gücünü içerik üzerinden değerlendiren Bayes uslamlama teorisi kullanılmıştır. Bu çalışma, Türk katılımcılarla Türkçe üzerine yapılmıştır. Bu teoride, sav gücü, sava ilişkin başlangıçtaki görüş, sav cümlesinin olumlu ya da olumsuz oluşu, savı desteklemek üzere sunulan verinin güvenilirliğinden oluşan üç temel faktör ve bunların etkileşimine bakılarak değerlendirilir. Ayrıca, savın konusunun da kişilerin sav değerlendirmelerinde etkili olması olasılığı da dikkate alınır. Bu doğrultuda üç deney yapılmıştır. İlk deney, Hahn ve diğerlerinin (2005) çalışmasının aynı şekilde Türkçe'de uygulandığı, benzer sonuçların farklı bir dil ve kültür ortamında da elde edilip edilemeyeceğine bakan bir

çalışma olmuştur. Bu deneyin sonuçları, Oaksford ve Hahn'ın (2004) ve Hahn ve diğerlerinin (2005) çalışmalarında olduğu gibi sav gücü belirlemede etkili olan faktörlerden başlangıçtaki görüş, veri güvenilirliği ve konu etkisinin sav gücü belirlemede anlamlı olduğunu göstermiştir. Ayrıca, Bayes analizinden elde edilen model ile katılımcılardan elde edilen veriler arasında anlamlı bir uyum bulunmuştur. İkinci deneyde, bir savın kabul edilip edilmemesinin farklı zeka seviyelerine göre değişmeyeceği hipotezi test edilmiştir. Bu deneyde, başlangıçtaki görüş, sav cümlesinin olumlu ya da olumsuz oluşu, sav konusu ve zeka faktörleri sav gücü belirlemede anlamlı bulunmamış, sadece veri güvenilirliği faktörü anlamlı bulunmuştur. Ancak, anlamlı etkileşimler üzerinde yapılan sonraki analizler, daha zeki olan katılımcıların olumsuz sav cümlelerini kabul edilebilir bulma konusundaki eğilimlerinin daha düşük olduğunu ortaya çıkarmıştır. Son olarak, üçüncü deneyde, bir savın kabul edilip edilmemesinin, Türkçede geçmişteki olayların hangi kesinlikle olmuş olduğunu gösteren farklı tanıtlama belirticilerinin (–DI or –mIş) sav içinde kullanılmasına bağlı olarak değişeceği hipotezi test edilmiştir. Bu deneyin sonuçları, Oaksford ve Hahn'ın (2004) ve Hahn ve diğerlerinin (2005) çalışmalarında ve ilk deneyimizde olduğu gibi sav gücü belirlemede etkili olan faktörlerden başlangıçtaki görüş ve veri güvenilirliğinin sav gücü belirlemede anlamlı olduğunu göstermiştir. Bunlara ek olarak, Türkçedeki tanıtlama belirticileri de sav gücü belirlemede anlamlı bulunmuş, bu belirticilerin veri güvenilirliği faktörüyle de etkileşime giriyor olması, bu faktörlerin hem ayrı ayrı hem de birlikte etkilerinin olduğunu ortaya çıkarmıştır. Ayrıca, Bayes analizinden elde edilen model ile katılımcılardan elde edilen veriler arasındaki uyumun, birinci deneyimize kıyasla daha az ancak yine de kabul edilir düzeyde olduğu bulunmuştur. Genel itibariyle, bu çalışma, savlamanın, bilgisayım, psikoloji, dilbilim ve felsefeyi birleştiren disiplinlerarası bir bakışaçısıyla kuralcı Bayes yaklaşımını kullanarak incelenmesini desteklemektedir.

Anahtar Kelimeler: savlama, Bayes olasılık teorisi, bilmezlik kanıtı kusuru, zeka, tanıtlama belirticileri

This work is dedicated to
all virtuous people.

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CHAPTER 1

INTRODUCTION

On a daily basis, people engage in arguments, either directly or through other people's discussions in an observant position but still updating their own views and beliefs based on incoming information. Apparently, arguments are frequent in scientific and everyday discourse – discourse perceived as a social action and interaction and defined as a practical, social and cultural phenomenon (Oktar, 1998). Thus, argumentation is an important skill in many respects, and investigating it and developing schemes to understand and teach it is an important topic of research.

In argumentation studies, the rules of formal logic have widely been used to explain the inferential connections between propositions with certainty (Oaksford & Chater, 2009). However, in the face of uncertainty which we encounter in our everyday lives, such logical standards dealing only with statements that are clearly true or false do not seem to suffice to define acceptable or bad reasoning. Indeed, informal arguments such as argument from ignorance, though frequently employed in everyday discourse and differentially acceptable depending on their semantic content, are readily discarded as fallacious within standard logic (Oaksford & Chater, 2009). In the logic literature, a comprehensive framework or an appropriate standard to account for the uncertainty prevalent in this kind of arguments has not been offered (Hamblin, 1970; Heysse, 1997; Johnson, 2000; Boger, 2005; Prakken & Vreeswijk, 2002; cited in Hahn, Harris & Corner, 2009).

Similarly, dialectical or procedural approaches (Alexy, 1989; Walton 1995; van Eemeren and Grootendorst, 1992, 2004; cited in Hahn et al., 2009) also have their

limitations as they focus on the discourse elements and procedural aspects of how a series of argumentation exchanges flow, rather than providing a framework to constrain the semantic content and explain the uncertainty existent in the reasoning process (Hahn et al., 2009). These consensus theories are about rights and obligations of the discussants. In other words, they cannot explore the variations in argument strength within the same discourse context (Hahn, Oaksford & Bayındır, 2005) though a normative theory of argument content can.

In science, not only such pragma-dialectical or descriptive theories of how things are but also normative theories of how they should be are important especially from an applied point of view (Thagard, 2009) (e.g. in educational settings while training pupils in effective argumentation skills). Normative theories can equip cognitive scientists with the appropriate norms or standards in their research, and even provide an organizing framework for descriptive studies (Thagard, 2009; Hahn & Oaksford, 2006b). They have already proved fruitful in the field of psychology in studies on "naïve statistics", decision-making and logical reasoning (Kahneman, Slovic & Tversky, 1982; Holyoak & Morrison, 2005; cited in Hahn & Oaksford, 2006b), and thus can provide the capacity for rational resolution in argumentation studies as well (Hahn & Oaksford, 2006b). In this research field, complementary normative theories can help to identify the objective standards of semantic content evaluation and to compensate for the missing focus on content-related elements in argumentation (Hahn et al., 2009; Hahn & Oaksford, 2006b).

Considering Marr's (1982) three levels of analysis in understanding and accounting for cognitive phenomena, normative theories, providing a computational level explanation of human behavior, gives the testing ground to investigate to what extent human beings match up to the standards of rational behavior (Hahn & Oaksford, 2006b).

Bayesian probability, extensively employed in artificial intelligence studies, viewing human everyday reasoning as solving probabilistic - rather than logical - inference problems, appears to be a good candidate offering appropriate epistemic norms for

argumentation which includes uncertainty (Hahn & Oaksford, 2006b; Oaksford & Chater, 2009; Hahn et al., 2009). Bayesian models have already been used in different aspects of cognition successfully including visual scene recognition (Geisler & Perry, 2009; cited in McClelland, 2009), language processing, learning causal relations, categorization, inductive and deductive reasoning (Chater, Oaksford, Hahn & Heit, 2010). Up to date, there have been successful applications of the Bayesian framework on various informal argument fallacies, including almost all of the 20 fallacies in the classic catalogue originating with Aristotle (Oaksford & Hahn, 2004; Hahn et al., 2005; Hahn & Oaksford, 2007; Corner & Hahn, 2009; Corner, Hahn & Oaksford, 2011; Neuman, Weinstock & Glasner, 2006; Korb, 2004; Neuman, 2003; Rips, 2002; cited in Hahn et al., 2009). Thus, it can be considered a useful general normative theory of argument content (Hahn et al., 2009).

This study adopts a Bayesian theory of content-dependent argument strength to investigate a specific type of classic fallacy, arguments from ignorance, the negative evidence cases, in Turkish. Such arguments are logically invalid but can be considered psychologically persuasive depending on their semantic content though the discourse context remains the same. The Bayesian theory, shifting the focus from the pragmatic norms to psychological processes (Neuman et al., 2006), claims to capture this graded validity prevalent in such arguments as a psychological reality and provide an explanation at a computational level. In addition to the previous applications of Bayesian framework, mainly in English, this further application in Turkish is important to show that similar results in a different linguistic and cultural community can be obtained. A further question whether intelligence can have any impact on the reasoning process has also been addressed. Most importantly, evidentiality, as a grammaticalized category in Turkish, has been incorporated as well in order to test whether it might also play a role in argument strength.

1.1 Problem statement

This study investigates the following research questions:

- Are Turkish subjects, as their English counterparts, in their judgments of argument strength sensitive to the same factors a Bayesian account predicts (prior belief, polarity, reliability, and topic effect)?
- Does argument acceptance vary depending on subjects' general intelligence levels, as measured by the Raven test?
- Does evidentiality, as a grammaticalized category in Turkish, influence argument acceptance?

Furthermore, there are several reasons which make a Bayesian account of reasoning attractive in analyzing argument strength and people's assessment of argument strength.

First of all, a Bayesian analysis can capture varying prior beliefs or audience relativity, a fundamental aspect of argumentation. That is, a person is more likely to be convinced about an argument if he, himself, believes the proposition entailed in the first place (Hahn & Oaksford, 2006a). This subjective perspective is represented by probabilities within a Bayesian account.

Another aspect of Bayesian reasoning is that it can provide an update rule based on incoming evidence. That is, a person, provided with a proof from a reliable source is more likely to find the argument presented convincing (Hahn et al., 2009). This approach can be used to calculate such posterior beliefs given the evidence as well as the amount of belief change (Hahn & Oaksford, 2007).

Moreover, a Bayesian analysis can also account for the difference in argument polarity. It captures the intuition that positive argument is stronger than the negative argument, as in "Drug A is toxic because a toxic effect was observed" and "Drug A is not toxic because no toxic effect was observed," having positive *vs*. negative polarity respectively. The latter being an argument from ignorance is weaker and the Bayesian model fit the data (Hahn et al., 2005).

1.2 Significance of the study

Although argumentation has been considered a classical topic of philosophy, specifically formal logic, standard logical treatments cannot explain seemingly exceptional cases, the so-called fallacious arguments. However, with the emergence of the Bayesian paradigm, we attain a new perspective. With its capacity to accommodate certain psychological factors that come into play, Bayes theory which has been extensively used in computational models and artificial intelligence, offers an alternative treatment of the so-called fallacious arguments.

Thus, the application of Bayesian reasoning on arguments, especially fallacious arguments in this thesis is a worthwhile topic of research with contributions to psychology, language, philosophy and computation, core areas of cognitive science.

Taking a more social-centered perspective, it relates to theory of mind (ToM), the ability to attribute mental states – beliefs, intentions, desires, knowledge – to oneself and to others. The Bayesian approach has already been employed in such studies on how people reason about the intentions of others, i.e. theory of mind (ToM) (Baker, Saxe & Tenenbaum, 2009; cited in Jones & Love, 2011). ToM is an intersecting topic of research in the fields of psychology, philosophy, and language. It is with the help of this skill as well that people attend to and track the flow of ideas in argumentative discourse. Specifically, by investigating evidentiality, in its grammaticalized form in Turkish which also relates to ToM, the study will contribute to the fields of language and psychology.

Evidentiality in Turkish indicating whether the speaker has direct (perceptual) evidence for a proposition or only indirect or hearsay evidence might play a role in argument strength. Investigating evidentiality in this respect is truly novel and would tell us whether the morphological options of a language encode information source in such a way that it can be directly used in argumentation, reducing the variation of individuals' argument evaluation. That is, if a language provides a morphological marker for uncertainty, the language users should more or less understand it in a

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uniform way. If they have to gather this information from other textual markers, people may do so in a less uniform way. Hence, it would tell us something about the "psychological reality" of this linguistic category.

It may also shed light on the importance of linguistic typology for thought processes, namely whether typologically differing languages (e.g., English *vs*. Turkish, initially within the limited scope of this study) might open up different perspectives on argumentation. In the most general sense, it is a contribution to the "language and thought" debate (or, the "linguistic relativity" hypothesis). The debate is mainly between two lines of thought: whether the acquisition of language depends on conceptual development and reflects it (Huttenlocher, Smiley & Charler, 1983; cited in Papafragou, Li, Choi & Han, 2007), as opposed to whether non-linguistic categories are shaped by language, the Whorfian theory (Whorf, 1956; cited in Papafragou et al., 2007). Both arguments capture the intuition that language and thought are closely and causally related, but each has different claims about the direction of this causality.

With its additional focus on intelligence as a separate construct, the study can also contribute to the fields of psychology and education. Although it is still controversial what intelligence is, how it is or should be measured or whether there are different types of intelligence, in this study, building on Spearman's idea of a single, unitary entity from which intelligent behavior emerges (*g* factor) (Plucker, 2003), a language-free "fluid intelligence" test (Raven's Advanced Progressive Matrices) is used. The Raven test estimates one's ability to reason analytically and solve problems without expecting one to refer to any body of knowledge derived from previous experience (Bors and Stokes, 1998). The relations between intelligence perceived in the sense explained here and performance on the kind of information processing and judgment tasks required in the series of experiments conducted in this study can reveal important information for a better understanding of the underlying processes.

Furthermore, argumentation relates to social cognition – the act of encoding, storing, retrieving, and processing information about other people. The idea of social cognition has come to be studied extensively in cognitive neuroscience and psychology, especially by developmental psychologists (Lieberman 2007; Verbrugge 2009; Johnson 2005).

Naturally, intact social cognition skills play an important role in effective argumentation, and the development of the different stages or levels of social cognition and argumentation fuel each other. In this respect, investigating argumentation and developing schemes to understand and teach it provide valuable insights into decision making and conflict resolution processes, as well (Frith & Singer, 2008). In line with such reasoning again, to what extent arguments are acceptable or fallacious is an important topic of research (Oaksford & Hahn, 2004; van Eeemeren & Grootendorst, 2003; Sartor, 1995; cited in Hahn et al., 2005).

In its adoption of the Bayesian approach as a normative theory, this study can also provide substance to test the argument that philosophy, especially with its experience in the assessment of normativity, feeding on its subfields of epistemology – addressing how people should obtain knowledge – and ethics – addressing how people ought to act, can benefit cognitive science profoundly and *vice versa* (Thagard, 2009). Establishing appropriate norms and finding ways to establish such norms are quite outside the scope of the empirical fields of cognitive science and require the use of the tools of philosophy forextracting the foundations for such knowledge. This is very much in line with the interdisciplinary nature of the field of cognitive science.

In Bayesian treatments, by specifying the factors that feed into a Bayesian reasoning framework, the study will also contribute to computation. The workings of the Bayesian inference is such that agents make optimal decisions given certain prior beliefs and in the light of new data gained. With its incorporation of prior assignments and an update rule for belief revision, it can provide a computational level analysis: stating the problem that the cognitive agent is facing.

The most prevalent approaches to studying argumentation in the linguistics literature are often of pragmatic or descriptive nature. They help us to evaluate arguments through a procedurel dialectical perspective, dividing the whole process of argumentation into stages of confrontation, argumentation and resolution; identifying the interlocutors' rights and responsibilities at each stage of developing and pursuing an argument; and judging its validity or acceptabilitiy against a set of procedural rules. That is why there is a need for more and varied studies in the field, which will focus more on the content-dependent elements of argumentation by manipulating the factors relating to argument strength. In particular, argumentation studies in Turkish are limited in number (Daylak, 2004). Studying argumentation in Turkish with its grammaticalized evidential system is therefore strongly desirable.

1.3 Organization of the Dissertation

There are four chapters in this dissertation. In the first chapter, that is, the current chapter, the subject of the study has been introduced and the problem addressed by the study has been stated with a focus on its significance in the related literature.

In the second chapter, a literature survey is presented which explains the specific argument type, arguments from ignorance, at large with examples while relevant terms and concepts in the argumentation and fallacy literature are also defined within the broader perspective of informal logic. Further, it explains the Bayesian framework adopted in the study with reference to its design features, modeling and analysis qualities, as well as to its previous applications in cognitive science. Finally, the construct of intelligence and the concept of evidentiality are briefly explained in line with the way they are employed in this study.

The third chapter is dedicated to the three experiments conducted for the purposes of this study. The presentation of each experiment starts with the statement of the hypotheses following a brief introduction. The methods for testing these hypotheses

and the design of the experiments are explained, and the results are presented. A discussion of the results is provided at the end of each experiment.

The fourth chapter summarizes the findings and provides a detailed discussion of the results of the various parts of the study with reference to the previous applications of the Bayesian theory. Its contributions are evaluated, and shortcomings are identified. The chapter ends with pointing out some limitations of the study and suggestions for future studies.

CHAPTER 2

LITERATURE REVIEW

This chapter starts with a definition and discussion of the concepts of argument and fallacious argument within the broader perspective of informal logic while essential references are also made to formal logic in the discussion of the historical background. Second, two predominant theories of fallacies are explained with respect to the specific informal argument investigated in this study, namely, the arguments from ignorance in order to locate the theory adopted in this study within its broader context. Third, the theory adopted in this study is presented with reference to its design features, modeling, and analysis qualities regarding arguments from ignorance as well as its previous applications. Finally, the construct of intelligence and the concept of evidentiality are briefly explained in line with the way they are employed in this study.

2.1 Informal Logic

Over the past twenty-five years, in educational contexts, there has been a growing appreciation of "critical thinking" skills, especially in Canada, the United States, the United Kingdom and some other countries, and such emphasis in order for the growing generations to reason well has found its place in the educational curricula (Paul, 1986; Groarke, 2012). This critical thinking movement has been one of the factors leading to more intensive work on argumentation, which would use tools appropriate for the analysis and evaluation of everyday arguments in their natural contexts, rather than the tools of traditional formal logic. In this attempt, not a rival

or alternative but a complementary form of logic has appeared – the so-called "informal logic" (Groarke, 2012).

In this respect, informal logic encompasses various fields including formal logic, psychology, rhetoric, dialectics, pragmatics, computation and a range of others, and thus has received support from scholars from a range of fields (Groarke, 2012). However, such an undertaking that aims to devise a theory of argumentation is quite ambitious and prone to certain problems in terms of how to define and analyze natural occurrences of arguments (Walton, 2008).

2.2 Argumentation and Fallacies

Arguments, be it a quarrel between couples or a school debate, or a dispute between two political parties or two scientists, are part of everyday life and follow a more-or-less similar question-and-answer dialog pattern across various discourse contexts despite their varied contents. Due to their frequent occurrence, there have been numerous attempts to develop schemes to understand arguments and reasonably judge their strengths and weaknesses.

Studies that examined argumentative dialogs in this respect date as far back as Aristotle's *Topics* and *Sophistical Refutations*, in which he classified them into three major categories of didactic, dialectical or examination, and contentious arguments, in the form of a dialog between two people identified as the questioner and the answerer, and developed some procedural rules about their conduct (Hamblin, 1970).

These were also the first texts that mentioned a separate list of arguments, the so-called *sophisms* or *fallacies*, which diverge from the mainstream violating the standard rules of formal logic. Put in Aristotle's own terms, a fallacious argument is one that *seems to be valid* but is *not* so (Hamblin, 1970, p.12), or as phrased later, one that is *psychologically persuasive* but *logically incorrect* (Copi & Burgess-Jackson; cited in Hahn & Oaksford, 2007, p.704). In the list which included around

thirteen informal argument fallacies[1], these arguments were classified as those dependent on language and those outside language by Aristotle. The list later received more additions mainly from Locke (cited in Hamblin, 1970).

An example of a fallacy dependent on language would be the fallacy of composition and division, in which what is true of a part is claimed to be true of the whole or vice versa (Hamblin, 1970). The traditional example of Aristotle is:

> Three and two are odd and even.
> Five is three and two.
> Therefore, five is odd and even.
>
> (Oesterle, 1952; cited in Hamblin, 1970, p.20)

Whereas there are also more acceptable versions of the same form of arguments:

> All the parts of this machine are made of metal;
> Therefore, this machine is made of metal.
>
> (Rowe, 1962; cited in Hamblin, 1970, p.21)

Following Aristotle's categorization again, an example within the category of fallacies outside language would be the fallacy of many/complex questions as in the example 'Have you stopped beating your wife?', which is fallacious in that it pushes non-wife-beaters to admit the guilt; however, as more recent work shows, questions of this sort involve some presumptions and appropriate answers are available depending on the context, as in courts where such questions (e.g. Have you stopped cheating on your income taxes?, this time) are allowed "in cross-examination" in which the suspect admitted initially that he had previously cheated on his income tax (Hamblin, 1970, p.40; Macagno, 2011).

Among around twenty fallacies with the later additions to Aristotle's list of thirteen fallacies, one can find further examples such as the *argumentum ad verecundiam*, the *argumentum ad hominem*, the *argumentum ad misericordiam*, or the *argumentum ad*

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[1] Aristotle's traditional catalogue of fallacies consists of: (1) those dependent on language: equivocation, amphiboly, composition, division, accent, figure of speech; (2) those outside language: accident, *secundum quid* (neglect of necessary qualifications), *ignoratio elenchi* (irrelevant conclusion), begging the question, affirming the consequent, false cause, many questions (Hamblin, 1970).

ignorantiam. In the *argumentum ad verecundiam* or in more simple terms arguments from authority or expert opinion, for instance, the argument has the following form:

> X is an authority on facts of type T
> X said S, which is of type T
> Therefore, S is true.

<div align="right">(Hamblin, 1970, p.43)</div>

Although it has a seemingly valid form in that the conclusion follows from the premises, in terms of deductive validity, the first premise might be false depending on the example because expertise or authority is a relative issue, e.g. whether the expert is biased or not (Hamblin, 1970). That being the case, in everyday situations, people often tend to take expert views seriously and refrain from questioning them due to politeness (Walton, 2011).

As mentioned in Hamblin (1970), the Aristotelian ideas of antiquity were later taken up in the Middle Ages by William of Sherwood, a very influential figure among his contemporaries in the field of logic, and developed with employment of the scholarly game of Obligation, which was very similar to the Greek debates, but later ignored in the science of logic (Macagno, 2011).

In the nineteenth century, when Whately (1826; cited in Hamblin, 1970) classified the Aristotelian fallacies dependent on language as opposed to the ones outside language into new categories of *logical*, resulting from faulty reasoning as in the fallacy of composition and division, and *non-logical*, resulting from the premises as in *ad verecundiam*, the Aristotelian tradition was revitalized. Further, in his later works, Whately (1828) also elaborated on the concepts of presumptions and the burden of proof, which can be illustrated in the example, "that every man is to be *presumed* innocent till his guilt is established," shifting the 'burden of proof' to the accusers, an idea that was also observed in the Greek tradition (cited in Hamblin, 1970, p.172).

Until the work of Hamblin in 1970 in which he reviewed the studies investigating fallacies, there were minor efforts in the field, according to van Eemeren and Grootendorst (2010). Hamblin (1970) was one of the pioneers who, having realized

the limitations of formal logic and the importance of contextual and dialectical aspects, offered moving from a formal approach that focused on truth or validity to a more epistemic, dialectic framework that focused rather on acceptability or plausibility. Accordingly, the criteria he set for good argument included:

(1) The premises must be accepted;
(2) The passage from the premises to the conclusion must be of an accepted kind;
(3) Unstated premises must be of a kind that are accepted as omissible;
(4) The conclusion must be such that, in the absence of the argument, it wouldn't be accepted.

<div align="right">(Hamblin, 1970, p.245)</div>

In like manner, most work in informal logic initially centered on the problem of appropriately defining what a good argument is or what comprises it. Initially, argument was overall defined "as an attempt to present evidence for a conclusion" and one representative of this approach was Hitchcock's version of defining argument as a "claim-reason complex," which includes "(i) an act of concluding, (ii) one or more acts of premising (which assert propositions in favour of the conclusion), and (iii) a stated or implicit inference word that indicates that the conclusion follows from the premises" (2006; cited in Groarke, 2012, p.4) as illustrated in the following argument and its components identified underneath:

This [opposition to embryonic research] is shortsighted and stubborn. The fact is, fetuses are being aborted whether conservatives like it or not. Post-abortion, the embryos are literally being thrown away when they could be used in lifesaving medical research. It has become a matter of religious and personal beliefs, and misguided ones at that. Lives could be saved and vastly improved if only scientists were allowed to use embryos that are otherwise being tossed in the garbage.

Premise: Fetuses are being aborted anyway and lives could be saved and vastly improved if only scientists were allowed to use embryos that are otherwise being tossed in the garbage.
Inference Indicator (*implicit, unstated*): (...hence...)
Conclusion: The conservative position is shortsighted and stubborn.

<div align="right">(2006; cited in Groarke, 2012, p.4)</div>

In his account, one could also argue referring to pictures, graphs, or other media to support his point.

As the field improved and new insights such as emotion (appealing to the emotions of the audience) and character (the character of the person who is putting forth an idea and claiming evidence for it) from Aristotle's *Rhetoric* were incorporated into the process, arguments also started to be evaluated in terms of their persuasive value (Tindale, 1999, 2004, 2010; cited in Groarke, 2012). Walton (2011) exemplifies this use of rhetoric means by the argument *ad hominem*, being effectively used as negative campaign tactics in elections by political parties although they are in fact fallacious arguments. Then, there was a tendency to bridge the gap between informal and formal logic, trying to reconstruct naturally occurring instances of informal arguments in the form of premises and conclusion, not expressing certainty in this case but reflecting plausibility or reasonableness, and relevance and sufficiency being key issues (van Eemeren & Grootendorst, 2002; cited in Groarke, 2012).

There appeared also other forms of arguments such as conductive arguments ("that provide an accumulation of non-decisive reasons in favor of a conclusion" (Zenker & Fischer 2010; cited in Groarke, 2012, p.11)) or abductive arguments ("inferences to the best explanation" which have an important role in medical, scientific and legal reasoning (Harman, 1965; cited in Hahn & Oaksford, 2007; Walton 2004; cited in Groarke, 2012)).

In most recent discussions of how to handle arguments, especially fallacious ones, two approaches figure, van Eemeren and Grootendorst's (1992) pragma-dialectical approach and Walton's (1995) pragmatic approach. With their additional focus on comparative strength of informal arguments, Oaksford and Hahn have developed a Bayesian account for evaluating argument strength adopting a normative perspective in an effort to complement these approaches. The details on these three accounts will be presented later in this chapter.

There are also scholars who study arguments through "corpora" research, working on public TV debates (Jorgenson, Kock & Rorbech, 1991; cited in Groarke, 2012) or TV talk-shows (Daylak, 2004) or selected written texts (Goodwin & Cortes, 2010; Mochales & Ieven, 2009; cited in Groarke, 2012).

Researchers like Reed and Norman (2004; cited in Groarke, 2012; Pearl, 1988; cited in Hahn et al., 2005), also put efforts in computational modeling to implement models of natural-language reasoning. Especially in computational modeling of argumentation, the area of defeasible resoning, "i.e. that kind of inference of everyday life in which reasoners draw conclusions tentatively, reserving the right to retract them in the light of further information (Antonelli, 2010)," attracts great attention (Bench-Capon & Dunne, 2007; Prakken & Sartor, 1996; cited in Walton, 2011). This compelling quality of defeasible reasoning is very much in line with Popper's idea of falsifiability or Johnson's (2000; cited in Walton, 2011) and van Eemeren and Grootendorst's (1992; cited in Walton, 2011) idea of arguments' being vulnerable to criticism, also credited by Walton (2011).

On the whole, in this study, mainly following the useful definition of van Eemeren and Grootendorst (2010), argumentation is considered as the exchange of ideas on a topic of disagreement in the form of a critical discussion which contains moves and counter-moves in order to cooperatively reach a resolution regarding the acceptability or reasonableness of a standpoint, with a consideration of the context in which it takes place (see also Hamblin, 1970; Walton, 2008).

With respect to fallacies, although they are mentioned briefly as informal fallacies in traditional logic textbooks and there is no agreed-upon definition of them, there are not many complications about the cases which can be considered fallacious (Hahn & Oakford, 2007). Recent work in the fields of argumentation and informal logic in a broader sense notices that seemingly fallacious arguments such as argument from expert opinion, *ad hominem* argument, argument from analogy, or argument from ignorance are not always fallacious considering the commitment sets of both the protagonist and antagonist reflected in their performances in a context of dialogue (Hansen & Pinto, 1995; cited in Walton, 2011; Walton, 1992), especially when dialectical shifts, i.e. moving from one dialog type to another, are concerned (Walton, 1992). Further, they may receive quite high acceptability ratings in tests of argument strength (Oaksford & Hahn, 2004; Hahn et al., 2005; Hahn & Oakford,

2007; Corner & Hahn, 2009; Hahn et al., 2009). In this respect, whether they are just 'blunders' or 'intentional sophistical tactics' in Walton's terms (2011), fallacies are worth investigating further.

2.3 Theories of Fallacy

Fallacies are 'outside the norm' arguments, but they certainly vary in their strength and acceptability. For this reason, there have been rich discussions on fallacies. Despite this, there has not been much work to devise a general theory of fallacy, except for the pragma-dialectical theory of the Amsterdam School (van Eemeren & Grootendorst, 1992) and the pragmatic theory (Walton, 1995). These two most fully developed theories of fallacy have much in common, but approach the concept in different ways. This section provides a review of these two leading theories of fallacy.

2.3.1 van Eemeren and Grootendorst's Approach to Fallacies

Scholars interested in argumentation challenge themselves in an effort not only to analyze argumentative dialogs as instances of actual verbal communication and interaction but also evaluate their quality in terms of reasonableness. In the same vein, van Eemeren and Grotendorst (2010) devised the pragma-dialectical approach as a comprehensive research program by making use of pragmatic tools from discourse and conversation analysis (referring primarily to Austin, 1962; Searle, 1969, 1979; Grice, 1975; cited in van Eemeren & Grootendorst, 1995) and adopting dialectical considerations from critical rational philosophy and dialogical logic (referring mainly to Crawshay-Williams, 1972; Barth & Krabbe, 1972, 1982; Popper, 1972, 1974; cited in van Eemeren & Grootendorst, 1995).

There are five inter-related components in this research program: (i) a philosophical component regarding the aspect of reasonableness, (ii) a theoretical component regarding a model of acceptable argument, (iii) an empirical component regarding the quantitative and qualitative investigation of naturally occurring arguments, (iv)

an analytical component regarding the link between the normative and descriptive aspects, and finally (v) a practical component regarding the methods to diagnose and solve emergent problems (van Eemeren, Garssen, & Meuffels, 2012).

Research goals as set above, in the pragma-dialectical approach, following the "critical rationalist" lead (as defined by Albert, 1975; cited in van Eemeren et al., 2012) in the theoretical component regarding the concept of reasonableness, a critical discussion model was adopted, in which argumentation is perceived as a collaborative process of resolving differences of opinion through dialectically regulated critical moves reflected in the speech acts performed by the protagonist and antagonist. In this approach, arguments are also evaluated in terms of problem-validity and conventional validity; the former referring to the extent to which the argumentative discourse at hand achieves the resolution of the difference of opinion, while the latter referring to the inter-subjective acceptability of it meaning to what extent both parties find the arguments convincing (van Eemeren & Grotendorst, 2010).

Analytically, there are four main stages in this model of critical discussion: (i) the confrontation stage in which a potential difference of opinion emerges; (ii) the opening stage in which the parties are identified and the premises and the rules of discussion are determined; (iii) the argumentation stage in which the protagonist advances arguments in favor of the standpoint to remove the antagonist's doubts and resolve the disagreement; (iv) finally, the concluding stage in which the parties decide on the result of the discussion (van Eemeren & Grotendorst, 2010).

Relevant speech acts and rules of discussion are defined for each level of this process. For instance, in the confrontation stage, the prototypical types of speech acts are assertives ("This is a bad copy") and commissives ("You may take it from me that Slovenian wine is delicious") (van Eemeren & Grotendorst, 2010). As of the rules, below is a compact list of them as presented in van Eemeren & Grootendorst (1995, p.4):

1. Parties must not prevent each other from advancing standpoints or casting doubt on standpoints.
2. A party that advances a standpoint is obliged to defend it if the other party asks him to do so.
3. A party's attack on a standpoint must relate to the standpoint that has indeed been advanced by the other party.
4. A party may defend his standpoint only by advancing argumentation relating to that standpoint.
5. A party may not falsely present something as a premise that has been left unexpressed by the other party or deny a premise that he himself has left implicit.
6. A party may not falsely present a premise as an accepted starting point nor deny a premise representing an accepted starting point.
7. A party may not regard a standpoint as conclusively defended if the defense does not take place by means of an appropriate argumentation scheme that is correctly applied.
8. In his argumentation, a party may only use arguments that are logically valid or capable of being validated by making explicit one or more unexpressed premises.
9. A failed defense of a standpoint must result in the party that put forward the standpoint retracting it, and a conclusive defense of the standpoint must result in the other party retracting his doubt about the standpoint.
10. A party must not use formulations that are insufficiently clear or confusingly ambiguous and he must interpret the other party's formulations as carefully and accurately as possible.

In their analysis of the natural argumentative discourse, they reconstruct the dialogs with reference to the corresponding speech acts at each level and transform them if need be. Transformations may be in the forms of "deletion" of irrelevant digressions, "permutation" of separated parts that belong together, "addition" of unexpressed and implicit premises, and "substitution" of confusingly ambiguous expressions (van Eemeren & Grootendorst, 2004, Chapter 5; cited in van Eemeren & Grotendorst, 2010).

Along with these argument schemes, the critical questions related with these schemes are employed to decide on the accuracy and appropriateness of the protagonist's points to "transfer the acceptability of the argument to that of the standpoint". An example for an argument based on comparison would be: "It's not at all necessary to give James 10 dollars allowance, because his brother always got just 5 dollars a week" (Hitchcock & Wagemans, 2011, p.185). The similarity argument between James and his brother is being used as a justification for the standpoint that 5 dollars

allowance is enough for James. Here, the critical questions specific to this argument scheme would be: "(1) Are the things that are compared actually comparable? (2) Are there enough relevant similarities between the things that are compared? (3) Are there any relevant differences between the things that are compared?" (Hitchcock & Wagemans, 2011, p.187)

While reconstructing the argumentative discourse, the analyst can also refer to certain resources: the text of the discourse (and the visuals if available), the context (micro, macro, and intertextual contexts), inferences (both logical and pragmatic), and background information (general as in rules the members of a society share or specific as in inside information or expert information) to come up with better justified accounts (van Eemeren & Grotendorst, 2010).

Finally, under the influence of the move towards incorporating "rhetoric" concerns into an understanding of arguments, the so-called distinction between argumentation and persuasion or effective argumentation, they devised the term "strategic maneuvering" to integrate this "effectiveness" dimension systematically (van Eemeren & Grootendorst, 2010). Strategic maneuvering can be reflected in aspects of "topic selection," "audience adaptation," and "presentational design;" and the interlocutors can weave their rhetorical goals into the process with a consideration of the limitations of the corresponding dialectical stages (van Eemeren et al., 2012).

Considering the framework as outlined above, accordingly, within the pragma-dialectical account, a fallacy is "a hindrance or impediment to resolving a difference of opinion on the merits and the specific nature of a particular fallacy depends on the way in which it interferes with the resolution process." (van Eemeren et al., 2012, p.37) A fallacy indicates that an appropriate scheme has not been used correctly because the associated critical questions have not been answered in a satisfactory way (Hitchcock & Wagemans, 2011). After the incorporation of the strategic maneuvering dimension in the approach, this definition has been broadened as "fallacies are derailments of strategic maneuvering that involve violations of critical

discussion rules," and fallacies of this sort are in fact the most tricky ones (van Eemeren et al., 2012, p.39).

In the pragma-dialectical approach, the fallacious cases of arguments from ignorance, which is the specific informal argument investigated in this study, are treated as some violation of critical discussion rules. Based on the examples below:

(1) It has never been proven that God does not exist. So God exists.
(2) It has never been proven that God exists. So God does not exist.
(3) It has never been proven that quintozene is harmful to human beings, so it is not.

<div align="right">(Wagemans, 2003, p.1049)</div>

If it occurs at the opening stage, it is a violation of Rule 2 by the proponent; that is, the proponent of the argument is shifting the burden of proof to the opponent. If it occurs at the closing stage, it is a violation of Rule 9 by the proponent or the opponent; that is, either the proponent is making absolute the success of the defense or the opponent is making absolute the failure of the defense, not considering the possibility of a neutral position with no standpoint (Wagemans, 2003); namely, the proponent is not retracting his standpoint nor is the opponent retracting his doubts. These are true especially for the first and second arguments above.

However, there are some arguments that look like arguments from ignorance but are in fact non-fallacious or relatively reasonable or acceptable depending on the surrounding context, as in the third argument above, in which a scientific hypothesis is considered true if it has not been falsified. In van Eemeren and Grootendorst's evaluation, this case is not a fallacy in that "the failure of the defense of the standpoint is not being absolutized, since the conclusion is not that the hypothesis is true, but merely that it is not proven that it is not true" (Wagemans, 2003, p.1050).

Again take the example "that every man is to be *presumed* innocent till his guilt is established." Under van Eemeren and Grootendorst's treatment, this argument is also plausible "because the conclusion of the argument is not that the suspect is innocent,

but only that it is not proven that he is guilty," "so the failure of the defense of the standpoint is not being absolutized" (Wagemans, 2003, p.1050).

As of its advantages, it is claimed that the pragma-dialectical approach provides a systematic theory of explaining fallacies, which eliminates the shortcomings of standard logic treatments (i.e. discarding even the relatively plausible arguments as fallacious in their tests of logical validity) and contemporary descriptive linguistics (i.e. ignoring the dialectical aspects) (van Eemeren & Grootendorst, 1995, 2010). Another benefit of the theory is that it accommodates speech acts in a theory of argumentative discourse and thus provides a useful framework for investigating speech acts as well (Daylak, 2004). Further, in his review of various typologies of argument schemes, Garssen (1997; cited in Hitchcock & Wagemans, 2011) identified that most of the other typologies correspond to some type, be it a main type, or a variant of it, or a sub-type, of argument scheme in the pragma-dialectical approach, which is an indirect validation of the theory.

When it comes to its limitations, Walton (1995; cited in Walton, 2011) states that considering violations of critical discussion rules as fallacies is a very narrow way of looking at the issue because such violations may as well be just blunders. Another criticism from Walton (2011) is that it is possible to analyze many fallacies as violations of the same rule, which makes it harder to differentiate between them. However, van Eemeren and Grootendorst (1995) claim that their theory can effectively distinguish certainly differing fallacies and bring together the ones that are in fact related. They believe their theory is stronger than the ones which can only provide *ad hoc* explanations for fallacies (van Eemeren & Grootendorst, 1995).

Further, Walton (2011) claims that even after the inclusion of the strategic maneuvering feature, the pragma-dialectical approach cannot capture the interests in an argumentative discourse that are outside the framework of the critical discussion itself, such as trying to impress the audience in some way. Finally, although there are main types in the theory, in more recent work, it is seen that these types are divided into sub-types and may be divided into further types, which in fact contradicts with

their criticism of the Woods-Walton approach as being "pluralistic," that is, treating each fallacy in its own way (van Eemeren & Grootendorst, 2010).

2.3.2 Walton's Approach to Fallacies

According to the pragmatic theory (Walton 1995, pp.237-8; cited in Walton, 2011, p.2), there are six basic qualities that characterize fallacies:

1. A fallacy is a failure, lapse, or error, subject to criticism, correction, or rebuttal.
2. A fallacy is a failure that occurs in what is supposed to be an argument or an argumentation strategy used as a move in a dialog.
3. A fallacy is associated with a deception or illusion.
4. A fallacy is a violation of one or more of the maxims of reasonable dialog or a departure from acceptable procedures in that type of dialog.
5. A fallacy is an instance of an underlying, systematic kind of wrongly applied technique of reasonable argumentation.
6. A fallacy is a serious violation, as opposed to an incidental blunder, error, or weakness of execution.

With a little bit of a refinement on the pragmatic side of the above characterization, a more developed form of a notion of fallacy refers to an argument which is defeasible and seems to be reasonable and plausibly correct but to some extent preventing the realization of the goal of the dialog, or misleading or lacking in terms of the standard of proof set for it in the dialog in a given context (Walton, 2011).

Initially, in his discussion of fallacies, Walton (2011) clearly distinguishes between two kinds of fallacies, which is often ignored in van Eemeren and Grootendorst's analyses: blunders and sophisms. In his view, some fallacies are just blunders, or errors, while some others are real sophistical tactics, the so-called sophisms, to win the argument and these are the ones that need to be analyzed and tested against sound proper arguments. That is why, he emphasizes, in the analysis of fallacies, it is important to capture this logical weakness or seemingly lower plausibility of such sophistical tactics.

In his treatment of fallacies, Walton (1989, 1990; Walton & Krabbe, 1995; Walton, 1998, cited in Macagno, 2011) adopts a dialog theory, in which a dialog is described as a verbal activity in which (at least) two people, each with his/her own commitment

sets, participate making their moves (which are essentially various speech acts – locution rules) by taking turns (and following similar procedural rules – dialog rules) trying to find the right balance between a desire to win and a need to collaborate following the Gricean (1975) maxims of polite exchange of ideas. An important aspect is that commitment rules change across different types of dialog (Walton & Krabbe, 1995; cited in Walton, 2011).

A dialog is composed of three main stages: opening, argumentation, and closing, slightly different from van Eemeren and Grootendorst's formulation, as represented in the Figure 1 below.
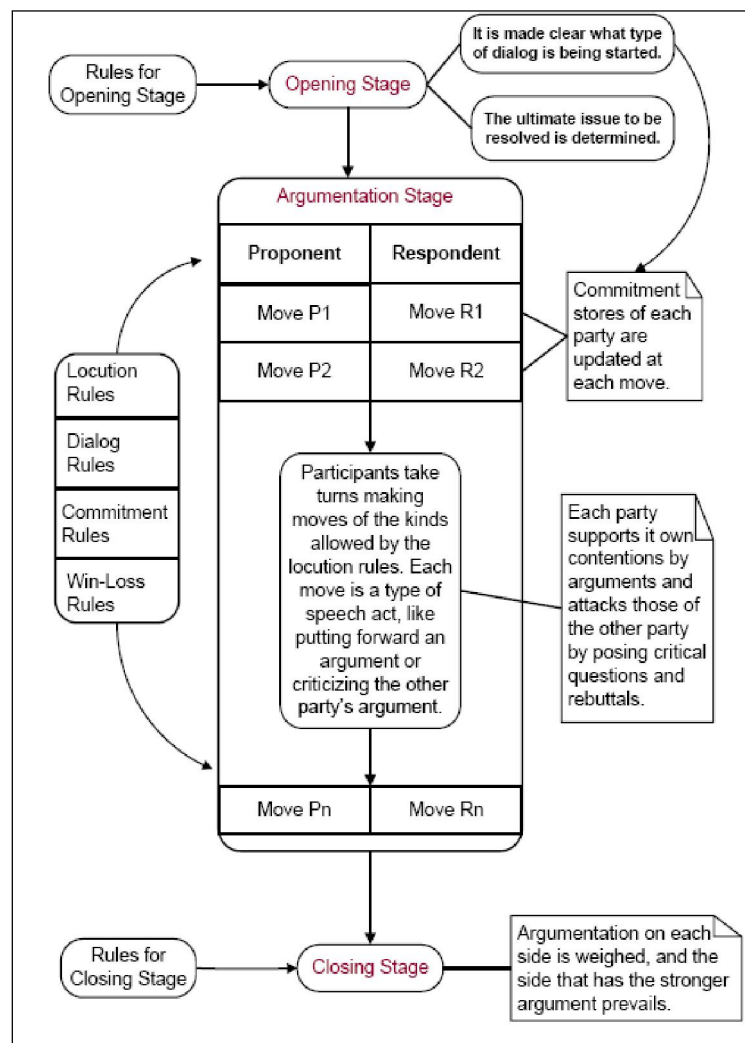
Figure 1. The three stages of a dialog (Walton, 2011, p.15)

The typology of dialog types in this account includes persuasion, negotiation, inquiry, deliberation, information seeking, and eristics, depending on the the type of commitments (propositional or not), the type of starting point (contrast of opinion, open problem, decision to be made), the type of dialogical goal (persuading, making a deal, etc.) involved as illustrated in Table 1 below; and it is often the case that in everyday dialogs one observes one type of dialog embedded in another or dialogical shifts (Macagno, 2011).

Table 1: The typology of dialog types (Macagno, 2011, p.103)

TYPE	INITIAL SITUATION	MAIN GOAL	PARTICIPANTS' AIMS	SIDE BENEFITS
1. Persuasion Dialogue	Conflicting points of view	Resolution of such conflicts by verbal means	Persuade the other(s)	Develop and reveal positions Build up confidence Influence onlookers, Add to prestige
2. Negotiation	Conflict of interests & need for cooperation	Making a deal	Get the best out of it for oneself	Agreement, Build up confidence Reveal position Influence onlookers Add to prestige
3. Inquiry	General ignorance	Growth of knowledge & agreement	Find a "proof" or destroy one	Add to prestige Gain experience Raise funds
4. Deliberation	Need for action	Reach a decision	Influence outcome	Agreement Develop & reveal positions Add to prestige, Vent emotions
5. Information-seeking	Personal Ignorance	Spreading knowledge and revealing positions	Gain, pass on, show, or hide personal knowledge	Agreement Develop & reveal positions Add to prestige, Vent emotions
6. Eristics	Conflict & antagonism	Reaching a (provisional) accommodation in a relationship	Strike the other party & win in the eyes of onlookers	Agreement Develop & reveal positions Gain experience, Amusement Add to prestige, Vent emotions

Accordingly, fallacies may in fact be instances of dialogical shifts (Macagno, 2011), which can be explained adopting an additional linguistic perspective (referring to the congruity theory (see Rigotti & Rocci, 2001; Rigotti & Rocci 2006; cited in

Macagno, 2011)) which establishes that "the sequences of the text are connected not only to the communicative intention (the relation between them), but also to the common ground, or context, including mutual knowledge" (see Clark, 1996; cited in Macagno, 2011, pp. 11-12).

One critical point challenging Walton's approach, similar to that of van Eemeren and Grootendorst, is whether fallacies can simply be seen as violations of dialog rules. Although there is no one-to-one correspondence, one can analyze dialogs with respect to their acceptability by the useful tool of the profile of dialog (Krabbe, 1999; cited in Walton, 2011). As in the example in Table 2 below, a profile of dialog is composed of columns showing the exchanges in order, and the proponent's and the respondent's statements in response to each other.

Table 2: The example of a profile of dialog (Walton, 2011, p.17)

MV	Proponent	Respondent
1.	Why should I accept *A*?	Because *B*.
2.	Why should I accept *B*?	Because *C*.
3.	I do not accept *C*.	Do you accept 'if *D* then *C*?'
4.	Yes.	Do you accept *D*?
5.	Yes.	Well then you must accept *C*.

This frame can be explained as follows through its application on the fallacy of many questions (Table 3), for instance, "Have you stopped cheating on your income taxes?" What makes this question fallacious is that it presumes that the addressee of the question is already cheating on his income taxes, which may in fact not be the case. As its profile shows, this fallacy can be overcome if certain questions and their answers precede this specific question under study (Walton, 1995, p.203; cited in Walton, 2011, p.17):

Table 3: Profile of dialog for the fallacy of many questions (Walton, 2011, p.17)

MV	Questioner	Respondent
1.	Have you made income tax returns in the past?	Yes.
2.	Have you cheated on those income tax returns in the past?	Yes.
3.	Have you stopped cheating on your income tax?	

The dialog theory has also proved very fruitful in modeling defeasible reasoning, operating on the basis of belief updates, a prevalent topic in the fields of artificial intelligence, logic (Bench-Capon et al., 1991, 2007; Gordon, 1995; McBurney & Parsons, 2002; cited in Walton, 2011), and legal reasoning (Prakken & Sartor, 1996; cited in Walton, 2011). Table 4 below shows a dialog profile fitting defeasible reasoning in which agents update their beliefs (upholding or retracting commitments) based on incoming information (openness to defeat condition), in which the burden of proof can be shifted:

Table 4: A profile of dialog that has defeasible reasoning (Walton, 2011, p.17)

MV	Proponent	Respondent
1.	*P*: *D* ; therefore *C*.	I accept that argument.
2.	Do you accept premise *P*?	Yes.
3.	So you must accept *C*.	Yes.
4.	*C* has been proven then?	I do not accept *C*.
5.	Why not?	Here is the evident for *not-D*.
6.	Ok, I accept that evidence.	Will you now retract *C*?

An example argument scheme in which defeasible reasoning rules apply is argument from expert opinion, (Walton, Reed & Macagno, 2008, p.310; cited in Walton, 2011, p.5):

MAJOR PREMISE: Source *E* is an expert in subject domain *S* containing proposition *A*.
MINOR PREMISE: *E* asserts that proposition *A* is true (false).
CONCLUSION: *A* is true (false).

with its corresponding critical questions:

1: *Expertise Question*. How credible is *E* as an expert source?
2: *Field Question*. Is *E* an expert in the field that *A* is in?
3: *Opinion Question*. What did *E* assert that implies *A*?
4: *Trustworthiness Question*. Is *E* personally reliable as a source?
5: *Consistency Question*. Is *A* consistent with what other experts assert?
6: *Backup Evidence Question*. Is *E*'s assertion based on evidence?

(Walton, 2011, p.6)

Such arguments can be non-fallacious if taken as an inconclusive defeasible argument that can be given up based on new information. In this case, as Wagemans puts forth, Walton appeals to the geometrical concept of reasonableness: arguments from ignorance are acceptable "if they are logically valid or can be transformed into logically valid arguments" (2003, p.1051).

In like manner, in Walton's (2010, 2011) consideration arguments from ignorance resemble defeasible reasoning, as a reasonable but not a conclusive argument form:

Proposition A is not known to be true, therefore A is false.
Proposition A is not known to be false, therefore A is true.

Walton (2010, p.57)

Such arguments, again, may or may not be valid depending on the context. In examples like,

Elliot: How do you know that ghosts don't exist?
Zelda: Well, nobody has even proved that ghosts do exist, have they?

Walton (2010, p.56)

they are generally invalid as lack of evidence for the existence of ghosts so far does not entail that it is impossible to prove their existence (Walton, 2010). However, negative information may also be useful as in default logics and can be represented as default (Reiter, 1980; cited in Walton, 2011). In the example that "if a positive flight connection between a pair of cities is not asserted on the screen representing the database, the conclusion is drawn that there is no flight connecting these two

cities," argument from negative evidence is a case of defeasible reasoning again and it is provisionally acceptable (Reiter, 1987; cited in Walton, 2011, p.25).

In such cases in which arguing from lack of knowledge may prove non-fallacious or at least plausible:

> Mr. X has never been found guilty of breaches of security, or of any connections with the KGB, even though the Security Service has checked his record.
> Therefore, Mr. X is not a KGB spy.
>
> Walton (2010, p.57)

there is a knowledge base and facts from this base are checked to prove the (non-) existence of a situation, the so-called "closed world assumption" in artificial intelligence (Clark, 1978; cited in Walton, 2011). Accordingly, the validity of this argument depends on whether this knowledge base is open or closed, and if the base is closed, the argument is no longer defeasible, but conclusive.

Arguments from ignorance might as well be analyzed on the basis of the burden of proof or shifting it determined by the context of the dialog, according to Walton. For example, in criminal law, "every man is to be *presumed* innocent till his guilt is established," to avoid the possibility of ruling an innocent person guilty, and thus the burden of proof lies with the prosecution, which is acceptable on the basis of "avoiding bad consequences" (Walton, 2010; Wagemans, 2003, p.1051) or "inference to the best" (Hahn & Oaksford, 2007; Walton, 2004; cited in Groarke, 2012), which is connected to the anthropological concept of reasonableness (Wagemans, 2003). Otherwise, answering a question "Why A?" saying "Why not-A?" just to shift the burden of proof is certainly not allowed and causes fallacious arguments (Walton, 2010).

When it comes to the applications of the pragmatic dialog theory, Walton's argumentation schemes have been used in the analyses of many fallacious arguments, including argument from expert opinion, analogy, correlation to cause, or *ad hominem* (Walton, Reed & Macagno, 2008; cited in Walton, 2011). Besides, in computing as well, again in the work on fallacies, with respect to the issue of the

burden of proof (Bench-Capon et al., 1991, 2007; Gordon, 1995; McBurney & Parsons, 2002; Gordon, Prakken & Walton, 2007; Verheij, 2003; cited in Walton, 2011), and in legal reasoning (Prakken & Sartor, 1996; cited in Walton, 2011), these argumentation schemes, with their consideration of the three characters of defeasible reasoning – openness to defeat, reversal of burden of proof, and retraction of commitment – have been used.

Again, the theory can account for the fact that the same question-answer pattern may acquire different qualities and different functions in different contexts (Daylak, 2004).

On the other hand, the theory is criticized in certain aspects. Wagemans (2003) claims that Walton's approach lacks a general account of fallacies, unlike that of van Eemeren and Grootendorst, and thus its treatment of arguments, as illustrated on the set of examples for arguments from ignorance cases, is arbitrary. The criticism of this "pluralistic" view is also present in van Eemeren and Grootendorst's (2010) evaluation of Walton's theory as well as in Hitchcock and Wagemans' (2011) expression that considering the many argument schemes (presented in Walton, Reed & Macagno, 2008), one can find topical overlap in every scheme.

Lewinski (2010) also concludes in his work on the discourse characteristics of online political forum discussions that the pragma-dialectical approach of van Eemeren and Grootendorst is better than Walton and Krabbe's as well as Jackson, Jacobs, and Aakhus' conceptions due to its "functionality in empirically strong and theoretically consistent analysis and evaluation" (2010, p.61).

2.4 Bayesian Approach

Although these two pragmatic or pragma-dialectical approaches have been widely employed in argumentation studies and each has its own comprehensive ways of dealing with fallacious arguments from which they also derive ways to deal with non-fallacious arguments, there are still certain limitations of them (Hahn et al.,

2009). They often focus on the discourse elements and procedural aspects of how a series of argumentation exchanges flow, rather than providing a framework to constrain the content and explain the uncertainty existent in the reasoning process (Hahn et al., 2009). They are about rights and obligations of the discussants. In other words, they cannot explore the variations in argument strength within the same discourse context (Hahn et al., 2005).

Consider the following examples of arguments from ignorance, negative evidence cases,

(1) Ghosts exist because nobody has proven that they don't.
(2) This drug is safe because no-one has found any side effects.

(Hahn et al., 2005, p.887)

Obviously, both arguments have the same structure of arguing from lack of evidence; however, content-wise, argument 2 is more compelling and plausible. Thus, there is a need for a general, normative theory of argument strength that can compensate to account for this graded variation within a given context, which is lacking in the procedural consensus theories explained above.

At this point, Bayesian probability, approaching daily argumentative issues as probabilistic, rather than logical-inference problems, with its reference to rational standards can serve our purposes well (Oaksford & Chater, 2009; Hahn et al., 2009).

Locating the Bayesian Approach in Cognitive Science

In cognitive science, probabilistic inference has been in use since the signal detection theory (Green & Swets, 1966; cited in Jones & Love, 2011), but the Bayesian models of cognition, as alternatives to previous symbolic and connectionist models to cognition, have become more prevalent only recently especially due to mathematical advances especially in particular in probability theory, providing guidance on what should be inferred from incomplete or uncertain data (Chater, Tenenbaum & Yuille, 2006; cited in Jones & Love, 2011).

Accordingly, Bayesian inference has been applied to various cognitive phenomena including language processing and acquisition (Chater & Manning, 2006; cited in Jones & Love, 2011), word learning (Xu & Tenenbaum, 2007b; cited in Jones & Love, 2011), causal inference (Griffiths & Tenenbaum, 2009; cited in Jones & Love, 2011), deductive reasoning (Chater & Oaksford, 2007; cited in Jones & Love, 2011), and categorization or concept learning (Anderson, 1991b; cited in Jones & Love, 2011).

At the heart of Bayesian probabilistic inference under uncertainty lies the commitment to representing degrees of belief with probability calculus (Chater, Goodman, Griffiths, Kemp, Oaksford & Tenenbaum, open peer commentary in Jones & Love, 2011):

> Each conjecture about the world is associated with a numerical degree of belief, defined to be an interval between 0 and 1, where 1 corresponds to absolute certainty that the belief is true; and 0 corresponds to the absolute certainty that it is false. These beliefs can be identified with probabilities; and a consistent cognitive agent is required to obey the rules of probability theory - at least, if the agent is to avoid paradoxical conclusions.
>
> (Chater et al., 2010, p.811)

In line with this reasoning, a rational agent is expected to make optimal decisions given certain prior beliefs and in the light of the data gained through experience (Chater et al., 2010; McClelland, 2009). In this way, the probabilistic approach provides a computational level explanation for various information processing problems faced by the brain with reference to the goals of the system and the surrounding environment in which these goals will be accomplished (Chater et al., 2010).

In many Bayesian models, the hypotheses and the related priors are grounded in the environment; that is, the model incorporates a generative model/description of the environment "in which the probabilities of observable variables depend on the values of unobservable, latent variables" (Jones & Love, 2011, p.175). One classical example is Anderson's (1991b; cited in Jones & Love, 2011) rational model of categorization reflected through a causal graphical model in Figure 2 below:
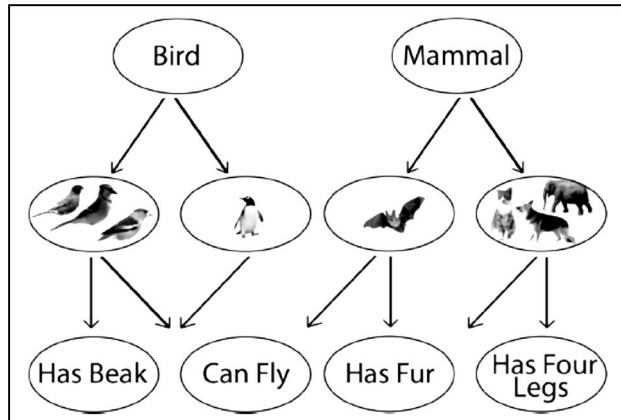
Figure 2. Simplified generative model based on Anderson's (1991b) rational model of categorization (adapted from Jones & Love, 2011, p.176). Upper and lower nodes refer to observable variables, middle ones to unobservable ones.

Accordingly in the model, decisions about category membership depend on feature information and this classification behavior is Bayesian at a computational level. That is,

> If a subject were told that a particular animal can fly, the optimal probability that it is a bird would equal the sum of the posterior probabilities of all the clusters within the bird category (and likewise for mammal). Critically, however, the clusters do not necessarily correspond to actual psychological representations. All that matters for predicting behavior is the joint probability distribution over the observable variables (i.e., the features and category labels). The clusters help the modeler to determine this distribution.

> (Jones & Love, 2011, p.176)

Such models, unlike the non-Bayesian accounts that require certainty for instance in induction (Osherson et al., 1990; Sloman, 1993; cited in Hayes & Newell, open peer commentary in Jones & Love, 2011), can explain category membership in the face of uncertainty.

This rationality focus of the Bayesian inference, if at extreme levels, was termed "Bayesian fundamentalism" and it was attacked especially through psychological and evolutionary viewpoints. Their objections were that the predictions of the model are unconstrained (e.g. in prior assignment) and fitting behavioral data does not entail that humans act rationally.

Building on Marr's (1982) required levels of explanation for a satisfying theory of cognition, they also criticized Bayesian fundamentalism for not having explanatory power at representational or algorithmic as well as implementational levels (Jones and Love, 2011). Marr (1982; cited in Jones & Love, 2011) had proposed that a cognitive phenomenon should be described at three levels for a better understanding of the processes occurring in the brain: (1) the computational level that identifies the problem faced by the cognitive system and specifies the goals of the computation; (2) the representational-algorithmic level that gives a representation of the input and output and an algorithm that transforms the input to the output; and (3) the implementational or hardware level where the representation and the algorithm are physically realized. In simpler terms, "a problem is defined, code is written to solve it and a device is employed to run the code" (Jones & Love, 2011, p.189). Thus, Bayesian fundamentalism was criticized for not having any psychological substance, "with no representations to be updated, no encoding, storage, retrieval, or search; no attention or control; no reasoning or complex decision processes" (Jones & Love, 2011, p. 175).

Thus, with the consideration that Bayesian inference is in fact a promising tool for cognitive modeling, an alternative Bayesian approach was coined by Jones and Love (2011) called the "Bayesian enlightenment", which proposes that Bayesian models can have both rational and mechanistic commitments, i.e., it pays "attention to representation and process and the structure of the environment, and compares explanatory models with empirical data and each other" (Chater et al., open peer commentary in Jones & Love, 2011, p.194).

However, in their reply to this evaluation of the Bayesian inference and its categorization into fundamentalist *vs.* enlightened, Chater et al. clarify that there is no such division and what Jones and Love call Bayesian enlightenment is already what has been the norm in Bayesian cognitive science (open peer commentary in Jones & Love, 2011). There have already been efforts to develop new computational methods for efficient Bayesian inference and learning that can initiate hypotheses for representations and algorithms (Goodman et al., 2011; Heller et al., 2009; Kemp et

al., 2010a; 2010b; cited in Chater et al., open peer commentary in Jones & Love, 2011; Griffiths, Chater, Kemp, Perfors & Tenenbaum, 2010). In addition, there has also been research into how traditional psychological mechanisms such as neural networks might be seen as doing approximate Bayesian inference (McClelland, 1998; Neal, 1992; cited in Chater et al., open peer commentary in Jones & Love, 2011; Oaksford & Chater, 2010; cited in Jones & Love, 2011).

Moreover, contrary to what Jones and Love (2011) claim regarding the lack of a true representation of the environment in the Bayesian approach as applied in the current literature, Chater et al. claim that the current Bayesian approaches already involve a careful study of the environment, examples of which include work on vision and language acquisition (Anderson, 1990; 1991a; Oaksford & Chater, 1994; 1998b; Yuille & Kersten, 2006; Chater & Vitanyi, 2007; Foraker et al., 2009; Hsu & Chater, 2010; Hsu et al., in press; Perfors et al., 2010; 2011; cited in Chater et al., open peer commentary in Jones & Love, 2011).

In addition, different from what Jones & Love (2011) state, Chater et al. state that there is already work in the Bayesian literature that compares explanatory models with empirical data and each other (Goodman et al., 2007; 2008b; Griffiths & Tenenbaum, 2009; Kemp & Tenenbaum, 2009; Oaksford & Chater, 2003; cited in Chater et al., open peer commentary in Jones & Love, 2011).

With respect to the expectation that Bayesian cognitive science should provide explanations at Marr's (1982) three levels of analysis – computational, representational, and implementational – Chater et al. prefer a function-first top-down research strategy (open peer commentary in Jones & Love, 2011); that is, from computational to algorithmic, to implementational levels, or simply, from function to mechanism (Anderson, 1990; Chater et al., 2003; Griffiths et al., 2010; cited in Chater et al., open peer commentary in Jones & Love, 2011).

Again, researchers using Bayesian inference appeal to evolutionary psychology in their claims of optimality (as well as adaptation and fitness) in human behavior

(McClelland, 2009; Jones & Love, 2011). Rational theories of cognition necessitate the specification of the environment and the behaviors that increase fitness; however, such approaches seem quite simplistic from the point of view of approaches that opt for more mechanistic explanations as behavior is not optimized solely based on the environment but it is also dependent on the organism itself, the brain and the body, as Jones and Love (2011) put forth. Moreover, contrary to the common belief in the rationalist approach, not all adaptations increase fitness or global optimality; they sometimes include by-products or noise or evolution selects incremental adjustments or locally advantageous alternatives as well (McClelland, 2009; Jones & Love, 2011).

Thagard (2012), through acknowledgement of his preference of neural network models over probabilistic Bayesian network models, points to the pitfalls of the probabilistic approach such that people, in their inferential practice, do not reason with probabilities (Kahneman, Slovic & Tversky, 1982; Gilovich, Griffin & Kahneman, 2002; cited in Thagard, 2012). He also states that different from the Bayesian networks which include directed graphs, in everyday reasoning, graphs with cycles, namely, graphs with feedback loops are also common. On this account, despite their computational and normative philosophical power, he doubts the plausibility of Bayesian networks in cognitive psychology. However, studies using Bayesian networks such as that of Gopnik et al. (2004, cited in Thagard, 2012) on children's causal learning and inference abilities seem to support Bayesian networks' psychological relevance.

Moreover, there is counter evidence for Kahneman, Tversky and their colleagues' (Kahneman, Slovic & Tversky, 1982; Tversky & Kahneman, 1974; cited in Griffiths & Tenenbaum, 2006) claim that people follow error-prone heuristics insensitive to prior probabilities in their cognitive judgments under uncertainty. Griffiths and Tenenbaum (2006), in their work on everyday cognitive judgments of people, revealed that people follow optimal statistical principles and there is a close relation between their implicit probabilistic models and the statistics of the world. Their finding is in line with those of the formal analyses of perception and memory where

inductive predictions are made based on probabilistic modeling of the environment (Anderson, 1990; Anderson & Milson, 1989; Anderson & Schooler, 1991; Freeman, 1994; Geisler et al., 2001; Huber et al., 2001; Knill & Richards, 1996; Körding & Wolpert, 2004; Shiffrin & Steyvers, 1997; Simoncelli & Olshausen, 2001; Weiss et al., 2002; cited in Griffiths & Tenenbaum, 2006). Hence, the debate whether humans reason probabilistically correctly or not continues and the conflicting evidence will need to be accounted for by any theory of human reasoning, Bayes or not.

To sum up, the Bayesian modeling also suffers from some limitations just like the other alternative methods in the cognitive science literature. Connectionist models are criticized regarding their compatibility with the actual properties of real neural networks; dynamical systems approach is criticized for not providing explanation regarding experience- or development-dependent changes in behavior as the source of change generally comes from outside the model (an external control variable); symbolic and logic-based approaches are questioned regarding their applicability for other aspects of human cognition (other than deriving conclusions from given statements) (McClelland, 2009).

However, the Bayesian approach still appears to be an attractive framework in cognitive modeling for making inferences (Lee, 2011). First of all, its use as a statistical method has become quite frequent recently with an awareness of the superiority of Bayesian methods over traditional null-hypothesis significance testing (Gallistel, 2009; Kruschke, 2010a; Lee & Wagenmakers, 2005; Wagenmakers, 2007; cited in Lee, 2011; Dienes, 2011). Bayesian statistics in cognitive science can be used to fit models of psychological processes to behavioral or observed data (e.g., Lee, 2008; Rouder, Lu, Speckman, Sun, & Jiang, 2005; Wetzels, Vandekerckhove, Tuerlinckx & Wagenmakers, 2010; cited in Lee, 2011), in which inference is done on the measured dependent variables from an experimental design (Lee, 2011; Dienes, 2011; Kruschke, 2010). Besides, with its capacity to give rational accounts for cognitive phenomena, the Bayesian approach can also provide a computational level analysis (e.g., Chater et al., 2006; Griffiths et al., 2008; cited in Lee, 2011).

Bayesian Inference

In the Bayesian treatment, in both arguments above there is one claim, i.e. ghosts exist or this drug is safe, and evidence for this claim, i.e. because nobody has proven that they don't or because no-one has found any side effects, respectively. A person's degree of belief in the claim is expressed in the form of probabilities, and it is updated based on incoming information or evidence (the relationship between the claim and evidence) (Hahn et al., 2009).

Thus, the Bayesian theorem has three probabilistic terms that determine the degree of one's posterior conviction in a claim upon the presentation of some evidence for it, *P(T|e)*: (i) one's prior degree of belief in the hypothesis *T*, *P(T)* (the probability of hypothesis *T* being true); (ii) how likely the evidence *e* would be if the hypothesis *T* were true, *P(e|T)* (the probability of evidence *e* given *T*); and (iii) how likely it would be if the hypothesis were false, *P(e|¬T)* (the probability of evidence *e* given *¬T*) (Hahn et al., 2009). This is reflected in *Equation 1* below:

Equation 1:

$$P(T \mid e) = \frac{P(e \mid T) \times P(T)}{P(e \mid T) \times P(T) + P(e \mid \neg T) \times (1 - P(T))}$$

<div align="right">(Adapted from Hahn et al., 2005, p.888)</div>

The likelihood ratio is the ratio between *P(e|T)* and *P(e|¬T)*, and it gives information about the diagnosticity or informativeness of the evidence such that if *P(e|T) > P(e|¬T)*, then the evidence leads to an increase in belief; and if *P(e|T) < P(e|¬T)*, a decrease (Hahn et al., 2009).

With the help of such an approach, one can accommodate relatively reasonable informal arguments within a larger encompassing normative theory of argumentation referring to its content with respect to its plausibility, rather than stacking them aside as exceptional cases.

Accordingly, there are several reasons which make a Bayesian account of reasoning attractive in analyzing argument strength and people's assessment of argument strength. First of all, a Bayesian analysis can capture varying prior beliefs or audience relativity, a fundamental aspect of argumentation. That is, a person is more likely to be convinced about an argument if he, himself, believes the proposition entailed in the first place (Hahn & Oaksford, 2006a). This subjectivity is represented by probabilities in a Bayesian account.

Another aspect of Bayesian reasoning is that it can provide an update rule based on incoming evidence. That is, a person, provided with a proof from a reliable source such as an independent consumer watchdog as opposed to a circular email from excitingnews@wowee.com, is more likely to find the argument presented convincing (Hahn et al., 2009). This approach can be used to calculate such posterior beliefs given the evidence as well as the amount of belief change (Hahn & Oaksford, 2007).

Furthermore, a Bayesian account can also account for the difference in argument polarity. It captures the intuition that [the] positive argument is stronger than the negative argument, as in "Drug A is toxic because a toxic effect was observed" and "Drug A is not toxic because no toxic effect was observed," having positive *vs.* negative polarity, respectively. The latter being an argument from ignorance is weaker and the Bayesian model fits the data (Hahn et al., 2005).

Also, this approach can accommodate Toulmin's (1992; cited in Hahn et al., 2005) view that the acceptability of an argument in one domain might be higher or lower than that in another domain. That is, two arguments with similar forms but different contents or topics, ghosts' existence as opposed to drug's toxicity, for instance, might receive varying ratings of acceptance.

Considering the wide variety of informal argument fallacies on which Bayesian treatments have been applied, which include arguments from ignorance, circular arguments, slippery slope arguments (Oaksford & Hahn, 2004; Hahn et al., 2005; Hahn & Oaksford, 2007; Corner, Hahn & Oaksford, 2011), as well as *ad populum*

and *ad hominem* arguments (Korb, 2004; cited in Hahn et al., 2009)[2], and which can be extended even further to include almost all of the 20 fallacies in the catalogue, the Bayesian approach can be considered a useful general normative theory of argument content and argument strength (Hahn et al., 2009).

Seeking computational level explanations as well, Hahn and Oaksford (2008, p.129) also find validation for such Bayesian inference patterns in the well-known *poverty of stimulus* argument in connection with *implicit* or *indirect negative evidence*, which can be expressed in the form of an argument from absence as:

> I have not encountered this construction [e.g., the past tense form "goed"]
> (I would have expected to encounter it, if it existed)
> Therefore, this construction does not exist
>
> (Hahn and Oaksford, 2008, p.137)

"If the learner has little or no explicit feedback on ungrammatical sentences, agrammaticality can only be *inferred*," (Hahn & Oaksford, 2008, p.129) providing further support for the claim that such inference should be seen as part of a computational level explanation of actual learners' behavior, not only in this linguistic phenomenon, but also in other everyday cases of such inference.

Arguments from Ignorance

In the Bayesian treatments of arguments from ignorance, at the definitional level, based on Walton's survey (1996; cited in Hahn & Oaksford, 2007, p.707) on definitions of arguments from ignorance, the main form of this type of argument is:

> If A were true (false), it would be known (proved, presumed) to be true (false).
> A is not known (proved, presumed) to be true (false).
> Therefore, A is (presumably) false (true).

---

[2] A **slippery slope** is a classical informal fallacy and states that a small first step inevitably leads to a chain of related events culminating in some significant impact. The fallacious sense of "slippery slope" is because it ignores the possibility of middle ground and assumes a discrete transition from category A to category B: *Whenever a tree falls down, it has a 95% chance of knocking over another tree. We might conclude that soon a great many trees would fall, but this is not the case.* An **ad populum** is a fallacious argument that concludes a proposition to be true because many or all people believe it; *If many believe so, it is so.* An **ad hominem** is a logical fallacy which attempts to persuade by linking the validity of a premise to a characteristic or belief of the person advocating the premise. *You claim that this man is innocent, but you cannot be trusted since you are a criminal as well.* (definitions are from http://en.wikipedia.org)

Accordingly, the three basic types of arguments from ignorance identified by Walton (1996) are investigated in Hahn and Oaksford's studies (2007): negative evidence, epistemic closure (closed world assumption), and shifting the burden of proof.

An argument from negative evidence is "Drug A is not toxic because no toxic effect was observed," considering that tests of a sufficient number returning a negative result would qualify as evidence of a conclusion. The next type is based on the concept of epistemic closure, as such if the railway timetable, considered an epistemically closed database, says that the train does not stop at Hatfield, for instance, then it is not one of its stops and one can conclude that the train is not going to stop there. Both arguments might prove fallacious if the conditional premises cannot be established, and thus excluded from standard logic treatment (Hahn & Oaksford, 2007). In the last type, the argument tries to shift the burden of proof from the accuser to the accused. Considering the case in legal reasoning, for instance, the burden of proof lies with the prosecution because "every man is to be *presumed* innocent till his guilt is established," such a shift from the prosecution/accuser to the accused would be unacceptable (Hahn & Oaksford, 2007).

This study focuses on only one type of arguments from ignorance; that is the negative evidence cases.

Considering the types of argumentative dialogs in which these arguments are embedded, in this approach, van Eemeren and Grootendorst's critical discussion, where the participants arrive at a consensus making appropriate discussion moves, is adopted. A rational standard is also required which entails arriving at conclusions based on incoming information under conditions of uncertainty (Perelman & Olbrechts-Tyteca, 1969, Zarefsky, 1995, van Eemeren & Grootendorst, 1996, cited in Hahn & Oaksford, 2007). So, this rational standard is not in the logical sense as in deductive validity but in the pragma-dialectical sense as in eliciting adherence of the participants of the dialog to some theses.

A Bayesian Analysis of the Arguments from Ignorance

Within the Bayesian framework, argument strength is determined by the interactions between three major factors including prior belief (strong *vs.* weak), polarity (positive *vs.* negative) and evidence/source reliability (strong *vs.* weak) across varying topics. These factors rely on the three main intuitions regarding the arguments from ignorance and the Bayesian framework can account for them. They are as follows:

(1) Negative arguments (e.g. Drug A is not toxic because no toxic effects were observed), that is the arguments from ignorance, are less compelling than positive arguments;

(2) People's prior beliefs influence argument acceptance (e.g. I sort of believe *vs.* I am fairly convinced);

(3) The more/stronger the evidence supporting the conclusion is, the higher the acceptability of it seems to be (e.g. one experiment *vs.* 50 experiments).

Also, following the idea that different topics might have differential effects on one's acceptance of arguments (Toulmin, 1992; cited in Hahn et al., 2005), one further intuition is:

(4) It is possible that argument acceptance varies across different topics (e.g. cloning, globalization, death penalty *vs.* using robots).

Bayes' theorem considers prior beliefs and provides an update rule for the degree of belief associated with the conclusion in light of the evidence, that is, it calculates posterior beliefs (Hahn et al., 2005). The normative rule expressed in *Equation 1* (repeated below for convenience) captures this updating mechanism:

Equation 1:

$$P(T \mid e) = \frac{P(e \mid T) \times P(T)}{P(e \mid T) \times P(T) + P(e \mid \neg T) \times (1 - P(T))}$$

(Adapted from Hahn et al., 2005, p.888)

In the above equation, *e* denotes a positive result; that is, an experiment in which a toxic effect is observed, and ¬*e* a negative result; that is, an experiment in which a toxic effect is not observed. Similarly, *T* denotes the hypothesis *T* that the drug produces a toxic effect, and ¬*T* the alternative hypothesis that the drug does not produce toxic effects. Accordingly, one's posterior degree of belief in the hypothesis, *P(T|e)* is calculated as a function of one's prior degree of belief in the hypothesis *T*, *P(T)* (the probability of hypothesis *T* being true); how likely the evidence *e* would be if the hypothesis *T* were true, *P(e|T)* (the probability of evidence *e* given *T*); and how likely it would be if the hypothesis were false, *P(e|¬T)* (the probability of evidence *e* given ¬*T*) (Hahn et al., 2009).

That is, the strength of the positive argument (i.e. the drug produces a toxic effect) is given by the conditional probability that the hypothesis, *T* is true given that a positive test result, *e* is found, *P(T|e)*. This is called *positive test validity* and this probability can be calculated from *Equation 1* above. Correspondingly, the strength of the argument from ignorance (negative evidence) is given by the conditional probability that the hypothesis, *T*, is false given that a negative test result, ¬*e*, is found, *P(¬T|¬e)*. This is called *negative test validity* and this probability can be calculated from *Equation 2* below (Hahn et al., 2005).

Equation 2:

$$P(\neg T \mid \neg e) = \frac{P(\neg e \mid \neg T) \times (1 - P(T))}{P(\neg e \mid \neg T) \times \big(1 - P(T)\big) + P(\neg e \mid T) \times P(T)}$$

(Adapted from Hahn et al., 2005, p.888)

In simpler terms, these probabilities can be calculated from the *sensitivity P(e|T)*, denoted by *n* and the *specificity or selectivity* (*P(¬e|¬T)*), denoted by *l*, and the prior belief that *T* is true *P(T)*, denoted by *h*, by using Bayes' theorem. The corresponding equations are,

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Equation 3:

$$P(T \mid e) = \frac{n \times h}{n \times h + (1 - l) \times (1 - h)}$$

Equation 4:

$$P(\neg T \mid \neg e) = \frac{l \times (1 - h)}{l \times (1 - h) + (1 - n) \times h}$$

(Hahn & Oaksford, 2007, p.709)

In *Equation 3* and *Equation 4* above, *sensitivity, n* stands for the "hit rate" of the test; that is, the probability that the evidence would be found if the hypothesis were true. *Specificity or selectivity, l* stands for the probability that the evidence would not be found if the hypothesis were false; and "1 _ *l*" gives us the "false positive rate;" that is, the probability that the evidence would still be found if the hypothesis were false. As it is the case in various clinical and psychological tests (Chernesky, Jang, Krepel, Sellors, & Mahony, 1999; cited in Hahn & Oaksford, 2007), there is a trade-off between sensitivity and specificity such that positive arguments are stronger than negative arguments. For instance, the reason why negative evidence on "ghosts" is considered so weak is "because of the lack of sensitivity (ability to detect ghosts) attributed to the tests as well as the low prior belief in their existence" (Hahn & Oaksford, 2006b, p.6). This is why, there is the constraint that hit rate/*sensitivity* is greater than the false positive rate, 1 minus *specificity*, i.e. *n* > 1-*l*. In the best-fit parameter estimations, this is taken into account. As of the prior beliefs, the Bayesian framework allows to differentiate between different aspects of audience subjectivity. In the parameter estimations, prior belief manipulations (strong *vs*. weak) are also considered.

When it comes to the manipulations of the amount of evidence, Bayesian updating can account for the relevant intuition that more or stronger evidence increases argument acceptance or strength, regardless of whether it is positive or negative argument, as displayed in Figure 3 below.
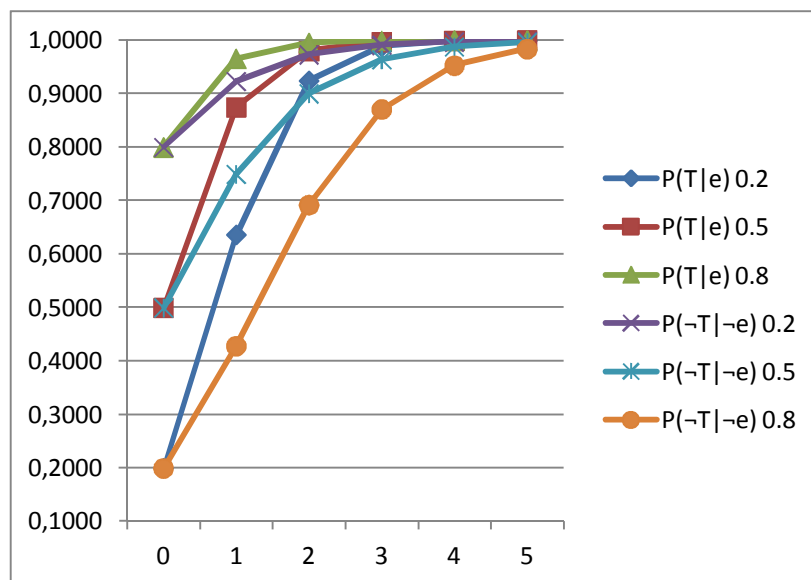
Figure 3. Bayesian updating (0 to 5 times, see x-axis) of positive and negative argument strength (ranging from 0.2 to 1, see y-axis) for three different priors ($P(T)$ = .2, .5, and .8), with sensitivity ($P(e|T)$) set to .7 and specificity ($P(\neg e|\neg T)$) set to .9 (adapted from Hahn & Oaksford, 2007, p.710)

In the experimental designs where the Bayesian account of argument evaluation is adopted, often a series of dialogs are constructed (Oaksford & Hahn, 2004; Hahn et al., 2005; Hahn & Oaksford, 2007). In these dialogs, the abovementioned factors that feed into a Bayesian modeling (prior belief, polarity, source reliability, and topic) appear in their different manipulations as in the following example in which the prior belief is set as "I sort of believe," that is the weak prior belief condition; the polarity is set to negative as "clone technology is not a threat for human beings"; the source reliability is manipulated in the high reliability condition as the source is a Professor at British Medical Research Council; and finally, the topic is "clone technology":

Margaret:	Do you think clone technology is a threat for human beings?
Anton:	I sort of believe that clone technology is not a threat for human beings.
Margaret:	You can do more than sort of believe it; you can be certain that it is not a threat.
Anton:	Why do you say that?
Margaret:	Because according to a Professor at British Medical Research Council, there have never been any reported harms of the technique on human beings and thus it doesn't present any threats.

(see Appendix D for the whole set of dialogs)

Following each dialog of the sort above, participants are presented with the below rating scale which is preceded by an instruction telling them to rate the argument in the dialog in terms of how convincing it is from the perspective of one of the interlocutors (Anton, in this example):

*Considering his initial view, how convinced do you think Anton should <u>now</u> be that clone technology is not a threat for human beings? Please indicate your response by putting a tick (√) in the corresponding box in the <u>**0 (not convinced at all) to 10 (totally convinced)**</u> scale below.*

0	1	2	3	4	5	6	7	8	9	10

Once the experiment is conducted using the dialogs and participants' ratings are gathered, a Bayesian model-fitting is done on the data. This is done by finding the parameter values for *sensitivity, n*; *specificity, l*; the prior belief that T is true $P(T)$, h (above) that minimize the discrepancy between the predictions of the model and the data to get the highest R^2 value, which will consequently show the fit of the model to the data; that is, like the amount of explained variance in a regression. The formula in Figure 4 shows how R^2 value is calculated.

$$R^2 = 1 - \left(\frac{\sum_i^n (data_i - predicted_i)^2}{\sum_i^n (data_i - mean)^2} \right)$$

Figure 4. The coefficient of variation (adapted from Hahn & Oaksford, 2007, p.714)

The variables present in the R^2 formula above represent the following:

<u>Data:</u> Each participant's individual rating for one dialog (Notation i stands for the first participant and n stands for the last participant, so if there are 20 participants in the study, $i=1$; $n=20$ and the calculation "$(data - predicted)^2$" is done for each participant's individual rating of a dialog.)

<u>Mean:</u> The mean value of all participants' individual ratings for one dialog

<u>Predicted:</u> The posterior degree of belief calculated for each participant's rating for one dialog using *Equation 3* above for positive arguments and *Equation 4* above for

negative arguments. To get the smallest result possible from each "(data −
predicted)", the *n, l, h* values in *Equation 3* and *Equation 4* are assigned for each
participant using the SOLVER function of the spreadsheet programme Microsoft
Excel (see Appendix K for a sample Solver screen). In this way, the discrepancy
between the predictions of the model and the data is minimized to get the highest R^2
value.

In these parameter estimations, *sensitivity (n)* and *specificity (l)* are allowed to vary,
with the additional constraint that hit rate/*sensitivity* will be greater than the false
positive rate, i.e. $n > 1-l$, in the high-reliability condition as opposed to the low-
reliability condition as it is more likely for arguments with more reliable evidence
(e.g. from a professor) to return positive test results as opposed to the ones with less
reliable evidence (e.g. from a couple in the street). The values of the priors ($P(T)$ or
h) are also constrained such that the prior for the argument with weak prior belief
manipulation was smaller than or equal to .4 and correspondingly the prior for the
argument with strong prior belief manipulation was larger than or equal to .45, as it is
likely that the argument about which people already have a strong prior belief is
expected to result in a higher degree of belief change.

Accordingly, for each dialog, an R^2 value is calculated from 1 minus the sum of
squares of "data − predicted" for all participants divided by the sum of squares of
"data − mean" for all participants. The modeling on the results for four scenarios is
done separately using different parameter values, considering the number of data
points; that is the number of dialogs. Then, these R^2 values can be averaged topic-
wise (clone, globalization, death penalty *vs.* globalization) or an overall R^2 value can
be calculated across all dialogs collapsing topic information. An R^2 value close to
one indicates a good fit between the model and the data while an R^2 value close to
zero indicates that the model does not fit the data well. Considering the context of
argumentation where the Bayesian account currently has no direct competitor theory
and simply to show that a simple normative theory does well, values of .6 or better
for each participant would be considered as good fit; however, in the case of
statistical analysis on mean parameter values, one would be stricter.

2.5 Intelligence

It would be interesting to examine the relations between intelligence and performance on the kind of information processing and judgment tasks required in the series of argumentation experiments conducted in this study. Ever since Spearman's idea of general intelligence, the so-called "*g* factor" indicating a common source of variance which explains the correlations between different mental tests (1939, 1946; cited in Vigneau & Bors, 2005), studies have tried to reveal the indicators of this single determinant or a unitary form of multiple correlated determinants which were thought to include or be associated with working memory, attention, mental speed or some other construct (Neubauer, 1995; Vernon, 1987; cited in Vigneau & Bors, 2005). Raven's two batteries, Standard Progressive Matrices (SPM) and Advanced Progressive Matrices (APM), building on Spearman's idea of a single, unitary entity from which intelligent behavior emerges (Plucker, 2003), have widely been viewed as suitable measures of general intelligence *g* (Burke, 1958; Jensen, 1987, cited in Vigneau & Bors, 2005).

For the purposes of this study to test intelligence, an intelligence test which would not ask the participants to rely on some explicit base of knowledge would be more preferable. In this respect as well, Raven's APM, compatible with our subject group with respect to age and maturity, served our purposes appropriately as it is a language-free "fluid intelligence" test – estimating one's ability to reason analytically and solve problems without expecting him/her to refer to any body of knowledge derived from previous experience (Cattell, 1963; Carpenter et al., 1990; cited in Bors and Stokes, 1998).

APM was found to be a reliable way of measuring general intelligence (Marshalek, Lohman, & Snow, 1983; cited in Howrigan & MacDonald, 2008) as it had a significant correlation of .74 with the full-scale Wechsler Adult Intelligence Scale (WAIS) and .75 with the Otis I.Q. (McLaurin, Jenkins, Farrar & Rumore, 1973; cited in Bors and Stokes, 1998).

Accordingly, the APM has been used in various studies to investigate the relationship between intelligence and other human capacities or qualities, e.g. aging and intelligence (Babcock, 1994), race and intelligence (Rushton, 2003) humor and intelligence (Howrigan & MacDonald, 2008).

In this study, a shorter version of the 36-item original APM test, consisting of items 3, 10, 12, 15, 16, 18, 21, 22, 28, 30, 31, and 34, was used to reduce administration time from around 60 minutes to 20 minutes. But still, both its internal consistency (Cronbach's alpha =.73) and its correlation with full-length scores were found to be satisfactory (Cronbach's alpha =.72) (Bors & Stokes, 1998).

The short-form APM test consists of a series of perceptual analytic reasoning problems, each in the form of a matrix. The problems include both horizontal and vertical transformations as shown in Figure 5 below: figures with size increases or decreases, elements being added, removed or rotated, and other similar progressive changes which follow some pattern.
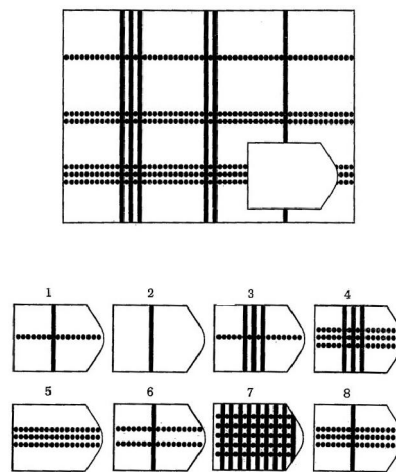
Figure 5. A sample item from Raven's Advanced Progressive Matrices

In the item above, the participant is expected to consider the vertical and horizontal transformations and pick item 8 to complete the board above. There are two items for training, and then the subjects are tested on 12 items (Bors & Stokes, 1998). The test takes about 20 minutes to complete, and the maximum score one can get from the test is 12.

This test does not only give information about the measures of specific higher order cognitive abilities but it is also a good index of general intelligence (Raven, Raven & Court, 1991; Arthur & Woehr, 1993; cited in Bors & Stokes, 1998).

2.6 Evidentiality

Regarding the relation between language and thought, evidentiality seems to present a good ground to investigate how linguistic and conceptual representations get in touch during language learning (Hauser, Chomsky, & Fitch, 2002; cited in Papafragou et al., 2007) as this is a category whose expression varies across languages. Evidential devices are mostly lexical items in some languages such as English, while they are expressed with certain morpho-syntactic markers in some other languages such as Turkish or Korean. In languages which have a coherent and obligatory inflectional system to deal with the source of evidence of an event, "whether the speaker saw it, heard it, inferred it from indirect evidence, or learnt it from someone else," evidentiality can be expressed in different ways, ranging from simple systems with "just two terms (eye-witness *vs.* non-eyewitness, or reported and everything else), while others [may] have six or more terms" (Aikhenvald, 2004, p.1).

There have been attempts to capture this relation or to contribute to the language-and-thought debate through various studies investigating children's acquisition of evidentiality markers on its own or in relation to other cognitive phenomena (e.g. source monitoring) (cited in Papafragou et al., 2007); however, so far, the findings to a great extent suggest that children's abilities regarding other cognitive phenomena proceed along similar lines independent of their linguistic environment, regardless of it being a language with grammaticalized evidentiality or not.

In such acquisition studies with children though, there is always the problem of devising appropriate experimental materials which do not include complex cognitive tasks such as asking the child to consider the situation from another person's point of

view or which do not include meta-linguistic features, both of which might hinder children's performance on the tasks. Taking this important link between language and thought into account, further studies such as the one conducted in this study are required to empirically investigate the functions of evidentiality markers.

Following up on the initial Turkish replication of the English experiment and the investigation of the role of intelligence in argumentation in the second experiment, the third experiment investigated whether evidentiality, a grammaticalized category in Turkish, indicating the certainty with which events in the past have happened, marked with overt morpho-syntactic markers (–DI *vs.* –mIş) played a role in argument strength.

Aikhenvald (2004), in her exhaustive work on the cross-linguistic analysis of how languages mark information source, analyzes evidentials as a grammatical category, their semantic extensions and overlaps with other grammatical categories as well as the conditions under which they evolve or disappear. Under her treatment, evidentiality is a linguistic grammatical category in its own right, whose core meaning is "information source". All languages express information source in some form, but around twenty-five percent of world's languages employ such grammaticalized systems in expressing different types of information source, whether seen, heard, or inferred (Aikhenvald, 2004).

Evidentiality marking may range from the mere marking of the reported information, as in most languages, to marking to differentiate between firsthand, direct, confirmative, validational, verificational or witnessed *vs.* non-firsthand, indirect(ive), secondhand, nonconfirmative, or nonwitnessed sources, or visually obtained data *vs.* data obtained through hearing or smelling or through different types of inference[3]. In this respect, an evidential can be a morpheme which may refer to one or more related information sources, but it can also optionally be expressed or

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[3] According to Willett's (1988) earlier categorization, languages which have grammaticalized evidentiality encode information source in three main ways which can be expressed as: (a) Direct access/ perception; (b) Indirect access – (b.1) Report from others, (b.2) Reasoning. Thus, the additional categories above are in fact the subdivisions of these three broader notional categories (Papafragou et al., 2007).

accompanied by a lexical item or lexical explanation, such as saying *they told me* along with a reported evidential (Aikhenvald, 2004). Such lexical means may include lexical verbs such as *allege* (e.g. the alleged killer of someone); adverbial expressions such as *reportedly*; clauses with complementation markers as in *it seems to me that*; or modal verbs like *should* or *must* (Aikhenvald, 2004). Non-evidential categories (such as past tenses and perfects, passives, nominalizations, and complementation strategies) may also take on evidential-like meanings, e.g. the conditional moods in French are used to express a speaker's refusal of responsibility for information obtained from another source (Aikhenvald, 2004). Such extensions are called evidential strategies.

It might be the case that linguistic evidentiality is mistaken for evidentiality in its conventional usage outside the field of linguistics. To illustrate, evidence or evidentiality can be used to provide proof in court or in arguments or to refer to the truth value of statements, which is not related to the kind of evidentiality, pointing to the source of information, meant in linguistics (Aikhenvald, 2004). That is, linguistic evidentiality does not have any direct bearing on such non-linguistic uses of the expression. Moreover, using the accurate marking to point to an appropriate information source does not imply anything about the person's knowledge level, point of view or reliability (Aikhenvald, 2004). But still, they can have their own truth value such that using a wrong evidential may mean telling a lie (Aikhenvald, 2004).

However, in addition to their primary meaning of expressing information source, evidentials may convey secondary meanings of reliability or probability (Aikhenvald, 2004), semantic extensions overlapping with modality. For instance, the conventional core meaning of reported evidentials (as instantiated by reported speech universally) is verbal report; however, one can add an overtone of doubt to it (dubitative), as in 'This is what I have been told, but I don't vouch for it" (Aikhenvald, 2004, p. 20). Evidentiality may also be conceptually linked with mirativity, a category which refers to expressions of "unprepared mind, new information and speaker's surprise" (Aikhenvald, 2004, p. 8). As its definition

suggests, this unusual or surprising information can also be expressed through evidentials, other than the visual or firsthand ones though.

Moreover, evidentiality choices may vary depending on the discourse genres, eg. using reported evidential in stories or an unexpected evidential to express stylistic preferences such as sarcasm or irony or to add rhetorical effects (Aikhenvald, 2004). Dependencies between evidentiality and other grammatical categories may extend further to include clause types or tense-aspect-person choice. For instance, use of a reported or inferential evidential in first person context would not be very likely or, if used, would have different semantic effects (Aikhenvald, 2004).

As the linguistic tool of referring to the source of information, evidentiality – the grammatical evidentiality in the context of Turkish – is of real interest considering especially one important factor that was manipulated for the purposes of this study, that is, the reliability of evidence source. Regarding this link, it is important to avoid a possible confusion resulting from the "polysemy of the term 'evidence' and its derivative 'evidential'" (Aikhenvald, 2004, p.5) and make a clear distinction between the reference to some information source ("evidentiality") and the reference to the validity or reliability of that information ("reliability") (Chung & Timberlake, 1985; cited in Aikhenvald, 2004) although there are also accounts which find the two quite interwoven (Chafe, 1986; Matthews, 1997; Dendale & Tasmowski, 2001; cited in Aikhenvald, 2004). This is why in this study these two factors, evidentiality and reliability, were manipulated independently to extract each one's unique contribution to argument strength.

Tying back to the issue of whether evidentiality is inherently associated with reliability with respect to the specific example of Turkish, Aksu-Koç and Slobin (1986; cited in Aksu-Koç, 1988) have shown that "Turkish has a single, non-differentiated form and the opposition between direct *vs*. indirect experience markers is primarily validational," "reflecting the speaker's certainty about or commitment to the truth of his or her proposition" (Aksu-Koç, 1988, p.16). Within this framework, modality, e.g. in the form of expressing probabilities or validity or certainty, comes

into play with this validational aspect of evidentiality, and mainly due to this intersection, the functions of evidentiality markers in Turkish have widely been investigated within the broader concept of modality, with a specific focus on the use of evidential markers in presenting evidence or inferring ideas (Underhill, 1979; Aksu-Koç & Slobin, 1986; Tura-Sansa, 1986; Kocaman, 1988; Kornflit, 1996; Ruhi, Zeyrek & Osam, 1997; Gencan, 2001; Güven, 2001; Banguoğlu, 2004; Göksel & Kerslake, 2005; cited in Sargın & Oktar, 2010).

Considering Table 5 below showing the functions of evidential markers in Turkish developed in the comprehensive work of Sargın and Oktar (2010) on scientific articles in the field of social sciences and the limits imposed by the dialogs constructed for this experiment, two main evidentiality markers were identified to investigate further: –DI, and –mIş, focusing mainly on the eyewitness *vs.* non-eyewitness distinction and using their simple forms (Demirci, Muhlbauer & Cook, 2010). Here, –DI indicates that the speaker has direct (perceptual) evidence for a proposition and assumes responsibility for the information s/he expresses, which is expected to increase reliability, whereas –mIş indicates that s/he has only indirect or hearsay evidence (excluding the reasoning or inference aspect of –mIş) and attributes responsibility to someone else, which is expected to decrease reliability (Aksu-Koç, 1988, p.16).

Table 5. Turkish evidentiality markers and their functions (adapted from Sargın & Oktar, 2010)

	Evidentiality Marker	Function	Example
Morphological markers (on the verb)	*-mIş*	- induction	Şiddetli rüzgardan dolayı cam kırıl**mış**. / The window **was apparently broken** due to the strong wind.
		- hearsay	Duyduğum kadarıyla sınav zor**muş**. / I heard that the exam **was** difficult.
	-DIr	- induction	Öyle gözükmektedir ki, hazırlıkların tamamlandığı dönem 1889-1890 yılları**dır**. / It seems that the time when the preparations were completed **are** the years 1889-1890.
	-AcAk	- induction - deduction	Her iki sektörde de yeni yatırımlar faydalı ol**acak**tır. / In both sectors, new investments **will** be beneficial.
	-mAlI	- induction	Bu kurumun faaliyetleri, gelecek kuşakların refahı için önemli katkılar

			olarak algılan**malı**dır. / The activities of this institution **should be** perceived as important contributions to the well-being of future generations.
	-DI	- perceptual evidence	Duvarlar ek inşaat malzemesiyle sağlamlaştırıl**dı**. / The walls **were strengthened** using additional construction material.
	-Iyor	- perceptual evidence	Akranlarımla aynı sorunları yaşı**yorum**. / I **am experiencing** the same problems with my peers.
	(y)-AbIl	- deduction	Özel sektör çalışanlarının, liderlikle ilgili puanlarının yüksek olması, bu fenomenin bir yansıması ol**abil**ir. / That people who work in the private sector have higher scores in leadership skills **might be** a reflection of this phenomenon.
	-A/Ir	- deduction	Özel sektör çalışanlarının, liderlikle ilgili puanlarının yüksek olması, bu fenomenin bir yansıması olabil**ir**. / That people who work in the private sector have higher scores in leadership skills **might be** a reflection of this phenomenon.
Adverbials	*galiba, herhalde* [presumably]	- induction	Sağlık durumunun ciddiyeti nedeniyle, mahkum **muhtemelen** hastaneye kaldırılmıştır. / Because of his serious health condition, the prisoner **might have been taken** to the hospital.
	bence, kanımca, fikrime göre [in my opinion]	- belief	**Bence** bu sorun hemen çözülmelidir. / **In my opinion**, this problem should immediately be solved.
Verbs	*gör-*[see], *duy-*[hear], *gözlemle-*[observe] (used with the suffix *–Iyor* and first-person suffix)	- perceptual evidence	Şaman inançlarından etkilenen bir takım anlatımlar gözl**üyoruz.** / **We are observing** some accounts which were influenced from Shaman beliefs.
	söyle-, belirt- [say, state] (with quotations)	- hearsay	Sağlık Bakanlığı'ndan bir yetkili hastaların randevularını internet üzerinden alabileceğini **söyle**di. / An official from the Ministry of Health **said** that patients can arrange their appointments online.
	varsay-, öngör-, kabul et- [suppose] (with assumptions)	- deduction	Herkesin eşit derecede katkıda bulunacağını **varsayalım**. / Let's **suppose** everybody will contribute equally.
	düşün-, inan- [think, believe] (with belief expressions)	- belief	Bu yöntemin çok etkili olacağını **düşün**üyorum. / I **think** that this method will be very effective.

References		- hearsay	Bu bulgular **Weiner'ın (1993; 1995)** sorumluluk yüklemenin önemi konusundaki tezini de desteklemektedir. / These findings support **Weiner's (1993; 1995)** thesis about the importance of giving responsibilities.

According to the main morphological distinction between direct *vs.* indirect evidence, three versions of the dialogs were constructed. The modifications on the dialogs in the experiment were as follows: –DI suffixation-*faydalıydı* [beneficial+DI]; -mIş suffixation-*faydalıymış* [beneficial+mIş]; neutral case (no marker)-*faydalı* [beneficial] on the verbs of the main argument sentences in the dialogs. Different from the original dialogs in the previous experiment, long sentences were split into two or three to include more instantiations of evidentiality markers in each dialog to make them more salient.

There were no lexical items or adverbs (e.g. güya [allegedly]) as signs of evidentiality because in this study, true evidentials, i.e., just the morpho-syntactic markers that form a grammatical system were under investigation, following Boas' distinction between evidentiality as a closed grammatical system and a lexical means of expressing meanings somehow related to 'source of knowledge,'" (1938; cited in Aikhenvald, 2004) "which can be realized through bound morphemes, clitics, and words which belong to full grammatical word classes, such as prepositions, preverbs, or particles" (Aikhenvald, 2004, p.11). Such adverbs or lexical items were excluded on account of not constituting a grammatical system or not being obligatory in use (Aikhenvald, 2004) although one still needs to keep in mind the inevitable interaction between grammar and lexicon.

CHAPTER 3

EXPERIMENTS

The Bayesian reasoning framework puts forth a normative theory trying to capture what people should do in the given argumentative context. For the purpose of applying this framework to informal argument fallacies in Turkish, to the specific example of arguments from ignorance – the negative evidence cases - three experiments were conducted. The first experiment replicated Hahn et al.'s (2005) study in Turkish in order to investigate whether the main claim of the Bayesian framework that argument strength is determined by the interactions between three major factors (prior belief, polarity, evidence reliability) and a complementary consideration of topic effects yield similar results in a different linguistic and cultural community. This questionnaire in its original English version can be found in Appendix D. In the second experiment, to explore whether intelligence interacts with the reasoning or argumentation process, the hypothesis was that argument acceptance would not vary across different intelligence levels. Finally, in the third experiment, the hypothesis was that in terms of evidentiality, a grammaticalized category in Turkish indicating whether the speaker has direct (perceptual) evidence for a proposition or only indirect or hearsay evidence, argument acceptance would vary depending on the presence of and the kind of evidentiality markers. After the explanation of the methodology of the experiments, the results are presented and briefly discussed. A more general discussion of the results can be found in Chapter 4.

For all the experiments conducted for the purposes of this study, the necessary permission was received from the Ethics Committee of the Middle East Technical University (see Appendix C for the consent form showing this approval).

3.1   Experiment 1 – The replication of Hahn et al.'s (2005) study on argumentation in   Turkish: Arguments from ignorance

The goal of the first experiment was to replicate Hahn et al.'s (2005) study in Turkish. Within the Bayesian framework, argument strength is determined by the interactions between three major factors including prior belief (strong *vs*. weak), polarity (positive *vs*. negative) and evidence/source reliability (strong *vs*. weak) across varying topics. These factors, in their alternating forms, were incorporated into a set of argumentative dialogs. Similar to Hahn et al. (2005), following Toulmin's (1992, cited in Hahn et al., 2005) view that the acceptability of an argument in one domain might be higher or lower than that in another domain, these argumentative dialogs were about four different topics to be able to account for the content effects that may show up in the results.

An application of the Bayes' theorem on the data gathered with a consideration of these factors takes prior beliefs into account and provides an update rule for the degree of belief associated with the conclusion in light of the evidence in the argumentative dialogs presented to the participants; that is, it calculates posterior beliefs as well (Hahn et al., 2005). Since these are common factors in argumentation processes, they are expected to yield similar results in any linguistic and cultural community.

3.1.1   Method

Hypotheses.
H1. In terms of prior beliefs, arguments with a stronger prior belief are more convincing than arguments with a weaker prior belief.
H2. In terms of argument polarity, positive arguments are more convincing than negative arguments.
H3. In terms of source reliability, arguments with higher source reliability are more convincing than those with less reliable sources of evidence.

H4. In terms of topic, argument acceptance is expected to vary across different topics.

Participants. 55 university students aged 18-21 participated in the experiment. 13 of the 55 questionnaires were removed from the analysis due to missing values. 25 of the students were from the English Preparatory School of Çankaya University, while the remaining 17 were from the English Preparatory School of Middle East Technical University. There were 23 males and 19 females.

Materials. To obtain participants' normative judgments, Hahn et al.'s experiment presented them with arguments to evaluate from the standpoint of one of the interlocutors in a short argumentative dialog (2005), as used in previous argumentation research (Bailenson & Rips, 1996; Rips, 1998, 2001, cited in Hahn & Oaksford, 2007). Below is one sample dialog from the original Hahn et al. (2005) study:

Margaret:	Do you think clone technology is a threat for human beings?
Anton:	I sort of believe that clone technology is not a threat for human beings.
Margaret:	You can do more than sort of believe it; you can be certain that it is not a threat.
Anton:	Why do you say that?
Margaret:	Because according to a Professor at British Medical Research Council, there have never been any reported harms of the technique on human beings and thus it doesn't present any threats.

(see Appendix D for the whole set of dialogs)

Following each dialog of the sort above, participants were presented with the below rating scale which is preceded by an instruction telling them to rate the argument in the dialog in terms of how convincing it is from the perspective of one of the interlocutors (Anton, in this example):

*Considering his initial view, how convinced do you think Anton should <u>now</u> be that clone technology is not a threat for human beings? Please indicate your response by putting a tick (√) in the corresponding box in the **<u>0 (not convinced at all) to 10 (totally convinced)</u>** scale below.*

0	1	2	3	4	5	6	7	8	9	10

This kind of third-person judgments is also employed in similar studies on evidence with a focus on normative issues (Tversky and Kahneman, 1980; cited in Hahn & Oaksford, 2007)[4]. Further, these dialogs were on topical issues which included public transport, clone technology, language learning, and international environmental laws and were determined based on a preliminary study prior to the construction of the dialogs in order to generate the best possible topics. For our materials as well, the same procedure was employed to choose the dialog topics specifically for the Turkish population.
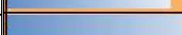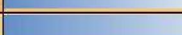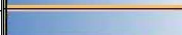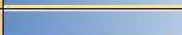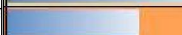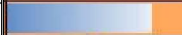
A preliminary study to choose the new topics was conducted with 33 Çankaya University Preparatory School students aged 18-20 for this purpose (see Appendix E for the questionnaire for topic selection). The questions about each of the 20 topics included: (a) How much do you know about the topic? (b) To what extent is the topic beneficial or not? (c) To what extent are you interested in the topic? (e) To what extent is the topic important according to you? For each question, the participants were asked to respond on an 11-point Likert scale, from *not at all true/valid* (0) to *completely true/valid* (10). Of the 20 topics, the results showed that students found themselves most knowledgeable about topics 7, 12, 14, and 17; they found topics 5, 6, 9, 13, 14, and 20 beneficial; they found topics 7, 12, and 14 interesting; and finally, they found topics 1, 3, 7, 9, 12, 13, 14, 16, 17, and 20 important.

The results are summarized in Table 6 below.

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[4] Indeed, we have also tested the participants' first-person judgments by presenting the main argument sentences in the dialogs to them four days before they took the actual questionnaire to obtain information about their own prior beliefs. The results of this test are presented and discussed in 3.1.3 Bayesian Model Fitting, under the Prior Beliefs section.

Table 6. The ratings of the 20 topics based on an 11-point Likert scale (0-10) by 33 students

	Know	Benefit
land-grabbing	198	23
privatization_transport	184	117
nuclear_energy	192	108
cloning	203	141
alternative_medicine	212	256
copyright	234	256
english_medium	285	205
globalization	153	185
child_adoption	162	236
animal_testing	202	209
use_of_robots	183	156
kids_computer_games	291	126
organ_donation	220	293
protection_of_nature	255	320
distance_education	139	101
capital_punishment	222	160
urban_life	251	191
rules_bans_democracy	179	87
homosexual_preferences	136	156
climate_change	183	251

	Interest	Importance
land-grabbing	194	291
privatization_transport	157	222
nuclear_energy	168	272
cloning	175	238
alternative_medicine	177	232
copyright	205	242
english_medium	250	278
globalization	154	226
child_adoption	138	243
animal_testing	154	225
use_of_robots	175	227
kids_computer_games	242	261
organ_donation	204	297
protection_of_nature	239	318
distance_education	138	173
capital_punishment	167	269
urban_life	195	237
rules_bans_democracy	152	223
homosexual_preferences	81	159
climate_change	170	254

Based on the best fitting criterion of the preliminary study – benefit level (showing the highest variance across topics), topics falling under the medium range (mid-level benefit) were selected to make sure that participants' responses could become inclined equally well to either side through the manipulations of the dialogs in the subsequent studies. So we devised four dialogs on topical issues: one on the dangers of cloning, one on the dangers of globalization, one on the efficacy of capital punishment, and a final one on the respective efficacy of using robots instead of hiring people in workplaces. In constructing the Turkish dialogs, Turkish translation equivalents of the dialogs used in Hahn et al.'s (2005) study were employed, with a topic manipulation. For example:

> *Sırma*: Sence iş yerlerinde insanların yerine robotların çalıştırılması toplumlar için faydalı mıdır?
> *Can*: Öyle olmadığından epey eminim.
> *Sırma*: Aslında öyle olmadığı konusunda kesin emin olmalısın.
> *Can*: Niye öyle düşünüyorsun?
> *Sırma*: Öyle düşünüyorum çünkü bağımsız bir araştırma merkezinden temsilcilerle yapılan bir gazete röportajına göre, hizmet kalitesindeki düşüş ve genel maliyetteki artış dikkate alınırsa robotların çalıştırılması faydalı değildir.

> (English version)

> *Sırma*: Do you think using robots in workplaces rather than hiring people is beneficial for the society?
> *Can*: I am fairly convinced that using robots is not beneficial.
> *Sırma*: You can be more than fairly convinced; you can be certain that it is not.
> *Can*: Why do you say that?
> *Sırma*: Because according to a newspaper interview with a group of researchers from a non-governmental research center, using robots in workplaces is not beneficial because of the decrease in service quality and overall costs.

At the expense of increasing the number of the dialogs, we decided to include four topics to be able to account for the content effects that may show up in the results. Similar to Hahn et al. (2005), we followed Toulmin's (1992, cited in Hahn et al., 2005) view that the acceptability of an argument in one domain might be higher or lower than that in another domain. That is, two arguments with similar forms but different contents might receive varying ratings of acceptance. For example, an argument such as "Drug A is not toxic because no toxic effect was observed" and an argument such as "Ghosts do not exist because no one has seen any" would not get similar treatments.

To allow comparisons between negative and positive evidence, each dialog existed in a positive and a negative version (polarity). For example, using robots was argued to be beneficial in one variant and not beneficial in the other. For the prior belief manipulation, the addressee of the argument (here *Can*) was either "fairly convinced" (high prior belief) or "sort of believed" (low prior belief) the proposition in question. Finally, there were variants with high and low reliability evidence. For these, we manipulated the source reliability of the evidence. In the above example, a non-governmental research body (high reliability) was contrasted with a TV street interview of a passing couple (low reliability).

Each dialog was followed by a ratings scale (see Appendix F for the complete version of the Turkish questionnaire):

> "Başlangıçtaki düşüncesini dikkate aldığınızda, Can'ın, Sırma'nın kendisine sunduğu açıklamalar sonrasında iş yerlerinde insanların yerine robotların çalıştırılmasının toplumlar için faydalı olmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz."

> (English version)
> "How convinced do you think Can should *now* be that it is not beneficial to use robots in workplaces? Please indicate your response by putting a tick (√) in the corresponding box in the 0 (not convinced at all) to 10 (totally convinced) scale below."

Hiç İkna Olmadı/Not convinced at all   Tamamen İkna Oldu/Totally convinced

0	1	2	3	4	5	6	7	8	9	10

Procedure. Each participant received all variants of each topic to rate, that is, each rated all of the 32 dialogs. The dialogs were presented to participants in booklets, with 3 different random orders. The booklet took about 20 minutes to complete and participants were tested during their classes (without talking to each other) in the presence of their instructors and the experimenter. Before the experiment, participants signed an informed consent form (see Appendix A for this consent form), and following the experiment, they read the debriefing form (see Appendix B for this debriefing form).

Experimental Design. There were four independent variables presented through the 32 constructed dialogs: prior belief, polarity, reliability and topic. Prior belief had two levels: strong *vs.* weak prior belief; polarity had two levels: positive *vs.* negative; reliability had two levels: high *vs.* low; and there were four different topics: the dangers of cloning, the dangers of globalization, the respective efficacy of using robots instead of hiring people in workplaces, and the efficacy of death penalty. The dependent variable was the participant's acceptance ratings for each dialog. They rated the 32 dialogs on a scale of 0 (not convinced at all) to 10 (totally convinced) from one of the interlocutor's point of view. So each rating (i.e. the posterior belief) reflected the combined effects of the prior belief, polarity, reliability, and topic manipulations. This was a 2x2x2x4 repeated measures design.

3.1.2 Results

In a 4 (Topic) × 2 (Polarity) × 2 (Reliability) × 2 (Prior Belief) within subjects analysis of variance based on acceptance ratings, we found significant main effects of three of the manipulated factors in Oaksford and Hahn (2004) and Hahn et al. (2005) and some complementary interactions.

First, arguments with a higher degree of prior belief (*m(Mean)* = 4.36, SE (Standard Error) = .27) were rated higher than arguments with a lower degree of prior belief (*m* = 3.99, SE = .21), $F(1,38) = 4.55$, *p* = .039, η_p^2 (Partial eta squared[5].)=.107. Second, the arguments with a higher reliability source (*m* = 6.21, SE = .26) were rated higher than those with a less reliable source of evidence (*m* = 2.14, SE = .33), $F(1,38) =$ 108.47, *p* = .000, η_p^2 =.741. However, unlike Hahn et al.'s study (2005), there was no main effect of polarity; positive arguments (*m* = 4.17, SE = .21) and negative arguments (*m* = 4.18, SE = .25) were almost equally convincing. Like in Oaksford

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[5] Partial eta squared (η_p^2) is derived from the eta squared (η^2). η^2 is the effect size measure in ANOVA showing how much of the total variation can be explained by the effect of the experimental manipulation. It is calculated by dividing the effect of the experimental manipulation (the model sum of squares: SS_{Effect}) by the total amount of variance in the data (total sum of squares: SS_{Total}); that is, $\eta^2 = SS_{Effect} / SS_{Total}$. However, when we have more than one experimental manipulation, we can use partial eta squared (η_p^2) to look at the proportion of variance that one experimental manipulation explains that is not explained by the other experimental manipulations in the analysis; that is, $\eta_p^2 = SS_{Effect} / SS_{Effect} + SS_{Residual}$. (Field & Miles, 2010, p.353)

and Hahn (2004) and Hahn et al. (2005), this experiment also showed differences between topics that are consistent with a Bayesian account of content effects and with Toulmin's (1992, cited in Hahn et al., 2005) position that the criteria for argument acceptance varies with subject matter ($F(1,38) = 10.68$, $p = .002$, $\eta_p^2 = .220$). The topic of globalization received the highest mean acceptance rating ($m = 4.69$, SE = .26); the topic of cloning ranked the second highest ($m = 4.38$, SE = .27) and the topic of death penalty followed it ($m = 3.95$, SE = .23), while the topic of using robots in workplaces received the lowest mean acceptance rating ($m = 3.68$, SE = .28).

There were also some interactions. There was a prior belief by polarity interaction ($F(1,38) = 7.3$, $p = .010$, $\eta_p^2 = .161$) as Figure 6 below shows.
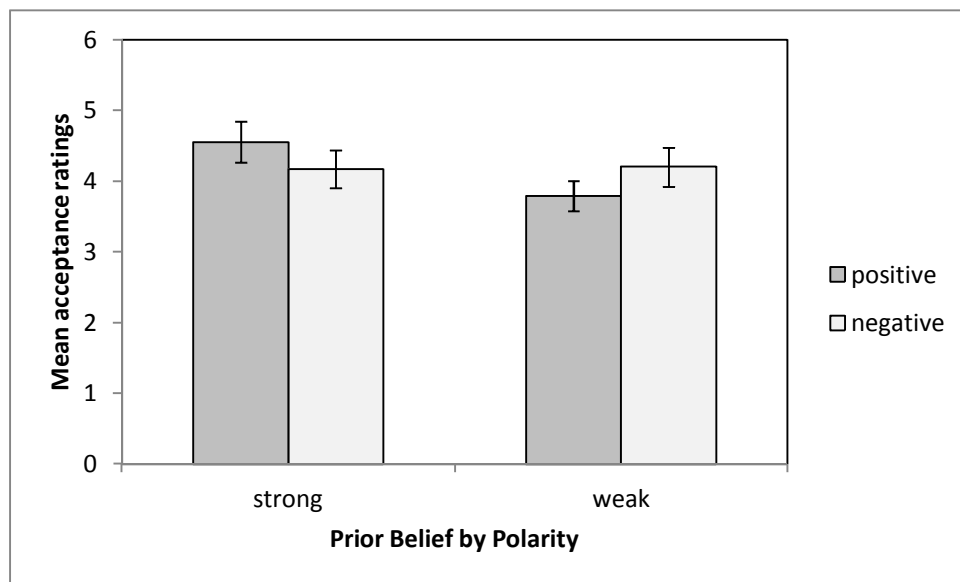
Figure 6. The prior belief by polarity interaction (Error bars in this and all the following figures indicate Standard Errors)

The participants rated positive polarity arguments higher when the interlocutor's prior belief was stronger ($m = 4.55$, SE = .29) as opposed to when it was weaker ($m = 3.79$, SE = .21); however, with negative polarity arguments, the interlocutor's prior belief, whether strong ($m = 4.17$, SE = .26) or weak ($m = 4.20$, SE = .27), did not matter.

We also found a two-way interaction between topic and reliability ($F(1,38) = 7.71$, $p = .005$, $\eta_p^2 = .169$), as shown in Figure 7 below.
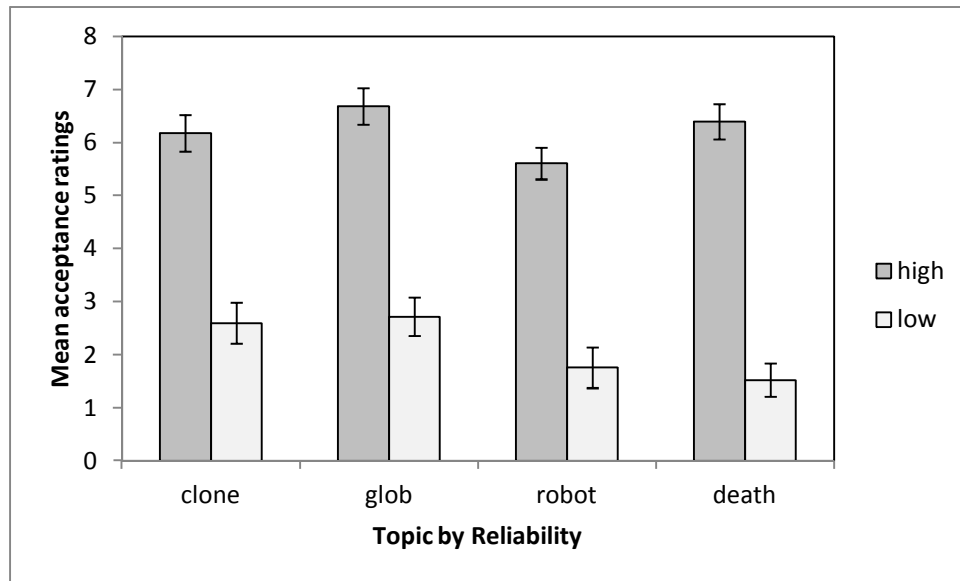
Figure 7. The topic by reliability interaction

Across all topics, acceptance ratings were higher with high reliability sources as opposed to low reliability sources, showing a main effect of reliability. However, within the topics themselves, mean acceptance ratings varied, as revealed by post-hoc tests: topic 1 cloning (high reliability condition: $m = 6.17$, SE = .34; low reliability condition: $m = 2.59$, SE = .38) differs significantly from topic 3 using robots (high reliability condition: $m = 5.6$, SE = .30; low reliability condition: $m = 1.75$, SE = .38); and topic 2 globalization (high reliability condition: $m = 6.68$, SE = .34; low reliability condition: $m = 2.71$, SE = .36) differs significantly from topics 3 using robots and 4 death penalty (high reliability condition: $m = 6.39$, SE = .33; low reliability condition: $m = 1.52$, SE = .31).

3.1.3 Bayesian Model Fitting

With the help of the Bayesian approach, one can accommodate relatively reasonable informal arguments within a larger encompassing normative theory of argumentation referring to its content with respect to its plausibility. In order to test whether the Bayesian analysis can be a useful tool in devising models that can predict human

behavior in the kind of argumentation required in the current experiment, based on subjects' actual ratings (*posterior beliefs*), the best fitting values for the parameters including *prior belief, sensitivity,* and *specificity* were calculated and later the fit between the predictions of the Bayes theorem and the real data was assessed. Consequently, the effects of prior belief, polarity, and reliability (evidence/source) as well as topic manipulations were examined.

Model fitting was done by finding the best values for the parameters of *n, l, h* (*n, sensitivity* ($P(e|T)$); *l, specificity* ($P(\neg e|\neg T)$); and *h,* the *prior belief* that *T* is true ($P(T)$)) that minimized the discrepancy between the predictions of the model and the data to get the highest R^2 value (see Figure 4-reproduced here for convenience), which would consequently show the fit of the model to the data. The formula in Figure 4 shows how R^2 value was calculated and this calculation was done for each of the 32 dialogs in the questionnaire.

$$R^2 = 1 - \left(\frac{\sum_i^n (data_i - predicted_i)^2}{\sum_i^n (data_i - mean)^2} \right)$$

Figure 4-reproduced here for convenience. The coefficient of variation

The variables present in the R^2 formula above represent the following:

Data: Each participant's individual rating for one dialog (Notation *i* stands for the first participant and *n* stands for the last participant, because there were 42 participants in the study, *i*=1; *n*=42 and the calculation "(data − predicted)^2" was done for each participant's individual rating of a dialog.)

Mean: The mean value of all 42 participants' individual ratings for one dialog

Predicted: The posterior degree of belief calculated for each participant's rating for one dialog using *Equation 3* for positive arguments and *Equation 4* for negative arguments (the equations were reproduced below for convenience). To get the smallest result possible from each "(data − predicted)" for each dialog, the *n, l, h* values in *Equation 3* and *Equation 4* were assigned for each participant using the SOLVER function of the spreadsheet program Microsoft Excel (see Appendix J for a

sample Solver screen). In this way, the discrepancy between the predictions of the model and the data was minimized to get the highest R^2 value.

Equation 3:

$$P(T \mid e) = \frac{n \times h}{n \times h + (1 - l) \times (1 - h)}$$

Equation 4:

$$P(\neg T \mid \neg e) = \frac{l \times (1 - h)}{l \times (1 - h) + (1 - n) \times h}$$

(Hahn & Oaksford, 2007, p.709)

In these parameter estimations, *sensitivity (n)* and *specificity (l)* were allowed to vary between 0 and 1, with the additional constraint that hit rate/*sensitivity* will be greater than the false positive rate, i.e. $n > 1-l$, in the high-reliability condition as opposed to the low-reliability condition as it is more likely for arguments with more reliable evidence (e.g. from a professor) to return positive test results as opposed to the ones with less reliable evidence (e.g. from a couple in the street). The values of the priors ($P(T)$ or h), between 0-1, were also constrained such that the prior for the argument with weak prior belief manipulation was smaller than or equal to .4 and correspondingly the prior for the argument with strong prior belief manipulation was larger than or equal to .45, as it is likely that the argument about which people already have a strong prior belief is expected to result in a higher degree of belief change.

Accordingly, for each dialog, an R^2 value was calculated from 1 minus the sum of squares of "(data − predicted)" for all participants divided by the sum of squares of "(data − mean)" for all participants. The modeling on the results for four scenarios was done separately using different parameter values, considering the number of 32 data points; that is the number of dialogs. Then, these R^2 values were averaged topic-wise (cloning, globalization, death penalty, using robots) and later an overall R^2

value was calculated across all dialogs collapsing topic information (see Table 7 below).

To actually run the analysis and produce the model using SOLVER, the steps below were followed:

(1) The whole datasheet (acceptance ratings for 32 dialogs) was divided into four (4x8) based on topic: cloning, globalization, death penalty, and using robots

(2) To calculate the best fitting n,l,h values for each subject in each topic group, each set of eight dialogs were further grouped into four pairs: strong prior-high reliability; strong prior-low reliability; weak prior-high reliability; weak prior-low reliability. Here the consideration was that while running the analysis we would add some constraints which were: $n > 1-l$ in high reliability cases as opposed to low reliability cases, and the *prior belief* would be set to .4 or smaller for weak prior belief cases while it would be set to .45 or larger for strong prior belief cases

(3) In each sheet, columns for *n ,l, h, predicted, data-predicted, data-mean, numerator (of the R^2 formula), denominator (of the R^2 formula), and R^2* calculations were added, the corresponding formulae were entered, and as the Solver requires one to enter some random but sound values initially for the parameters that one wants to be changed during the estimation, *n* was set to .7, *l* was set to .3 and *h* was set to .5 initially

(4) After clicking on the Solver option in the Data menu on the toolbar in Microsoft Excel, in the Solver Parameters screen we set the target cell to the one which calculated "(data-predicted)" and we wanted Solver to return the minimum value for it. Also, we set the changing cells to the ones where the *n, l, h* values were; and defined the constraints accordingly in some solutions depending on the constraints summarized in Step 2 above (see Appendix J for this Solver screen). Here we wanted to get the smallest value for "(data-predicted)" in the R^2 formula

(5) Accordingly, Solver was run to calculate each subject's best fitting values for *n, l, h* for each pair of dialogs in each topic group

(6) Then using the *n, l, h* values gathered this way, R^2 values for each data point/each dialog in each topic group were calculated

(7) Afterwards, average R^2 values for each topic group were calculated, and then an overall R^2 value was calculated for the whole study

(8) To obtain the overall *n (sensitivity), l (specificity),* and *h (prior belief)*, the mean values of these parameters across the pairs of dialogs were calculated

Consequently, the overall fit was very good, with an R^2 value of 0.88, and the separate R^2 values for each topic are cloning, 0.89; globalization, 0.88; death penalty, 0.86; using robots, 0.86, respectively, as summarized in Table 7.

Table 7. The summary table for the results of Bayesian parameter estimation across topics

	Parameter Estimations across Topics						
	Prior Belief		Sensitivity		Specificity		
Topic	Strong	Weak	High Rel.	Low Rel.	High Rel.	Low Rel.	R^2
Clone	.57	.46	.76	.36	.55	.16	.89
Glob	.53	.46	.79	.41	.58	.16	.88
Death	.57	.40	.78	.26	.58	.07	.86
Robot	.47	.45	.71	.28	.52	.11	.86
						Overall	.88

As Table 7 above shows, for cloning, the prior, (P(T)) or alternatively *h*, in the strongly believed condition was .57, while the prior, (P(T)) or alternatively *h*, in the weakly believed condition was .46. Sensitivity, ($P(e|T)$) or alternatively *n*, and specificity ($P(\neg e|\neg T)$) or alternatively *l*, were higher in the high-reliability condition than in the low-reliability condition; high: ($P(e|T)$)= .76 and ($P(\neg e|\neg T)$)= .55; low: ($P(e|T)$)= .36 and ($P(\neg e|\neg T)$)= .16.

For globalization, the prior, (P(T)) or alternatively *h*, in the strongly believed condition was .53, while the prior, (P(T)) or alternatively *h*, in the weakly believed condition was .46. Sensitivity, ($P(e|T)$) or alternatively *n*, and specificity ($P(\neg e|\neg T)$) or alternatively *l*, were higher in the high-reliability condition than in the low-reliability condition; high: ($P(e|T)$)= .79 and ($P(\neg e|\neg T)$)= .58; low: ($P(e|T)$)= .41 and ($P(\neg e|\neg T)$)= .16.

For death penalty, the prior, (P(T)) or alternatively h, in the strongly believed condition was .57, while the prior, (P(T)) or alternatively h, in the weakly believed condition was .40. Sensitivity, $(P(e|T))$ or alternatively n, and specificity $(P(\neg e|\neg T))$ or alternatively l, were higher in the high-reliability condition than in the low-reliability condition; high: $(P(e|T))= .78$ and $(P(\neg e|\neg T))= .58$; low: $(P(e|T))= .26$ and $(P(\neg e|\neg T))= .07$.

For using robots, the prior, (P(T)) or alternatively h, in the strongly believed condition was .47, while the prior, (P(T)) or alternatively h, in the weakly believed condition was .45. Sensitivity, $(P(e|T))$ or alternatively n, and specificity $(P(\neg e|\neg T))$ or alternatively l, were higher in the high-reliability condition than in the low-reliability condition; high: $(P(e|T))= .71$ and $(P(\neg e|\neg T))= .52$; low: $(P(e|T))= .28$ and $(P(\neg e|\neg T))= .11$.

Consequently, these results replicated those of Oaksford and Hahn (2004) for a pure reliability manipulation and a more realistic manipulation of the priors, and those of Hahn et al. (2005) for a new language manipulation (Turkish) and a topic manipulation (cloning, globalization, death penalty, and using robots in workplaces, this time).

Prior Beliefs.

The practical issue of finding out what the priors were in the experiments was dealt with in two ways; a more empirical one, as in asking participants for ratings of the prior degree of belief before presenting an argument; or alternatively a more theoretical one, as in treating the likelihoods and priors as free parameters and estimating the values that give the best fit to the posteriors (i.e., the argument strength ratings). In the study, in order to collect data about the prior beliefs, we used both methods, empirical and theoretical.

In order to get participants' prior beliefs before they read the arguments in the dialogs, four days before the administration of the actual questionnaire with dialogs, the same participants were asked to read a list of sentences (the main argument

sentences from the dialogs; e.g. "Cloning is beneficial for humanity".) and respond on an 11-point Likert scale again, from *not agree at all (0)* to *completely agree (10)* reflecting their own priors. The order of the sentences were randomized in different booklets (with 5 different random orders), controlling for the requirement that no two sentences of the same topic would follow each other (see Appendix G for the complete questionnaire for prior beliefs).

A four-day interval between the test of prior beliefs and the real argumentation dialogs was necessary to avoid some possible problems: (1) If participants have different prior beliefs from the ones in the dialogs, their own prior beliefs may overshadow the interlocutor's priors; (2) When participants are asked to score these statements for themselves, their consciousness is activated, they consciously think about the issues and they might make further links and think about examples in their environment or concentrate on their own observations.

Upon a couple of correlation analyses shown in Table 8 below to see whether there is any relation between participants' own priors and their ratings of the interlocutors' acceptance level, no significant correlation was found in the topics of cloning, death penalty, and using robots in workplaces. Only in the topic of globalization, specifically in the positive globalization statement, there was a significant positive correlation ($p < .05$). On the whole, the participants were able to rate the acceptance levels of the interlocutors irrespective of their own prior beliefs, excluding the topic of globalization.

Table 8. The results of the topic-wise correlation analyses of subject's argument acceptance ratings and their own prior beliefs

	Pearson Correlations (*r*)							
	Own Prior Beliefs							
	Clone		Glob		Death		Robots	
Dialog Acceptance Ratings	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg
Strong Prior (*m*)	-.01	.12	.34*	-.17	.11	-.14	.27	-.17
Weak Prior (*m*)	.11	.03	.23	-.15	.15	-.18	.16	-.04

*Correlation is significant at $p < .05$.

As to the theoretical dimension regarding the priors, it was dealt with in the previous section by treating the likelihoods and priors as free parameters and estimating the values that give the best fit to the posteriors.

3.1.4 Discussion

In summary, the present experiment replicated with different topics in Turkish, three main findings of Oaksford and Hahn's (2004) study and Hahn et al.'s (2005) study, suggesting that arguments with stronger prior beliefs and arguments with higher source reliability were considered more convincing as compared to arguments with lower prior beliefs and lower source reliability, and that argument acceptance varies across topics. Thus, three of the hypotheses in this experiment were accepted.

However, the third factor that positive arguments are rated higher did not appear as a main effect in this replication study although it came up in two-way interactions. Considering the very close mean acceptance ratings they received it could be either that polarity, as expressed in our constructed dialogs was not as salient as the other more readily observable features such as prior belief, e.g. öyle olduğundan epey eminim (I am fairly convinced) *vs.* öyle olduğunu pek sanmıyorum (I sort of not believe), or reliability or topic or that people, in daily argumentation situations do consider the negative evidence cases of arguments from ignorance equally plausible.

Taking all into account, people's rating of how acceptable an argument is, is mediated by the three main factors, prior belief, reliability, and topic (excluding polarity) posited by the Bayesian account. The model-fitting done on the data showed that the predictions of the model fit the data well ($R^2 = .88$). Furthermore, in line with the findings from the within-subjects repeated measures analysis, the model could predict that the prior belief in the strongly believed condition was higher than that in the weakly believed condition. Besides, the model could also return results that would be expected of a legitimate consistent test: that the two complementary aspects of a test's informativeness – the sensitivity (the probability that an effect would be observed if the hypothesis were true) and the specificity (the probability

that an effect would not be observed if the hypothesis were false) values were higher in high reliability condition as would be expected from a more reliable source and lower in low reliability condition.

3.2   Experiment 2 – Intelligence and argumentation

The relations between intelligence and performance on the kind of information processing and judgment tasks required in the series of experiments conducted in this study were investigated. It is important to test whether there is such a relation between them and, if there is one, of what kind that relation might be because intelligence has not been taken into consideration before in the kind of argumentation studies conducted in the current study; however, it might in fact be a confounding factor. Understanding arguments is quite closely associated with reasoning and detecting proper *vs.* faulty reasoning is an important aspect of intelligence.

Since there is no previous research on that relation (at least not to our knowledge), we test for the null hypothesis that there be no relation between them; that is, anyone – within a normal range of intelligence – can understand arguments and evaluate them properly and that people do it in a similar way, irrespective of their (admittedly) differing levels of intelligence. This might be important for the entire framework of argumentation in education: that argumentation is a basic ability of everyone, not just for highly intelligent people. Therefore, the results are also highly and broadly relevant for society at large. With these considerations, the Raven test was administered as an index of general intelligence to the same people who participated in the first experiment (the replication study).

3.2.1   Method
Hypotheses.
H5. Argument acceptance does not vary across different intelligence levels.

Participants. 37 of the 42 university students aged 18-21 who participated in the first experiment took the intelligence test. There were 19 males and 18 females.

Materials. To test intelligence, we used a shorter version of the Raven's Advanced Progressive Matrices, consisting of items 3, 10, 12, 15, 16, 18, 21, 22, 28, 30, 31, and 34, to reduce administration time. Both its internal consistency and its correlation with full-length scores were found to be satisfactory (Bors and Stokes, 1998).

The test consisted of a series of perceptual analytic reasoning problems, each in the form of a matrix. The problems included both horizontal and vertical transformations. There were two items for training, and then the subjects were tested on 12 items of the sort in Figure 5 below:
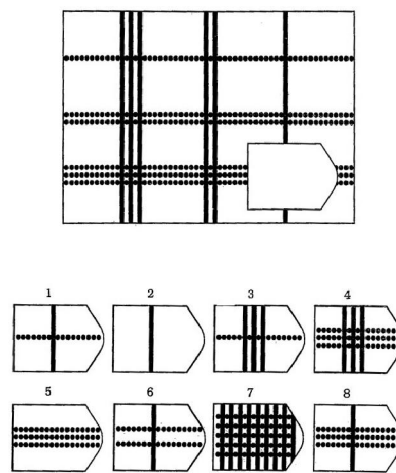
Figure 5 – reproduced here for convenience. A sample item from Raven's Advanced Progressive Matrices

In the item above, the participant is expected to consider the vertical and horizontal transformations and pick item 8 to complete the board above. The maximum score one can get from the test is 12.

Procedure. The booklet took about 20 minutes to complete and participants were tested during their classes (without talking to each other) in the presence of their instructors and the experimenter. Initially they were asked to solve the first two training items; after each got feedback from the experimenter on his/her performance, they continued with the remaining 12 test items with no interaction with the experimenter. The intelligence test was administered after the replication study.

3.2.2 Results

In a 4 (Topic) × 2 (Polarity) × 2 (Reliability) × 2 (Prior Belief) within subjects analysis of variance based on acceptance ratings using Raven scores of intelligence as a covariate, we did not find a significant main effect of intelligence (m = 7.84, SD = 2.38, Range=2-12) as indicated by the Raven test covariate in the study. However, it entered into some higher-level interactions.

With respect to the main effects found in the first experiment, similar to it, as depicted in Figure 8 below in this experiment with intelligence scores included, the arguments with a higher reliability source (m = 6.06, SE = .27) were rated higher than those with a less reliable source of evidence (m = 2.01, SE = .33), $F(1,35)$ = 5.23, p = .028, η_p^2 =.130.
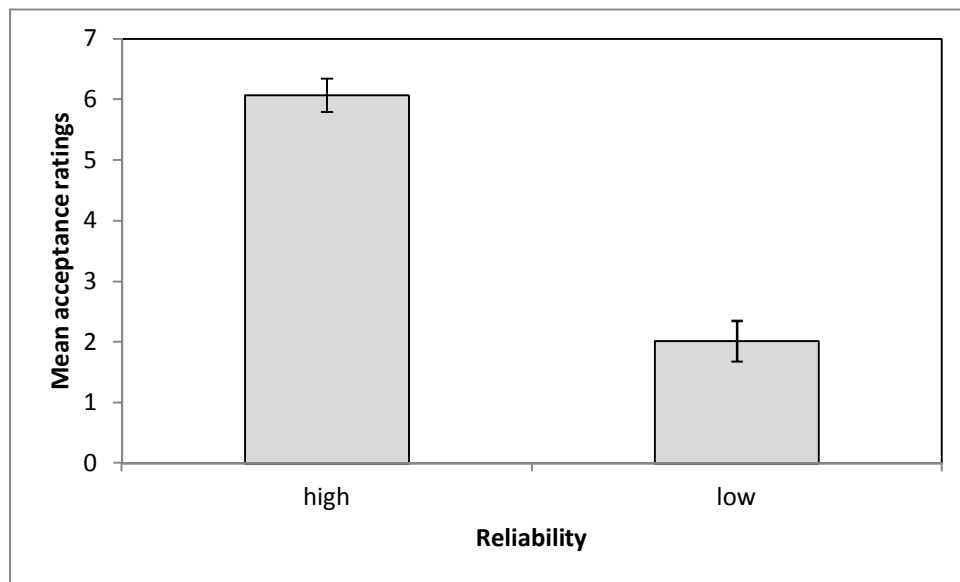
Figure 8. The reliability manipulations

Likewise, there was no main effect of polarity; the acceptance ratings of positive arguments (m = 4.05, SE = .20) and negative arguments (m = 4.02, SE = .26) did not differ significantly as they did in the first experiment. However, in this second experiment, different from the first experiment, we did not find a significant main

effect of prior belief (strong condition: m = 4.19, SE = .27; weak condition: m = 3.88, SE = .21) or topic.

We found a three-way interaction between polarity, topic and intelligence (F(3,105) = 3.58, p = .022, η_p^2 =.093); and also there was a topic by polarity interaction (F(3,105) = 4.88, p = .005, η_p^2 =.122), which did not exist in the first experiment. When we examine Figure 9 below and consider the within-subjects repeated contrasts, with respect to the topic*polarity and the topic*polarity*intelligence interactions, it was revealed that these significant interactions emerged as a result of the contrast between topic 1 (cloning) and topic 2 (globalization) (Raven*Polarity*Topic (Topics 1 $vs.$ 2): F(1,35) = 14.62, p = .001, η_p^2 =.295) where positive polarity arguments were rated higher in topic 1 (m = 4.38, SE = .26) as opposed to their negative counterparts (m = 3.91, SE = .29) while negative polarity arguments were rated higher in topic 2 (m = 4.73, SE = .31) as opposed to their positive counterparts (m = 4.58, SE = .25).
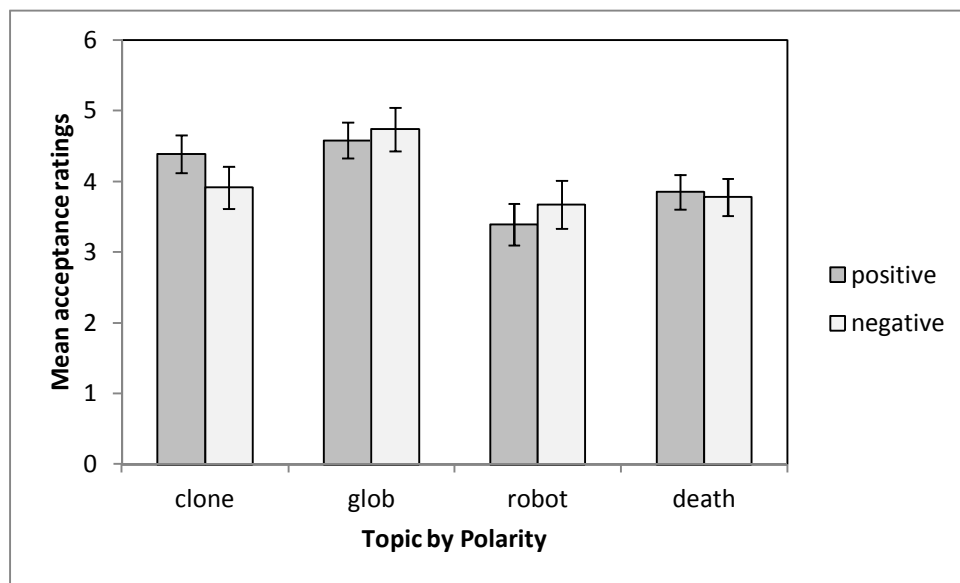
Figure 9. The topic by polarity interaction

Consequently, although topic did not emerge as a significant main effect in this experiment, its appearance in such interactions shows that differences between topics matter, which is consistent with a Bayesian account of content effects and with

Toulmin's (1992, cited in Hahn et al., 2005) position that the criteria for argument acceptance varies with subject matter. However, these differences might not originate from different topics but be mediated by intelligence. The present study allows us to explore this mediating effect in more detail.

In order to further investigate the effect of intelligence in this interaction rather than factoring out its contribution, we ran correlation analyses between intelligence as indicated by Raven scores and topic, intelligence and polarity, and intelligence, topic and polarity, respectively. The results of these correlation analyses are presented in Tables 9, 10, and 11 below.

Table 9. The results of correlation analyses between subjects' intelligence scores and their argument acceptance ratings for topic

Pearson Correlations (r)				
	Clone	Glob	Robot	Death
Raven scores of intelligence	.01	-.13	-.27	-.29

Table 10. The results of correlation analyses between subjects' intelligence scores and their argument acceptance ratings for polarity

Pearson Correlations (r)		
	Positive	Negative
Raven scores of intelligence	-.13	-.23

Table 11. The results of correlation analyses between subject's intelligence scores and their argument acceptance ratings for topic and polarity combined

Pearson Correlations (r)								
	Clone		Glob		Robot		Death	
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg
Raven scores of intelligence	-.11	.13	.01	-.24	-.17	-.32	-.14	-.35*

*Correlation is significant at p<.05.

As the Tables 9-10 reflect, although topic and polarity did not enter into any interactions with intelligence scores on their own, their combined effect had an interaction with the intelligence scores such that death penalty arguments in their negative polarity forms were rated relatively more highly by subjects who had lower

Raven scores of intelligence in the study than by subjects with higher Raven scores (at p=.030). This can also be captured in the relevant scatter plot in Figure 10 below:
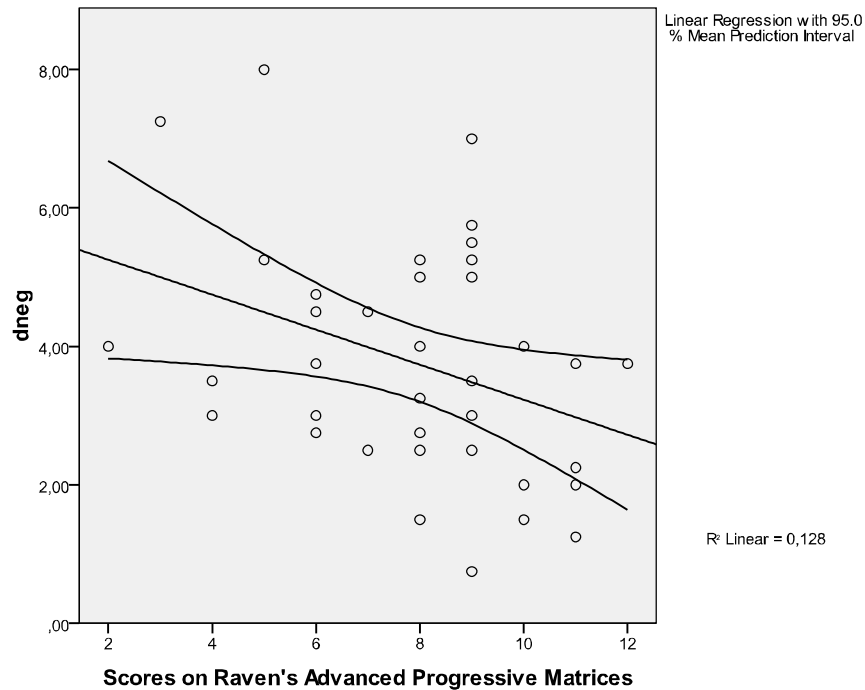
Figure 10. The scatter plot showing the significant negative correlation between intelligence scores and argument acceptance ratings for death penalty and negative polarity combined. (The middle line shows the regression line between the two factors and the curved lines around it show the mean prediction interval.)

We also found a three-way interaction between prior belief, polarity and intelligence ($F(1,35) = 12.42$, $p = .001$, $\eta_p^2 = .262$); and there was also a prior belief by polarity interaction ($F(1,35) = 17.87$, $p = .000$, $\eta_p^2 = .338$), which is stronger than the same interaction in the first experiment, as Figure 11 below shows. When the prior belief was strong, positive polarity arguments were rated higher ($m = 4.42$, SE = .28) than negative polarity arguments ($m = 3.97$, SE = .27); while in arguments with weak prior beliefs people rated negative polarity arguments higher ($m = 4.07$, SE = .28) than their positive counterparts ($m = 3.68$, SE = .21).
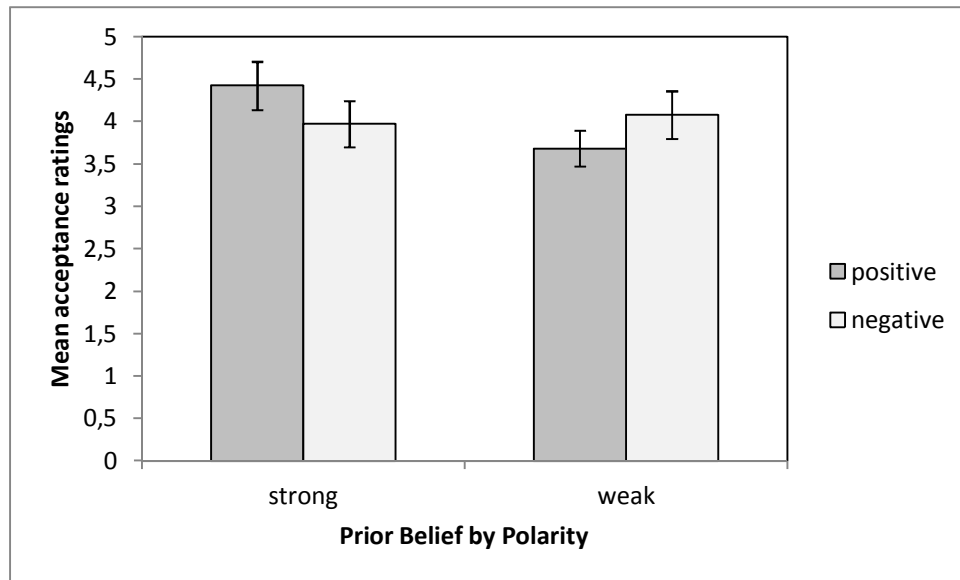
Figure 11. The prior belief by polarity interaction

In order to further investigate the effect of intelligence in this interaction rather than factoring out its contribution, we ran correlation analyses between intelligence as indicated by Raven scores and prior belief, and intelligence, prior belief and polarity respectively. The results of these correlation analyses are presented in Tables 12 and 13 below.

Table 12. The results of correlation analyses between subject's intelligence scores and their argument acceptance ratings for prior belief

Pearson Correlations (r)		
	Weak	Strong
Raven scores of intelligence	-.23	-.15

Table 13. The results of correlation analyses between subject's intelligence scores and their argument acceptance ratings for prior belief and polarity combined

Pearson Correlations (r)				
	StrongPositive	StrongNegative	WeakPositive	WeakNegative
Raven scores of intelligence	-.23	-.06	.04	-.36*

*Correlation is significant at p<.05.

As the Tables 12-13 reflect, although prior belief did not enter into any interactions with intelligence scores on its own, its combined effect with polarity had an

interaction with the intelligence scores such that arguments which have negative polarity and weak prior belief were rated relatively more highly by subjects who had lower Raven scores of intelligence in the study as compared to subjects with higher Raven scores (at p=.027). This can also be captured in the relevant scatter plot in Figure 12 below:
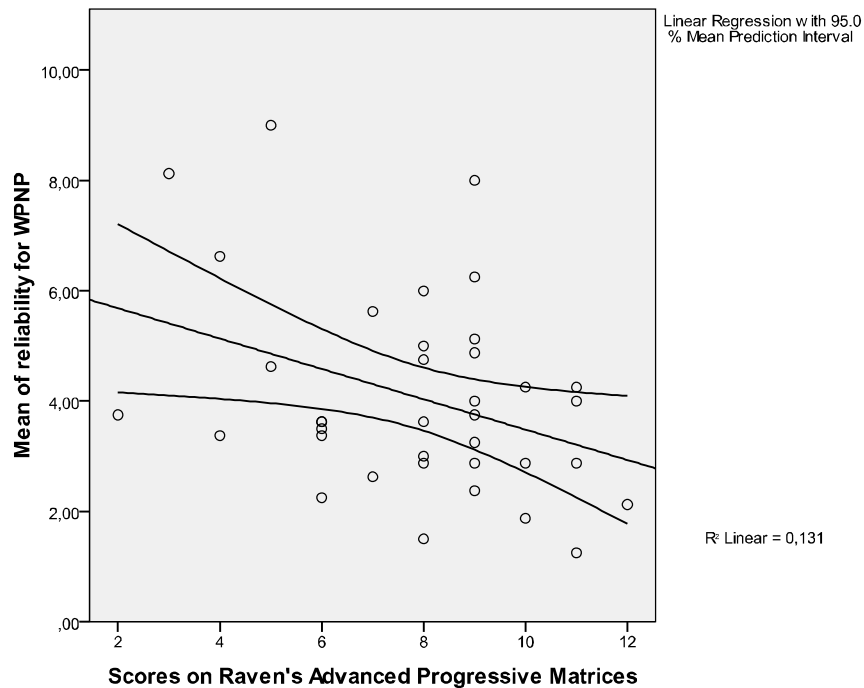
Figure 12. The scatter plot showing the significant interaction between intelligence scores and argument acceptance ratings for weak prior belief and negative polarity combined. (The middle line shows the regression line between the two factors and the curved lines around it show the mean prediction interval.)

There was also one four-way interaction between topic, polarity, reliability and intelligence ($F_{(3,105)}$ = 3.99, p = .018, η_p^2 =.102). This interaction came out significant as a consequence of the previously discussed significant two- and three-way interactions. It will not be discussed here any further, therefore.

There was a topic by reliability interaction ($F_{(3,105)}$ = 3.15, p = .036, η_p^2 =.083), which is not as strong as the same interaction in the first experiment though, as Figure 13 below shows. Across all topics, acceptance ratings were higher with high

reliability sources as opposed to low reliability sources though within the topics themselves, mean acceptance ratings varied.
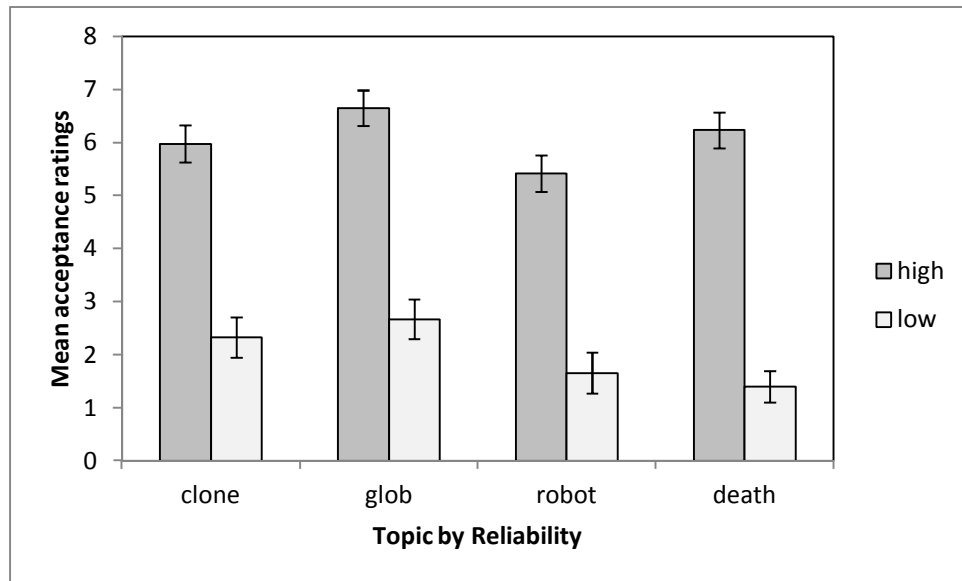
Figure 13. The topic by reliability interaction

Finally, there was a topic by polarity by reliability interaction ($F(3,105) = 4.45$, $p = .012$, $\eta_p^2 =.113$), which did not exist in the first experiment, as Figure 14 below shows.
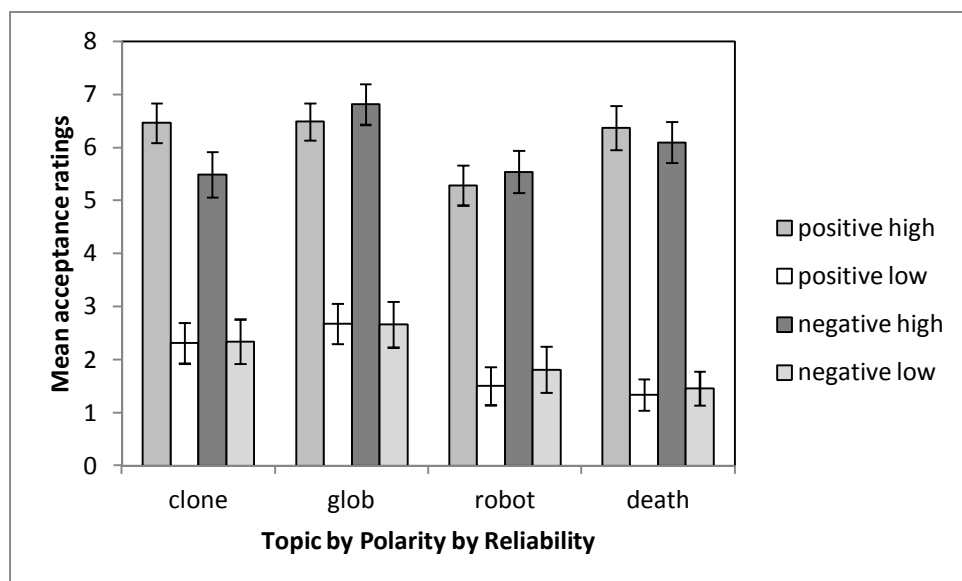
Figure 14. The topic by polarity by reliability interaction

The participants rated the high reliability positive polarity arguments higher in the topics of cloning ($m = 6.45$, SE = .37) and death penalty ($m = 6.36$, SE = .41), while they rated the high reliability negative polarity arguments higher in the topics of globalization ($m = 6.81$, SE = .38) and using robots instead of humans in workplaces ($m = 5.54$, SE = .39). On the other hand, with the low reliability arguments, they rated positive and negative polarity items almost equally in the topics of cloning (positive: $m = 2.31$, SE = .38; negative: $m = 2.33$, SE = .42) and globalization (positive: $m = 2.67$, SE = .37; negative: $m = 2.66$, SE = .43) while they rated negative polarity items higher in the topics of using robots instead of humans in workplaces (positive: $m = 1.50$, SE = .35; negative: $m = 1.81$, SE = .43) and death penalty (positive: $m = 1.33$, SE = .29; negative: $m = 1.45$, SE = .32).

3.2.3 Discussion

The present experiment showed that although it entered into some interactions especially with polarity manipulations, intelligence did not have a main effect on participants' ratings of the interlocutor's acceptance levels in the dialogs, suggesting that the factors we manipulated in our present argumentation task were processed by subjects in a similar way, regardless of their intelligence level. Thus the null-hypothesis was confirmed.

With respect to the main effects found in the first experiment, similar to it, in this experiment with intelligence scores included, the arguments with a higher reliability source ($m = 6.06$, SE = .27) were rated higher than those with a less reliable source of evidence ($m = 2.01$, SE = .33), $F(1,35) = 5.23$, $p = .028$, $\eta_p^2 = .130$. Since source reliability is an extrinsic feature unrelated to the cognitive process or argumentation, it remains influential, irrespective of the intelligence level of subjects.

However, in this second experiment, different from the first experiment, we did not find a significant main effect of topic or prior belief. The fact that the topic effect vanished may be explained by the fact that certain topics were rated differently by subjects with different levels of intelligence. This was in fact observed in the topic of

death penalty in which subjects with lower intelligence scores rated negative polarity arguments relatively highly (at p=.030). This is why when the intelligence effect was factored out by the covariate analysis in the second experiment, variation due to different topics in the first experiment vanished.

The same situation held true for the prior belief factor. Subjects with lower intelligence scores rated the arguments with manipulations of weak prior belief and negative polarity combined relatively highly (at p=.027). Consequently, it might be the case that again when the intelligence effect was factored out using covariate analysis in the second experiment, the prior belief effect that was observed in the first experiment disappeared.

There was no main effect of polarity; the acceptance ratings of positive arguments and negative arguments in general did not differ significantly as it had already been found in the first experiment. But still, it is interesting that polarity, which did not emerge as a main factor either in the first or in the second experiment, came up in both of the significant interactions with intelligence. One can speculate that argument polarity which does not seem to be an evident factor readily transparent to the participants as they judge the strength of the arguments in the dialogs may become visible at varying levels to the participants with varying levels of intelligence. In fact, the findings of our study show that more intelligent subjects are less inclined to accept negative polarity items as convincing than less intelligent subjects.

3.3   Experiment 3 – Evidentiality and argumentation

Following up on the initial Turkish replication of the English experiment and the investigation of the role of intelligence in argumentation in the second experiment, the third experiment investigated whether evidentiality, as a grammaticalized category in Turkish, indicating the certainty with which events in the past have happened, marked with overt morpho-syntactic markers (-DI or –mIş) played a role in argument strength. Evidentiality exists in all languages, but only some languages grammaticalize it and Turkish is one of them (Aikhenvald, 2004; Aksu-Koç 1988).

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In Turkish, –DI indicates that the speaker has direct (perceptual) evidence for a proposition, whereas –mIş indicates that s/he has only indirect or hearsay evidence (excluding the reasoning or inference aspect of –mIş).

3.3.1 Method

Hypotheses.

H6. Argument acceptance is expected to vary depending on the presence of and the kind of evidentiality markers.

Participants. 114 university students aged 18-22 participated in the experiment. The questionnaires with missing values or where specific rating patterns were used were excluded from the study. 59 of the students were from the English Preparatory School of Başkent University, while the remaining 55 were from the English Preparatory School of Middle East Technical University. There were 40 males and 74 females.

Materials. In this case, the modifications on the dialogs were as follows: -DI suffixation, e.g., -*faydalıydı*; -mIş suffixation, e.g., -*faydalıymış*; neutral case, e.g., -*faydalı* on the verbs of the main argument sentences in the dialogs. Different from the original dialogs, long sentences were split into two or three to include more instantiations of evidentiality markers in each dialog to make it more salient in the sentences. There were no lexical items or adverbs (e.g. güya [allegedly]) as signs of evidentiality because just morpho-syntactic markers were under investigation.

In the construction of the dialogs in their evidentiality versions, in addition to the already present high *vs.* low reliability cases (e.g. a professor from some reliable institute *vs.* a layman in the street), moderate reliability cases were also necessary to avoid a possible interference of reliability such that extreme cases would probably overshadow the influence of the evidentiality markers. In order to identify information sources with varying levels of reliability, a survey study was conducted before the actual experiment. We contacted people through e-mail (around 35 people, all native speakers of Turkish living currently in Turkey) and requested them to list

as many items as possible under the categories of information sources: the most reliable information sources, moderately reliable ones and the least reliable ones. Considering that we needed to have at least 5 items in each reliability category, 15 items from this pool were compiled, and a subsequent test was designed and administered to 45 students (*Mean Age*=19; *SD*=0.8) at Çankaya University Preparatory School to ensure that the three categories formed (high, medium, low reliability of source) would really match their ratings and would really be different, statistically. (see Appendix H for the questionnaire to identify the reliability levels of different information sources):

> "Lütfen aşağıdaki bilgi kaynaklarını güvenilirlik dereceleri bakımından değerlendiriniz. Konuyla ilgili kendi fikrinizi ifade edecek şekilde her bilgi kaynağının altında verilmiş olan 11'lik ölçek üzerinde *Hiç Güvenilir Değil (0)* ile *Çok Güvenilir (10)* arasında bir kutuya √ işareti koyunuz. Her bir bilgi kaynağını kendi içinde değerlendiriniz." /Please evaluate the information sources below based on their levels of reliability. Indicate your reponse by putting a tick (√) in the corresponding box in the 0 (not reliable at all) to 10 (very reliable) scale below. You need to consider each item separately.

Sample Item: Wikipedia

Hiç Güvenilir Değil/Not reliable at all   *Çok Güvenilir/Very reliable*

0	1	2	3	4	5	6	7	8	9	10

The test was administered in three different orders to remove any order effect. 5 students' data were removed from the analysis due to missing values or use of specific rating patterns. As the results of SPSS analysis in Table 14 below show, students' ratings confirmed the e-mail results and the subsequent categorization of data with just one difference. After the student ratings, the item "local newspapers" was placed in the moderate reliability category and the item "poll/survey companies" was placed in the low reliability category.

Table 14. The reliability classification of information sources based on students' ratings

Information Sources		
High Reliability	**Mean**	**SD**
1. Documentaries	7,97	1,51
2. Academic Scientific Publications	7,7	1,69
3. University Databases and Resources	7,17	1,99
4. Wikipedia	6,62	2,43

5. Regularly-followed authors/writers	6,35	1,73
Moderate Reliability		
6. Sci-Tech Sections of Newspapers	6,3	2,3
7. News Portals and Agencies	5,32	2,28
8. Local Newspapers	4,87	2,52
9. Regularly-followed Internet Forums	4,22	1,92
10. Facebook-Youtube-Twitter	3,62	2,61
Low Reliability		
11. Poll/Survey Companies	3,45	2,14
12. GSM Operators	3,32	2,55
13. Political Parties	2,62	2,07
14. Politicians and Ministers	2,5	2,34
15. Internet Advertisements	2	1,92

When the classification was based on students' ratings of the list of information sources, we found a significant difference across all levels of reliability: the members of high reliability category (m=7.16, SE=.30) were found to be significantly more reliable than the members of the moderate reliability category (m=4.87, SE=.45) and both the members of high reliability category and the members of the moderate reliability category were found to be significantly more reliable than the members of the low reliability category (m=2.78, SE=.26), F(2,14) = 38.11, p = .000. This result indicated that all the three levels of reliability would have to be included when writing the evidentiality questionnaire to account for the effect of reliability independent of the influence of evidentiality markers.

However, with the inclusion of the moderate reliability case as well as the high and low cases already included, the number of dialogs would be even higher, that is, 144 dialogs. To limit the number of dialogs each subject sees, we separated the topics across the booklets; and each participant saw the different versions of one topic only. Therefore, topic was dropped as a variable. Still, all four topics were used, only they were dispersed among the sample. This procedure seems legitimate since we are actually not interested in the effects of the content of various topics on acceptability ratings but only in the effects of the more general factors "prior belief", "polarity", "reliability" and, in addition, "evidentiality". These were maintained as within subject factors. The experimental design on a sample topic was as follows:

Design of the Sample Topic: Robots
3 (evidentiality: -DI *faydalıydı*, -mIş *faydalıymış*, neutral *faydalı*)
X
3 (reliability: high, moderate, low)
X
2 (priors: strong vs. weak)
X
2 (polarity: positive vs. negative)
=
36 dialogs in random order

Sample Dialog:

Sırma: Sence iş yerlerinde insanların yerine robotların çalıştırılması toplumlar için faydalı mıdır?
Can: Öyle olmadığından epey eminim.
Sırma: Aslında öyle olmadığı konusunda kesin emin olmalısın.
Can: Niye öyle düşünüyorsun?
Sırma: Öyle düşünüyorum çünkü bağımsız bir araştırma merkezinden temsilcilerle yapılan bir gazete röportajına göre, hizmet kalitesindeki düşüş ve genel maliyetteki artış dikkate alınırsa robotların çalıştırılması faydalı değildir.

(English version)

Sırma: Do you think using robots in workplaces rather than hiring people is beneficial for the society?
Can: I am fairly convinced that using robots is not beneficial.
Sırma: You can be more than fairly convinced; you can be certain that it is not.
Can: Why do you say that?
Sırma: Because according to a newspaper interview with a group of researchers from a non-governmental research center, using robots in workplaces is not beneficial because of the decrease in service quality and overall costs.

The last exchange was modified as follows:

Evidentiality: -neutral case *faydalı*
Sırma: Öyle düşünüyorum çünkü bağımsız bir araştırma merkezinden temsilcilerle yapılan bir gazete röportajına göre, hizmet kalitesindeki düşüş ve genel maliyetteki artış dikkate alınırsa robotların çalıştırılması faydalı değil.

Evidentiality: -mIş case *faydalıymış*
Sırma: Öyle düşünüyorum çünkü bağımsız bir araştırma merkezinden temsilcilerle bir gazete röportajı yapmışlar. Buna göre, araştırmacılar hizmet kalitesindeki düşüşü ve genel maliyetteki artışı dikkate almışlar. Sonuçlara bakılırsa robotların çalıştırılması faydalı değilmiş.

Evidentiality: -DI case *faydalıydı*
Sırma: Öyle düşünüyorum çünkü bağımsız bir araştırma merkezinden temsilcilerle bir gazete röportajı yaptılar. Buna göre, araştırmacılar hizmet kalitesindeki düşüşü ve genel maliyetteki artışı dikkate aldılar. Sonuçlara bakılırsa robotların çalıştırılması faydalı değildi.

Consequently, each booklet included 36 dialogs in random order (see Appendix I for Turkish questionnaire with evidentiality incorporated on the topic of cloning).

Procedure. The dialogs were presented to participants in booklets. They were asked to indicate their ratings of each dialog on the corresponding rating scales in the answer sheet:

> "Başlangıçtaki düşüncesini dikkate aldığınızda, Can'ın, Sırma'nın kendisine sunduğu açıklamalar sonrasında iş yerlerinde insanların yerine robotların çalıştırılmasının toplumlar için faydalı olmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, cevap kağıdındaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz."

> (English version)
> "How convinced do you think Can should *now* be that it is not beneficial to use robots in workplaces? Please indicate your response by putting a tick (√) in the corresponding box in the 0 (not convinced at all) to 10 (totally convinced) scale in the answer sheet."

The booklet took about 20 minutes to complete and participants were tested during their classes (without talking to each other) in the presence of their instructors and the experimenter. Before the experiment, participants signed an informed consent form (see Appendix A for this consent form), and following the experiment, they read the debriefing form (see Appendix B for this debriefing form).

Experimental Design. There were five independent variables presented through the 36 constructed dialogs: prior belief, polarity, reliability, evidentiality and topic. Prior belief had two levels: strong *vs.* weak prior belief; polarity had two levels: positive *vs.* negative; reliability had three levels: high *vs.* moderate *vs.* low; evidentiality had three levels: neutral/no marker *vs.* -mIş suffixation *vs.* –DI suffixation; and there were four different topics: the dangers of cloning, the dangers of globalization, the efficacy of capital punishment, and the respective efficacy of using robots instead of hiring people in workplaces. Topic was a between-subjects factor while the other four factors were within-subjects. The dependent variable was the participants' acceptance ratings for each dialog. Each participant rated the 36 dialogs on one topic only on a scale of 0 (not convinced at all) to 10 (totally convinced) from one of the

interlocutor's point of view. So each rating (i.e. the posterior belief) reflected the combined effects of the prior belief, polarity, reliability, evidentiality, and topic manipulations. This was a 2x2x3x3x4 mixed ANOVA design.

3.3.2 Results

In a 2 (Prior Belief) × 2 (Polarity) × 3 (Reliability) × 3 (Evidentiality) × 4 (Topics) mixed ANOVA with the first four being within subjects variables and the last being a between subjects variable, we found a significant main effect of evidentiality as well as replicating the significant main effects of the two of the manipulated factors (reliability and prior belief) in Oaksford and Hahn (2004), Hahn et al. (2005) and in our first experiment, and some complementary interactions.

First, as Figure 15 below shows, arguments with –DI statements (*m(Mean)* = 3.88, SE (Standard Error) = .16) were more convincing than arguments with –mIş statements (*m* = 3.66, SE = .15), and arguments with neutral statements were the least convincing (*m* = 3.28, SE = .16), $F(2,220) = 36.384$, *p* = .000, $\eta_p^2 = .249$.
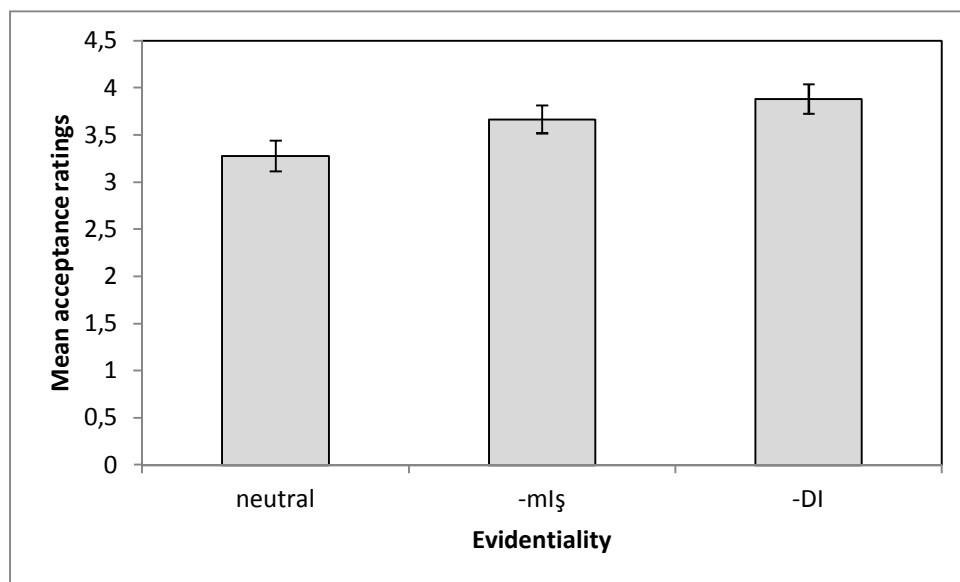
Figure 15. Evidentiality manipulations

In the subsequent contrast analysis, it was revealed that the "neutral" category differed significantly from –mIş and –DI categories, $F(1,110) = 47.903$, *p* = .000, η_p^2

=.303. Similarly, -mIş and –DI also differed from each other significantly, $F(1,110)$ = 13.287, p = .000, η_p^2 =.108, but the effect was smaller this time.

Second, as Figure 16 below shows, the arguments with a high reliability source (m = 6.02, SE = .19) were rated higher than those with a moderately reliable source of evidence (m = 2.56, SE = .18), and arguments with a low reliability source of evidence were the lowest rated (m = 2.24, SE = .18), $F(2,220)$ = 261.877, p = .000, η_p^2 =.704.
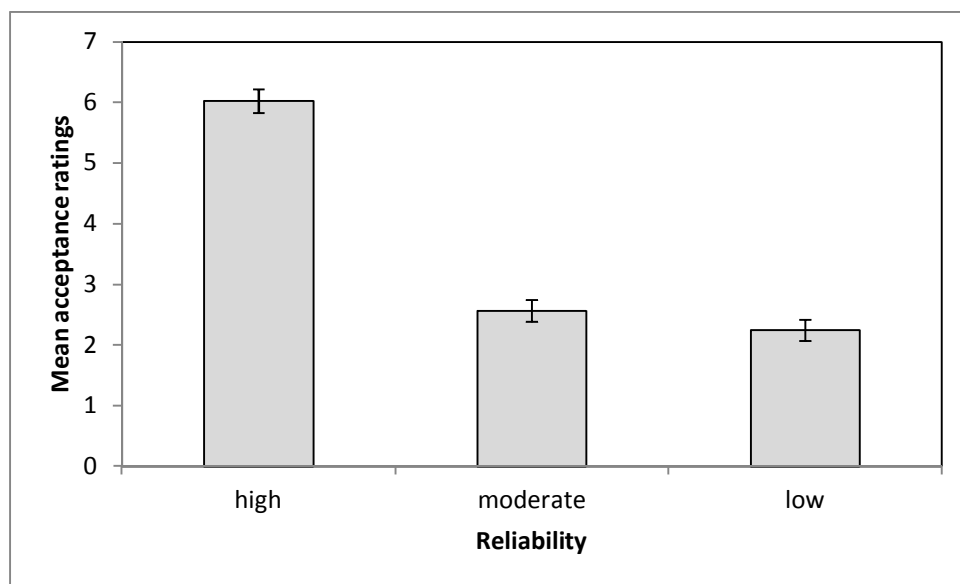
Figure 16. Reliability manipulations

In the subsequent contrast analysis, it was revealed that the "high reliability" category differed significantly from "moderate reliability" and "low reliability" categories taken together, $F(1,110)$ = 298.024, p = .000, η_p^2 =.730. Similarly, "moderate reliability" and "low reliability" categories also differed from each other significantly, $F(1,110)$ = 11.950, p = .001, η_p^2 =.098, but the effect was smaller this time. It seems that although people can differentiate the three levels of reliability, if it comes to argumentation, they treat them in quite a binary fashion: reliable being the "high reliability" case vs. unreliable being the moderate and low reliability cases.

In addition, as Figure 17 below shows, arguments with a higher degree of prior belief (m = 3.80, SE = .17) were rated higher than arguments with a lower degree of prior belief (m = 3.41, SE = .14), $F(1,110)$ = 29.083, p = .000, η_p^2 =.209.
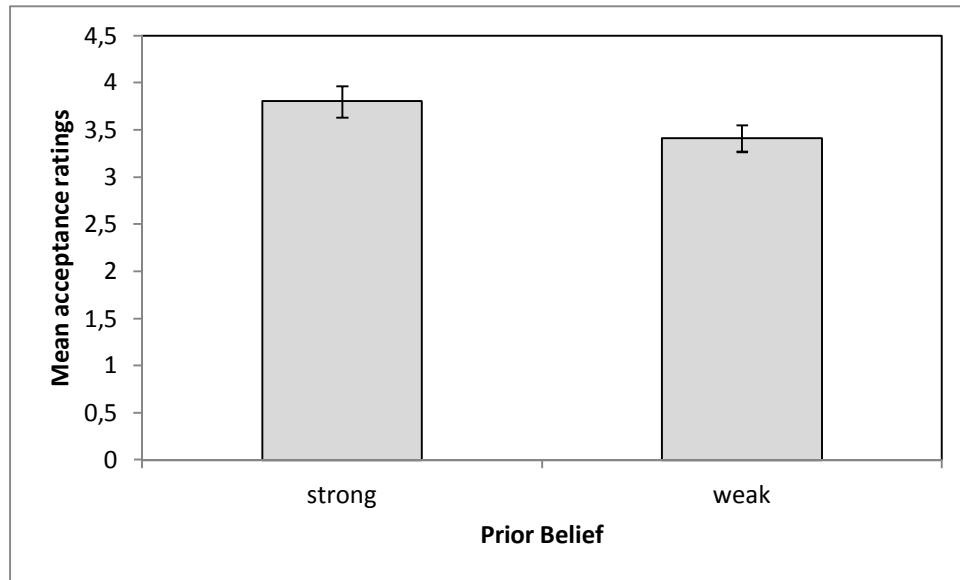
Figure 17. Prior belief manipulations

However, unlike in Hahn et al.'s study (2005) but similar to our first study, there was no main effect of polarity; positive arguments (m = 3.63, SE = .15) and negative arguments (m = 3.58, SE = .16) were rated almost equally.

Again, unlike in Oaksford and Hahn (2004), Hahn et al. (2005) and our first experiment, this experiment did not show significant differences between dialog topics when topic was explored as a between subject factor. Though insignificant, there were some differences across topics, especially the topic of death penalty was scored relatively low. The topic of using robots in workplaces received the highest mean acceptance rating (m = 3.96, SE = .32); the topic of cloning ranked the second highest (m = 3.88, SE = .28) and the topic of globalization followed it (m = 3.51, SE = .30), while the topic of death penalty received the lowest mean acceptance rating (m = 3.10, SE = .30).

There were also some interactions. There was an evidentiality by reliability interaction ($F_{(4,440)} = 5.442$, $p = .001$, $\eta_p^2 = .047$) as Figure 18 below shows.
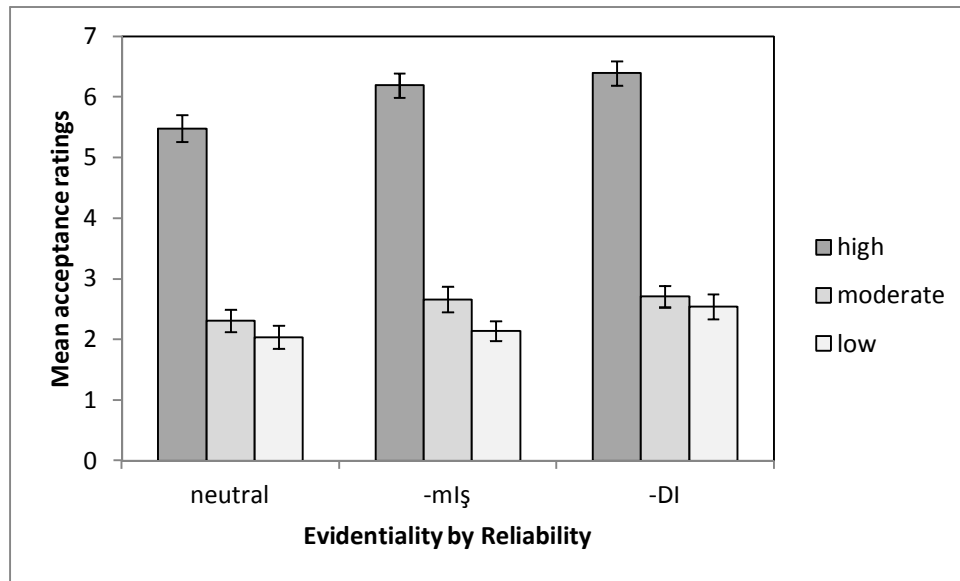
Figure 18. The evidentiality by reliability interaction

The participants rated arguments with neutral statements lower than arguments with –mIş and –DI statements across all levels of reliability (high, moderate and low); on the other hand, ratings of arguments with –mIş and –DI statements were quite close to each other in high reliability and moderate reliability cases, while they were quite apart in low reliability cases, the ratings of arguments with –mIş statements getting closer to those of arguments with neutral statements. That is, -DI always yields higher ratings of conviction than neutral, irrespective of reliability. However, -mIş is only found more convincing if reliability of dialogs is high, that is, it patterns with -DI; if reliability is low, however, -mIş does not increase the level of conviction that is, it patterns with the neutral condition. In general, subjects use the additional information provided by the two evidentiality markers, -DI and -mIş, however, only -DI has always the same consistent effect (raising levels of conviction), whereas –mIş may raise the level of conviction, if reliability is low, or may not rise it further if reliability is high already. It should be taken into consideration, however, that this interaction effect is a quite small one.

There was an evidentiality by polarity interaction ($F_{(2.220)} = 4.170$, $p = .019$, $\eta_p^2 = .037$) as Figure 19 below shows.
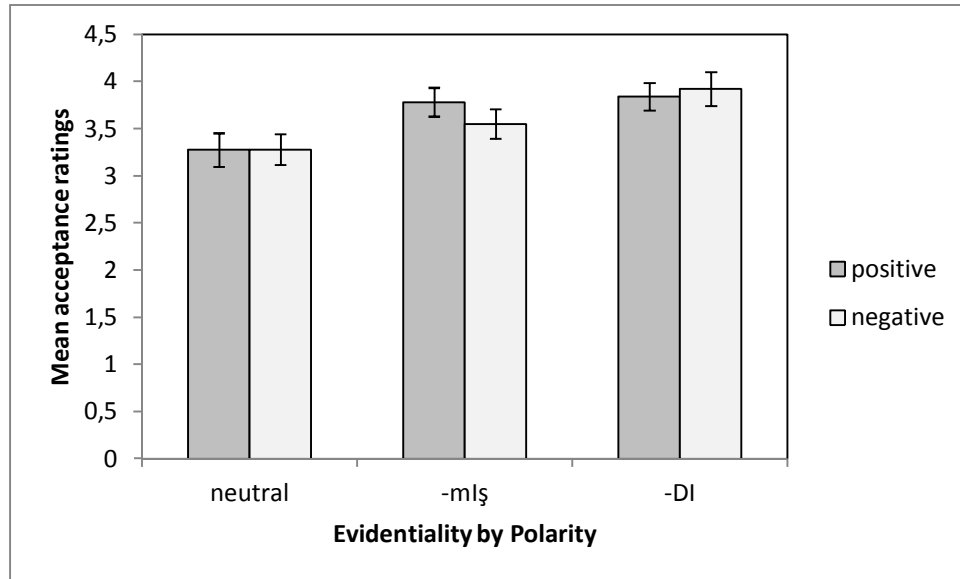
Figure 19. The evidentiality by polarity interaction

The participants rated positive polarity arguments higher when these arguments contained –mIş statements (positive: $m = 3.78$, SE = .15; negative: $m = 3.55$, SE = .15); however, negative polarity arguments were rated higher when these arguments contained –DI statements (positive: $m = 3.83$, SE = .14; negative: $m = 3.92$, SE = .17) and neutral statements (positive: $m = 3.27$, SE = .17; negative: $m = 3.27$, SE = .16) (very slightly in the neutral case though). That is, –DI and neutral do not vary with respect to positive and negative polarity; however, -mIş does. If polarity is positive, -mIş raises levels of convictions as much as -DI does; but if polarity is negative, it decreases levels of conviction such that the score is right in between neutral and -DI. Again, this effect is rather small.

We also found a two-way interaction between topic and reliability ($F_{(6,220)} = 3.277$, $p = .015$, $\eta_p^2 = .082$), as in Figure 20 above.
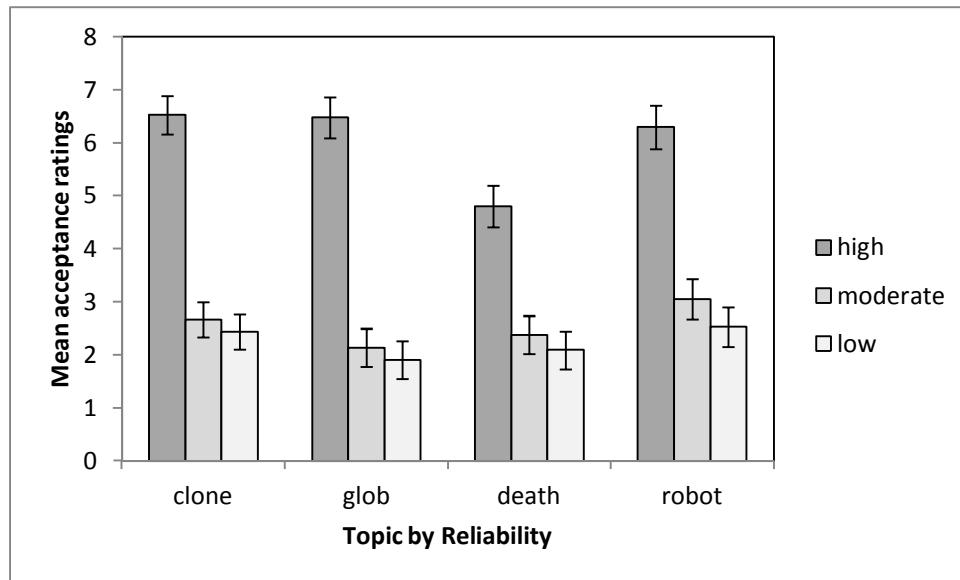
Figure 20. The topic by reliability interaction

Across all topics, acceptance ratings were higher with high reliability sources as opposed to moderate and low reliability sources and there wasn't much of a difference between moderate and low reliability sources. However, within the topics themselves, with respect to high reliability sources, topic 3 "death penalty" differs significantly from the other three topics. In this case, levels of conviction decrease even if the reliability of the source is high. This seems to imply that judging this topic is somewhat less dependent on reliability information. Possibly, own personal convictions of subjects play a stronger role here as it is an issue of a more controversial sort compared to the other three. Since only one topic behaves in that way, the effect is only slight.

3.3.3 Bayesian Model Fitting

Following the same scheme as in Experiment 1, the modeling on the results for four scenarios was done separately using different parameter values, considering the number of 36 data points this time.

Consequently, the overall fit was moderate, with an R^2 value of 0.52, and the separate R^2 values for each topic are cloning, 0.68; globalization, 0.42; death penalty, 0.42; using robots, 0.50, respectively.

Table 15. The summary table for the results of Bayesian parameter estimation across topics

| | Parameter Estimations across Topics | | | | | | | |
| | Prior Belief | | Sensitivity | | | Specificity | | | |
Topic	Strong	Weak	High R.	Mod. R.	Low R.	High R.	Mod. R.	Low R.	R^2
Clone	.55	.35	.62	.40	.36	.70	.17	.14	.68
Glob	.54	.35	.78	.35	.31	.50	.11	.10	.42
Death	.50	.35	.66	.40	.34	.50	.12	.11	.42
Robot	.53	.35	.77	.50	.41	.51	.16	.13	.50
							Overall		.52

As Table 15 above shows, for cloning, the prior, (P(T)) or alternatively *h*, in the strongly believed condition was .55, while the prior, (P(T)) or alternatively *h*, in the weakly believed condition was .35. Sensitivity, ($P(e|T)$) or alternatively *n*, and specificity ($P(\neg e|\neg T)$) or alternatively *l*, were higher in the high-reliability condition than in the moderate-reliability and low-reliability conditions; high: ($P(e|T)$)= .62 and ($P(\neg e|\neg T)$)= .70; moderate: ($P(e|T)$)= .40 and ($P(\neg e|\neg T)$)= .17; low: ($P(e|T)$)= .36 and ($P(\neg e|\neg T)$)= .14.

For globalization, the prior, (P(T)) or alternatively *h*, in the strongly believed condition was .54, while the prior, (P(T)) or alternatively *h*, in the weakly believed condition was .35. Sensitivity, ($P(e|T)$) or alternatively *n*, and specificity ($P(\neg e|\neg T)$) or alternatively *l*, were higher in the high-reliability condition than in the moderate-reliability and low-reliability conditions; high: ($P(e|T)$)= .78 and ($P(\neg e|\neg T)$)= .50; moderate: ($P(e|T)$)= .35 and ($P(\neg e|\neg T)$)= .11; low: ($P(e|T)$)= .31 and ($P(\neg e|\neg T)$)= .10.

For death penalty, the prior, (P(T)) or alternatively *h,* in the strongly believed condition was .50, while the prior, (P(T)) or alternatively *h*, in the weakly believed condition was .35. Sensitivity, ($P(e|T)$) or alternatively *n*, and specificity ($P(\neg e|\neg T)$) or alternatively *l*, were higher in the high-reliability condition than in the moderate-reliability and low-reliability conditions; high: ($P(e|T)$)= .66 and ($P(\neg e|\neg T)$)= .50; moderate: ($P(e|T)$)= .40 and ($P(\neg e|\neg T)$)= .12; low: ($P(e|T)$)= .34 and ($P(\neg e|\neg T)$)= .11.

For using robots, the prior, (P(T)) or alternatively h, in the strongly believed condition was .53, while the prior, (P(T)) or alternatively h, in the weakly believed condition was .35. Sensitivity, $(P(e|T))$ or alternatively n, and specificity $(P(\neg e|\neg T))$ or alternatively l, were higher in the high-reliability condition than in the moderate-reliability and low-reliability conditions; high: $(P(e|T))$= .77 and $(P(\neg e|\neg T))$= .51; moderate: $(P(e|T))$= .50 and $(P(\neg e|\neg T))$= .16; low: $(P(e|T))$= .41 and $(P(\neg e|\neg T))$= .13.

Consequently, these results did not quite replicate those of Oaksford and Hahn (2004) for a pure reliability manipulation and a more realistic manipulation of the priors, and those of Hahn et al. (2005) for a new language manipulation (Turkish), a topic manipulation (cloning, globalization, death penalty, and using robots in workplaces, this time), and an evidentiality manipulation.

3.3.4 Discussion

In summary, the present experiment replicated the two main findings of Oaksford and Hahn's 2004 study and Hahn et al.'s 2005 study and our first experiment, suggesting that arguments with stronger prior beliefs and arguments with higher reliability of source are considered more convincing. Thus, two of the hypotheses in this study are further accepted. However, the third factor that positive arguments are rated higher did not appear as a main effect in this experiment similar to our first experiment. Besides, the hypothesis about the topics that they are expected to affect the ratings is rejected this time unlike in our first experiment where we found significant effects of topic.

Finally, the main hypothesis of this experiment that argument acceptance is expected to vary depending on the presence of and the kind of evidentiality markers was accepted. As the data shows, both –mIş and –DI as markers of evidentiality affect people's acceptance ratings of the arguments, as compared to the neutral case leading to significantly lower scored arguments. In particular, this effect goes back mainly to the contrast between the neutral condition *vs.* both evidentiality conditions. First of all, this result from the current study in which evidentiality was investigated with

adults in an argumentative dialog context shows that understanding arguments and thus engaging in some high-level cognitive process is indeed dependent on the processing of some morphological marker that one's language provides him/her – across the board, for all language users. This result stands in contrast to the more common acquisition studies where other cognitive phenomena such as source monitoring and theory of mind seem to develop or to be processed similarly regardless of whether one's language has evidentiality marking or not (Papafragou et al., 2007). This raises the question why, in adult argumentation, evidentiality markers do but in language and thought related acquisition studies, they do not, seem to have an impact on subjects' performance.

Why does –mIş also raise the level of conviction compared to no marking at all? What might subjects think about evidentiality if no morphological or other cue is available? Do they find such statements weird or grammatically awkward or incomplete because they expect markers and if there are no such markers they become very reluctant to give high levels of convictions? It might in fact be the case with the consideration that marking how one has acquired some information is not optional but obligatory in languages with grammatical evidentiality (Aikhenvald, 2004).

This situation may be different across typologically different languages. In languages without any grammaticalized marking of evidentiality the question may not even arise. Having –mIş, then, is still more convincing (but not as convincing) as having –DI. That is, any marker is better than no marker. The difference between -mIş and -DI is secondary with respect to this first big divide between having or not having any marker.

Another important finding of the current study was that "reliability" and "evidentiality" were found to be two different factors and that subjects very well distinguish between them as witnessed by the two separate main effects and by their interaction. This result also confirms the validity of the experimental design, especially the inclusion of the neutral case among the levels of evidentiality and the

inclusion of the moderate reliability case among the levels of reliability manipulation.

With respect to the Bayesian model-fitting on the data from this last experiment in which evidentiality was incorporated as a specific feature of Turkish along with the already present factors of prior belief, polarity, reliability, and topic which the Bayesian account can capture, the overall fit ($R^2=.52$) was not very bad compared to the .60 which is considered to be a sign of good fit in the relevant literature where there does not seem to be another competitor normative theory of argument strength (Oaksford, through personal correspondence). Nevertheless, compared to our first experiment in which a better fit was found, the lower value in this experiment might also be due to the higher number of factors and their corresponding levels that were fed into the formula or topic becoming a between-subjects factor. Besides, in Solver, it is very important how you set the initial parameter values and the constraints based on which the function operates to find the best fitting values and consequently the best fitting model. Further trials using different constraints or initial values might help to improve the fit.

CHAPTER 4

DISCUSSION & CONCLUSION

This chapter summarizes the findings and provides a detailed discussion of the results of the various parts of the study with reference to the previous applications of the Bayesian theory. Its contributions are evaluated, and shortcomings are identified. The chapter ends with pointing out some limitations of the study and suggestions for future studies.

4.1 Summary of the study

This study aimed at applying the Bayesian reasoning framework on informal argument fallacies, on the specific example of arguments from ignorance – the negative evidence cases, in Turkish. Accordingly, three experiments were conducted. The first experiment replicated Hahn et al.'s (2005) study in Turkish, similarly tested the three major factors (prior belief, polarity, evidence reliability) influential in argument strength as predicted by the Bayesian account, and tried to uncover whether similar results would be obtained in a different linguistic and cultural community. The second experiment tested the hypothesis that argument acceptance would not vary across different intelligence levels. Finally, the third experiment investigated the hypothesis that argument acceptance would vary depending on the presence of and the kind of evidentiality markers prevalent in Turkish.

4.1.1 Experiment 1 – The replication of Hahn et al.'s (2005) study on argumentation in   Turkish: Arguments from ignorance

The first experiment tested four hypotheses: In terms of prior beliefs, arguments with a stronger prior belief are more convincing than arguments with a weaker prior belief; in terms of argument polarity, positive arguments are more convincing than negative arguments; in terms of source reliability, arguments with higher source reliability are more convincing than those with less reliable sources of evidence; and finally, in terms of topic, argument acceptance is expected to vary across different topics. For this purpose, the participants were presented with arguments to evaluate their acceptability from the standpoint of one of the interlocutors in a series of short argumentative dialogs on an 11-point Likert rating scale.

The data from the experiment were analyzed using within-subjects analysis of variance based on acceptance ratings. There was a main effect of prior belief (strong *vs.* weak), a main effect of reliability (high *vs.* low), and a main effect of topic (cloning, globalization, death penalty *vs.* using robots). Thus, the hypothesis that arguments with a stronger prior belief are more convincing than arguments with a weaker prior belief was confirmed, as well as the hypothesis that arguments with higher source reliability are more convincing than those with less reliable sources of evidence, and the hypothesis that argument acceptance is expected to vary across different topics. However, there was no main effect of polarity (positive *vs.* negative arguments) and arguments of both types were found to be almost equally acceptable; therefore, the hypothesis that positive arguments are more convincing than negative arguments was rejected.

There were also some interactions. There was a prior belief by polarity interaction. This interaction effect indicated that the participants rated positive polarity arguments higher when the interlocutor's prior belief was stronger; however, with negative polarity arguments, the interlocutor's prior belief, whether strong or weak, did not matter. In addition, a two-way interaction between topic and reliability was found. Across all topics, acceptance ratings were higher with high reliability sources

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as opposed to low reliability sources, only with the exception of the topic using robots in workplaces rather than people, in which the high reliability condition was significantly lower rated than the high reliability conditions in the other topics.

With respect to the Bayesian analysis, the overall fit between the data and the model was very good, with an overall R^2 value of 0.88, and the separate R^2 values for each topic – cloning, 0.89; globalization, 0.88; death penalty, 0.86; using robots, 0.86, respectively. Furthermore, in line with the findings from the within-subjects repeated measures analysis, the model could predict that the prior belief in the strongly believed condition was higher than that in the weakly believed condition. Besides, the model could also return results that would be expected of a legitimate consistent test: that the two complementary aspects of a test's informativeness – the sensitivity (the probability that an effect would be observed if the hypothesis were true) and the specificity (the probability that an effect would not be observed if the hypothesis were false) values were higher in high reliability condition as would be expected from a more reliable source and lower in low reliability condition.

The results replicated those of Oaksford and Hahn (2004) for a pure reliability manipulation and a more realistic manipulation of the priors. In Hahn et al. (2005) and this study of ours, reliability was manipulated in a new way: in Oaksford and Hahn's (2004) previous study the reliability was manipulated as a finding from one experiment *vs.* the findings from 50 experiments, whereas in these later studies the reliability was manipulated as information from a university professor *vs.* views of a couple in the street. Again with the priors, in the previous version this condition was expressed as "I weakly believe" *vs.* "I strongly believe", while in these later studies it was expressed as "I sort of not believe / öyle olduğunu pek sanmıyorum" *vs.* "I am fairly convinced / öyle olduğundan epey eminim". They also confirmed the results of Hahn et al. (2005) for a new language manipulation (Turkish, this time) and a topic manipulation (cloning, globalization, death penalty, and using robots in workplaces, this time).

4.1.2 Experiment 2 – Intelligence and argumentation

The second experiment, on the same group of participants as in the first experiment, tested the hypothesis that argument acceptance does not vary across different intelligence levels. Intelligence perceived in the "fluid intelligence" sense as explained above can capture one's analytic reasoning and problem solving skills (Bors and Stokes, 1998). Its relation to performance on the kind of information processing and judgment tasks required in the series of experiments conducted in this study can reveal important information for a better understanding of the underlying processes. For this purpose, the participants were presented with the Raven's Advanced Progressive Matrices – short form, building on Spearman's idea of a single, unitary entity from which intelligent behavior emerges (g factor) (Plucker, 2003). The test consisted of a series of perceptual analytic reasoning problems, each in the form of a matrix with a missing piece, and the participants, considering the vertical and horizontal transformations and the alternatives provided, completed the missing part.

A within subjects analysis of variance based on acceptance ratings using Raven scores of intelligence as a covariate was run on the data. There was no significant main effect of intelligence as indicated by the Raven test in the study. Thus, the hypothesis that argument acceptance does not vary across different intelligence levels was confirmed.

Still, intelligence entered into some interactions. There was a three-way interaction between polarity, topic and intelligence. Further investigation showed that this interaction was mainly due to topic effects: positive arguments about cloning resulting in higher ratings while negative arguments about globalization resulting in higher ratings, when the effect of the covariate, intelligence was factored out. In order to further investigate the effect of intelligence in this interaction rather than factoring out its contribution, we ran correlation analyses having collapsed prior belief and reliability information, and found that death penalty arguments in their negative polarity forms were rated relatively more highly by subjects who had lower

Raven scores of intelligence in the study than by subjects with higher Raven scores (at p=.030).

There was also a three-way interaction between prior belief, polarity and intelligence. This interaction indicated that when the prior belief was strong, positive polarity arguments were rated higher as opposed to negative polarity arguments; while in arguments with weak prior beliefs people rated negative polarity arguments higher. In fact in a further analysis when we collapsed the reliability and topic information, it was revealed that the arguments which have negative polarity and include weak prior beliefs were rated relatively highly by subjects who had lower Raven scores of intelligence in the study than by subjects with higher Raven scores (at p=.027).

Based on both of these findings, we can conclude that more intelligent subjects are less inclined to accept negative polarity items as convincing than less intelligent subjects, intelligence referring to the analytic reasoning and problem solving skills as expressed in the form of scores from 0-12 on Raven's fluid intelligence test called APM-short form.

With respect to the main effects found in the first experiment regarding the Bayesian factors which include prior belief, polarity, reliability and topic, similar to it, in this experiment with intelligence scores included, the arguments with a higher reliability source were more convincing than those with a less reliable source of evidence. Likewise, there was no main effect of polarity. However, in this second experiment, different from the first experiment, there was no significant main effect of topic or prior belief, but they entered into some significant interactions.

There was a topic by polarity interaction, a topic by reliability interaction, and a topic by polarity by reliability interaction. Although topic did not emerge as a significant main effect in this experiment, its appearance in such interactions shows that differences between topics still matter.

There was also a prior belief by polarity interaction. The participants rated positive polarity arguments higher when the interlocutor's prior belief was stronger; on the other hand, they rated negative polarity arguments higher when the interlocutor's prior belief was weaker.

4.1.3 Experiment 3 – Evidentiality and argumentation

The third experiment, on a new group of participants, tested the hypothesis that argument acceptance is expected to vary depending on the presence of and the kind of evidentiality markers prevalent in Turkish. For this purpose, the participants were presented with arguments to evaluate their acceptability from the standpoint of one of the interlocutors in a series of short argumentative dialogs on an 11-point Likert rating scale. This time, there were additional manipulations on the dialogues: (1) reliability was expressed at three levels: high, moderate and low; (2) evidentiality was incorporated at three levels: –DI suffixation as in *faydalıydı*; –mIş suffixation as in *faydalıymış*; neutral case (no marker) as in *faydalı* on the verbs of the main argument sentences in the dialogues.

The data from the experiment were analyzed using a mixed ANOVA based on acceptance ratings, using dialog topic as a between subjects variable. The experiment found a significant main effect of evidentiality as well as replicating the significant main effects of the two of the manipulated factors (prior belief and reliability) in Oaksford and Hahn (2004), Hahn et al. (2005) and in our first experiment, and some complementary interactions.

Accordingly, the hypothesis that arguments with a stronger prior belief are more convincing than arguments with a weaker prior belief was confirmed, as well as the hypothesis that arguments with higher source reliability are more convincing than those with less reliable sources of evidence, and the hypothesis that argument acceptance is expected to vary depending on the presence of and the kind of evidentiality markers prevalent in Turkish. With respect to the evidentiality markers, the main effect indicated that arguments with –DI statements were more convincing

than arguments with –mIş statements, and arguments with neutral/no-marker statements were the least convincing. This clearly shows that both factors – although they seem to share some common ground, so that –DI is more associated with "high reliability" and –mIş with "lower reliability" – are distinctively represented in Turkish subjects, which will be discussed further down while explaining their interaction.

Different from the findings in Oaksford and Hahn (2004), Hahn et al. (2005) and our first experiment, this experiment did not show significant differences between dialog topics. This may be due to its having become a between subjects factor. This increases the variance because now the topics are distributed over different subjects which may have differing views on those topics. Besides, different from the findings in Oaksford and Hahn (2004) and Hahn et al. (2005), but similar to our first experiment, there was no main effect of polarity (positive *vs.* negative arguments) and arguments of both types were found to be almost equally acceptable. Thus, the hypotheses that argument acceptance is expected to vary across different topics and that positive arguments are more convincing than negative arguments were rejected.

There were also some interactions with evidentiality: evidentiality by reliability, and evidentiality by polarity. With respect to reliability, the participants rated arguments with neutral statements lower than arguments with –mIş and –DI statements across all levels of reliability (high, moderate and low); on the other hand, ratings of arguments with –mIş and –DI statements were quite close to each other in high reliability and moderate reliability cases, while they were quite apart in low reliability cases. In the low reliability case the –DI version yielded higher acceptability ratings as opposed to –mIş and neutral, showing that in the absence of a reliable source in reporting information, subjects resort to the evidentiality marking in their judgments of an argument's acceptability. This interaction once more proves that subjects differentiate between the two factors – reliability and evidentiality – and represent them even distinctively enough to allow for fine-grained interactions between them.

With respect to polarity, the participants rated positive polarity arguments higher when these arguments contained –mIş statements; however, negative polarity arguments were rated higher when these arguments contained –DI statements and neutral statements (very slightly in the neutral case though). In line with the view that positive arguments are more acceptable than negative arguments (Hahn et al., 2005) and that –DI statements yield higher acceptability (our finding above), subjects' rating of –mIş statements increased with the acceptability increase brought about by positive statements; while on the other hand, subject's rating of negative statements increased with the acceptability increase brought about by –DI statements.

There was also a two-way interaction between topic and reliability. Across all topics, acceptance ratings were higher with high reliability sources as opposed to moderate and low reliability sources and there was not much of a difference between moderate and low reliability sources. However, within the topics themselves, with respect to high reliability sources, topic 3 "death penalty" differs significantly from the other three topics. In this case, levels of conviction decrease even if the reliability of the source is high. This seems to imply that judging this topic is somewhat less dependent on reliability information. Possibly, own personal convictions of subjects play a stronger role here as it is an issue of a more controversial sort compared to the other three. Since only one topic behaves in that way, the effect is only slight.

With respect to the Bayesian analysis, the overall fit between the data and the model was lower than the one in the first experiment, with an overall R^2 value of 0.52, and the separate R^2 values for each topic – cloning, 0.68; globalization, 0.42; death penalty, 0.42; using robots, 0.50, respectively. This overall fit was not very bad compared to the .60 which is considered to be a sign of good fit in the relevant literature where there does not seem to be another competitor normative theory of argument strength (Oaksford, through personal correspondence). But still, the lower value in this experiment might be due to the higher number of factors and their corresponding levels that were fed into the formula or topic becoming a between-subjects factor. Besides, in Solver, it is very important how you set the initial parameter values and the constraints based on which the function operates to find the

best fitting values and consequently the best fitting model. Further trials using different constraints or initial values might help to improve the fit.

Furthermore, in line with the findings from the mixed ANOVA, the model could to some extent predict that the prior belief in the strongly believed condition was higher than that in the weakly believed condition. Besides, the model could also return results that would be expected of a legitimate consistent test: that the two complementary aspects of a test's informativeness – the sensitivity (the probability that an effect would be observed if the hypothesis were true) and the specificity (the probability that an effect would not be observed if the hypothesis were false) values were higher in high and moderate reliability conditions as would be expected from a more reliable source and lower in low reliability condition.

The results did not quite replicate those of Oaksford and Hahn (2004) for a pure reliability manipulation and a more realistic manipulation of the priors, and those of Hahn et al. (2005) for a new language manipulation (Turkish, this time), a topic manipulation (cloning, globalization, death penalty, and using robots in workplaces, this time), and an evidentiality manipulation.

4.2 Discussion of the results

The results of the three experiments summarized in the previous section were further elaborated on with reference to the specific factors examined for the purposes of this study on argumentation.

Prior Belief

A major topic of discussion regarding prior beliefs was whether they could be captured reliably through third-person judgments as employed in this study, but the results of both empirical and theoretical ways of handling them showed that this was in fact possible; and on the whole, the participants were able to rate the acceptance levels of the interlocutors irrespective of their own prior beliefs, excluding the topic

of globalization in which we found a positive correlation between subject's own prior beliefs and his/her acceptance ratings for the arguments in the dialogs.

From a social-centered perspective, considering the study's relation to ToM – the ability to attribute mental states, beliefs, intentions, desires, knowledge, to oneself and to others, this finding shows that participants not only have their own separate views about the issues in the argumentative dialogs (attribution of mental states to oneself) but they can also leave their own beliefs aside and attend to and track the interlocutors' ideas in the argumentative dialogs (attribution of mental states to others) to explain and predict behavior. This finding is a further sign of the applicability of Bayesian approach in studies on how people reason about the intentions of others (Baker et al., 2009; cited in Jones & Love, 2011).

As one of the three major factors predicted and explained by the Bayesian account to play a significant role in argument strength, prior belief turned out to produce a significant main effect in the first and third experiments similar to the situation in the previous applications of the Bayesian theory (Oaksford & Hahn, 2004; Hahn & Oaksford, 2006a; Hahn et al., 2005; Hahn, Oaksford & Corner, 2005, Korb, 2004, cited in Hahn & Oaksford, 2006b; Hahn & Oaksford, 2007; Hahn & Oaksford, 2008; Hahn et al., 2009). In this current application, however, its effect is not as strong as in Hahn & Oaksford (2004) possibly because of a more natural manipulation of strong *vs.* weak prior belief, which makes them less salient: In their study, the manipulation was "I strongly believe *vs.* I weakly believe"; in the later manipulations of prior belief which were also adopted in our study (following Hahn et al., 2005), it was "I am fairly convinced (öyle olduğundan epey eminim) *vs.* I sort of not believe (pek öyle olduğunu düşünmüyorum)", which increased its naturalness at the expense of lessening its saliency.

Different from the first and third experiments, in the second experiment with the inclusion of intelligence as a covariate, prior belief did not have a significant main effect, which could be due to the varying levels of importance attached to prior beliefs by the participants with different intelligence levels. Further, as it enters into

interactions with polarity and intelligence, one can speculate that prior belief which does not seem to be an evident factor readily transparent to the participants as they judge the strength of the arguments in the dialogs may become visible to various extents to the participants with varying levels of intelligence. In fact, our further correlation analyses revealed that subjects with lower intelligence scores rated the arguments with manipulations of weak prior belief and negative polarity combined relatively highly (at $p=.027$).

Consequently, as further validated by our experimental results, prior beliefs, or subjective degrees of belief, need to be considered in argumentation studies. In the relevant literature (Walton, 1995; van Eemeren & Grootendorst, 2010), they are often neglected or could not be accommodated. This is why normative theories such as the Bayesian account that can capture the information provided by prior beliefs in the argumentation process can fill this gap.

Polarity

Despite being another major factor, determining argument strength, predicted and explained by the Bayesian account, polarity did not have a significant main effect in any of the experiments in this study, unlike the situation in the previous applications of the Bayesian theory (Oaksford & Hahn, 2004; Hahn et al., 2005). However, it entered into some interactions with the other major factors playing a role in argument strength, namely, prior belief and reliability, and with other secondary dimensions of argument evaluation investigated in this study, namely, topic, intelligence, and evidentiality.

When the reliability and topic information was collapsed in further analysis, it was revealed that the arguments which have negative polarity and include weak prior beliefs were rated relatively highly by subjects who had lower Raven scores of intelligence. Tentatively, it might be stated that less intelligent people do not readily recognize as well as more intelligent people that there is actually a problem with negative polarity statements. Thus they may be more prone to be convinced by the

argument or more intelligent people are less easily persuaded in general (Hovland & Weiss, 1951).

Thus, polarity, among other factors, seems to be the least salient one and becomes visible only in interaction with other more apparent factor manipulations. On the whole, arguments from negative evidence cases, although discarded as fallacious in most standard logic treatments, can get as high acceptance ratings as those from positive evidence, and this can be captured using the Bayesian account, which is a great contribution to the studies on informal arguments.

Reliability

As the third major factor predicted and explained by the Bayesian account to play a significant role in argument strength, reliability turned out to produce a significant main effect in all the experiments in this study similar to the situation in the previous applications of the Bayesian theory (Oaksford & Hahn, 2004; Hahn & Oaksford, 2006a; Hahn et al., 2005; Hahn, Oaksford & Corner, 2005, Korb, 2004, cited in Hahn & Oaksford, 2006b; Hahn & Oaksford, 2007; Hahn & Oaksford, 2008; Hahn et al., 2009). It was observed that source reliability, as an extrinsic feature unrelated to the cognitive process or argumentation, remains influential, irrespective of the other constructs considered in this study.

Its experimental manipulation in our context, such as a university professor compared to an ordinary couple in the street, was also the most salient, compared to the other factors considered (prior belief or polarity), which might explain its relatively larger effect size.

The finding that arguments with higher source reliability are more convincing than those with less reliable sources of evidence was also in line with the discussion on the higher appeal that expressions of objectively constructed truth have relative to the lower appeal that expressions of individual subjectivities suffer from, judged through the perspective of the reader or the audience (Sargın & Oktar, 2010). It also reveals

important information about another domain called source monitoring, a part of ToM (Papafragou et al., 2007). Source monitoring is the idea that "people stand in different and variable informational relations to the world – hence their beliefs may vary and be modified or updated as new evidence becomes available" (Papafragou et al., 2007, p.255). People know the sort of evidence that has led them to think in a certain way about the issues and acting on this knowledge they evaluate their beliefs and revise and update them. This is why they are less likely to believe in what an ordinary couple in the street says than in the words of a university professor.

The same implication applies to the finding that shows an interaction between reliability and evidentiality, which is taken up later in this section in the discussion of the findings of the evidentiality study.

Topic

As a secondary factor in judging argument strength but still considered in the Bayesian account, topic had a significant main effect in the first experiment similar to its previous applications (Oaksford & Hahn, 2004; Hahn et al., 2005). However, in the second and third experiments, it did not have a main effect although it entered into some interactions with other factors such as polarity, reliability, intelligence, and evidentiality.

The effect of topic disappeared in the second experiment due to the possibility that certain topics were rated differently by subjects with different levels of intelligence and when the intelligence variation was factored out, variation among the topics vanished, while in the third experiment it disappeared probably due to the experimental design which required the separation of booklets across topics such that one participant would see all the versions of one story/topic only, turning topic into a between-subjects variable.

On the whole, topic effects are expected in argumentation studies and the Bayesian account can accommodate that. However, they have a different status than the other

factors. Actually, we are not interested in whether globalization leads to higher or lower acceptance ratings than robots. This does not tell us anything about the cognitive system – it only tells us about people's general stance towards various topics. If topics that are all judged similarly are chosen, most probably there would not be any topic effect.

Intelligence

The present study showed that intelligence did not have a main effect on participants performance on the kind of reasoning tasks required in this study. This finding suggests that people of different intelligence levels do not differ in their processing of arguments presented in this study. This finding is significant for the role of argumentation in education and public discussions in society, politics, and science. It shows that across the board people are capable of engaging in argumentation and argumentative discourse – a very important basis of participative societal practice.

However, intelligence entered into some interactions, especially with polarity manipulations. That is, more intelligent subjects were found to be less inclined to accept negative polarity items as convincing than less intelligent subjects. It seems that intelligence comes into play when relatively subtle manipulations are employed, as in the case of quite invisible polarity manipulations. Otherwise, the kind of subtlety employed in the argumentative dialogs constructed for the purposes of this study was not at such a level that would be distinguishable only by very intelligent participants.

Finally, this study, though limited in its scope due to its primary concern for argumentation, has been a further contribution to the other work on intelligence (Babcock, 1994; Rushton, 2003; Howrigan & MacDonald, 2008) using Raven Advanced Progressive Matrices.

Evidentiality

As the linguistic tool of referring to the source of information in Turkish, the grammatical evidentiality, –DI and –mIş, focusing mainly on the eyewitness *vs.* non-eyewitness distinction and using their simple forms, was considered with respect to its contribution to argument strength, either its unique contribution or its contribution in interaction with reliability.

In this context, –DI indicates that the speaker has direct (perceptual) evidence for a proposition and assumes responsibility for the information s/he expresses, which is expected to increase reliability, whereas –mIş indicates that s/he has only indirect or hearsay evidence and attributes responsibility to someone else, which is expected to decrease reliability (Aksu-Koç, 1988). Yet, the present study aimed at drawing the borders of each of these constructs or pointing out the intersection between them.

This study showed that evidentiality had a significant main effect on the participants' acceptance ratings of the arguments. Both suffixed particles, –mIş and –DI, as grammaticalized markers of evidentiality affected subject's acceptance ratings of the arguments, neutral/no marker case leading to significantly lower scored arguments. In particular, it seems that if no morphological or other cues were available, subjects found such statements awkward because they expected markers and if these were lacking they became very reluctant to give high levels of convictions. This is very much in line with Aikhenvald's (2004) findings agreeing on the conclusion that marking how one has acquired some information is not optional but obligatory in languages with grammatical evidentiality and their absence often leads to suspicion. Having –mIş, then, was still more convincing (but not as convincing) as having –DI. That is, any marker was better than no marker.

In this respect, it could have been better to include –DIr as the neutral case and make the modification *-faydalıdır* on the verbs of the main argument sentences rather than making the neutral case a no-marker modification. However, in that case, –DIr manipulation would be stronger than –mIş and –DI as an expression of induction

because it expresses objectivity or shared-subjectivity more than the other two, better achieving objectively constructed truth (Underhill, 1979; cited in Sargın & Oktar, 2010), or a generally accepted rule or fact or expressing certainty (Kornflit, 1996; cited in Sargın & Oktar, 2010), and thus would not help much with the distinction between –mIş and –DI again. Another alternative without any neutral marking might also be suggested but the kind of design we adopted here required a neutral case against which to contrast the two main evidentiality markings. Even in that case without a neutral marking though, the main distinction between the perceptual evidence and the hearsay would still prevail as indicated by the consistent difference between them across the different levels of reliability.

Again, by marking the information source differently (–DI, –mIş, or no marking/neutral) across the dialogs, the speaker expressed caution in the amount of responsibility s/he assumed for the information s/he conveyed (Weber, 1986; cited in Aksu-Koç, 1988, p.16): assumed responsibility in –DI, but attributed responsibility to someone else in –mIş, and left it to the listener's own judgment in neutral/no marking cases. Whether the participants would be aware of these intentions of the speakers in the dialogs was an intriguing question relating to source monitoring and ToM (Papafragou et al., 2007) again. The results showed that they were able to realize this intentional distance the speakers put between themselves and the different information sources at varying levels, and rated the acceptability of the arguments accordingly. That is, –DI received higher ratings than –mIş or neutral marking. In the neutral case, as Turkish is a language that grammaticalizes evidentiality, the participants approached no marker cases with suspicion and rated them less acceptable than the other two options.

The issue whether evidentiality is inherently associated with reliability with respect to the specific example of Turkish (Aksu-Koç and Slobin 1986; Aksu-Koç, 1988) was addressed in the current study considering the view that "Turkish has a single, non-differentiated form and the opposition between direct *vs.* indirect experience markers is primarily validational, reflecting the speaker's certainty about or commitment to the truth of his or her proposition" (Aksu-Koç, 1988, p.16). The

findings showed that each of these constructs, evidentiality and reliability, has their own unique contribution to argument acceptance, so does an interaction between them. That is, in all reliability cases, arguments with –mIş and those with –DI were rated higher than those with no marker, while in low reliability cases, though, arguments with –DI were rated higher than those with –mIş, indicating a single effect of reliability, a single effect of evidentiality, and a combined effect of the two.

Maybe the fact that they come out differently is also a result of the linguistic "grammaticalization" of the "evidentiality" markers as morphological markers that are processed automatically and are part of a system (language) that provides already pre-defined and consistently interpreted information across all language users as opposed to the un-encapsulated and in a way "open" information regarding the external source of the information as provided in the form of "reliability" manipulations in the little discourse units used in this study.

The combined effect of evidentiality and reliability also reveals important information about source monitoring, a part of ToM (Papafragou et al., 2007). The results showed that people in fact monitored the information source expressed in the words of the interlocutors in the dialogs (attributing mental states to others), judged whether the information was presented to him/her directly or it was hearsay or it was presented with no evidential marking (neutral case), and finally made the belief-updates of the interlocutors accordingly. This is why they were less likely to think that the interlocutors believed in the words of an ordinary couple in the street which included statements with neutral marking than in the words of a university professor which included statements with –DI.

Thus, the study showed that the morphological options of Turkish encode source reliability and express uncertainty in such a way that it can be directly used in argumentation, reducing the variation of individuals' argument evaluation. In this respect, this study, though limited in its scope, has been a further contribution to other work on the linguistic tool of evidentiality and the functions of evidentiality markers, which mainly investigated evidentiality within the scope of modality,

especially in presenting evidence, expressing levels of certainty and making inferences (Underhill, 1979; Aksu-Koç and Slobin, 1986; Tura Sansa, 1986; Kocaman, 1988; Kornflit, 1996; Ruhi, Zeyrek and Osam, 1997; Gencan, 2001; Güven, 2001; Banguoğlu, 2004; Göksel and Kerslake, 2005; cited in Sargin and Oktar, 2010). Further studies on evidentiality may incorporate lexical evidentiality markers or evidentiality strategies as well, by which cross-linguistic comparisons across languages with or without grammatical evidentiality markings can also be made to shed more light on the construct of evidentiality, irrespective of its varying linguistic realization.

Bayesian model-fitting

With respect to the Bayesian analysis, the overall fit between the data and the model was very good in the first experiment, while it was relatively lower in the third experiment. The models could in general return results that would be expected of a legitimate consistent test: that the two complementary aspects of a test's informativeness – the sensitivity (the probability that an effect would be observed if the hypothesis were true) and the specificity (the probability that an effect would not be observed if the hypothesis were false) values were higher in high or moderate reliability conditions as would be expected from a more reliable source and lower in low reliability condition. Similarly, prior belief manipulations were also predicted appropriately such that the strong prior belief conditions had higher values than the weak prior belief conditions.

On the other hand, when the general applicability of the Bayes modeling is concerned, some modeling difficulties, i.e. how to set the initial parameter values or how to determine constraints (an important trade-off point), were observed especially in the analysis on the data from the third experiment, although some of this might be due to the increasing number of factors (with the evidentiality and more levels of reliability incorporated) or the topic becoming a between-subjects factor. Its requirement for further trials using different constraints or initial values might turn out to be a critical restriction when many factors with several levels come into play.

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4.3 Conclusion

This dissertation, with the work on informal argument fallacies, with a specific focus on arguments from ignorance – negative evidence cases, aimed at contributing to the argumentation studies. Defining its scope within the work on fallacies, it tried to help with the development or further validation of a normative framework to account for argument strength to complement more procedural or dialectic approaches to argumentation.

To what extent such arguments can rationally be justified using the Bayesian probability has been the focus in various studies to date (Oaksford & Hahn, 2004; Hahn & Oaksford, 2006a; Hahn et al., 2005; Hahn, Oaksford & Corner, 2005; Korb, 2004, cited in Hahn & Oaksford, 2006b; Hahn & Oaksford, 2007; Hahn & Oaksford, 2008; Hahn et al., 2009). The results of those studies and this current study which employed the same methodology have been fruitful in giving some ideas about the extent to which Bayesian probability might provide a general, normative theory of argument strength.

Following the Bayesian account which succeeds where classical logic failed by dealing with uncertain information, capturing inductive inference, providing both qualitative and quantitative predictions and allowing belief revision (Hahn et al., 2009), the series of experiments conducted in this study formed an important step towards providing a common ground or convenient level of explanation for producing and testing new hypotheses about argument strength in different languages or in relation to other related constructs such as intelligence, emotions, development and so on.

Considering the study's contribution to ToM and to the language and thought debate in general, it reflects the participants' understanding of the factors of argumentation manipulated in this study, namely, prior belief, polarity, reliability, and the related issues of topic effects embedded in the little discourse units constructed for the purposes of this study; their understanding of the analytic reasoning and problem-

solving tasks employed in the intelligence test; and their understanding of information source expressions in the grammatical evidentials used. Mostly based on linguistic tasks, these findings suggest the main intuition captured in the language and thought debate that language and thought are closely and causally related (Papafragou et al., 2007); however, it does not provide information about the direction of this causality: which one precedes or shapes the formation of the other. In this respect, developmental studies may provide more straightforward information though. We already have some preliminary work on such an extension of the current study which is briefly mentioned in the suggestions for future studies section.

One has to consider the difficulties that this kind of modeling also causes, such as in assigning parameter values and defining constraints. Nevertheless, considering that other important argumentation work mainly focuses on procedural, dialectical and descriptive aspects of argumentative dialogs (Walton, 1995; van Eemeren & Grootendorst, 2010), this Bayesian account, trying to provide a normative explanation, can help to construct an understanding of how people should reason. In this respect, it can have important implications for various fields of science including education.

4.4 Limitations and suggestions for future studies

One theoretical issue was whether the Bayesian theory presupposes a "rational agent" as it is well-established that human subjects do not follow the laws of logic, e.g., the probabilities of hypotheses (h) and ($\neg$h) $\neq$1. The Bayesian account, as a normative theory of argumentation in our context, attempts to provide standards against which to compare and explain human data; that is why it attempts to provide a *rational analysis* of behavior (e.g., Anderson, 1991; Chater & Oaksford, 2000; Oaksford & Chater, 1998a; Chater & Oaksford; 1999a, cited in Hahn & Oaksford, 2006b), seeing human behavior as an approximation to some ideal behavior, by which deviations from the norms can also be explained (Hahn & Oaksford, 2006b). From our experience, it can be concluded that with its clear consideration of descriptive paradigms, the prescriptive Bayesian approach, trying to set the standards

of rational behavior, is still a promising research area which can in return feed the descriptive work especially in providing a framework for argumentation analysis.

A further criticism about the Bayesian theory employed in this study was as to how the prior probabilities are assigned to the arguments. In our study, following Hahn and Oaksford (2004, 2005), the practical issue of finding out what the priors were in the experiments was dealt with in two ways; a more empirical one, as in asking participants for ratings of the prior degree of belief before presenting an argument; and alternatively a more theoretical one, as in treating the likelihoods and priors as free parameters and estimating the values that give the best fit to the posteriors (i.e., the argument strength ratings). Actually, what we could have also done was to let the subjects rate the priors of the interlocutor, i.e., how strongly, they think, is interlocutor B convinced of the argument before listening to interlocutor A. However, that kind of "too-much-familiarity with prior belief, as one of the factors that were manipulated in the design" would have caused an additional training effect.

A related criticism about the experiments was mainly due to the use of constructed dialogs rather than naturally occurring – written or spoken – language samples and the use of third-person judgments instead of first-person judgments. Although naturally occurring data from weblogs or forums for instance would be more appealing and realistic, it was necessary to construct the dialogs in their current forms in the study due to a consideration of the three main factors (prior belief, polarity, and reliability) that affect argument strength according to the Bayesian theory and an additional consideration of topic effects. Considering all these essential constraints and manipulations, the study made use of the dialogs in their current forms. However, future research into argumentative discourse in Turkish can incorporate such naturally occurring data as in the studies of Sargın & Oktar (2010), and Daylak (2004).

Further, the issue of whether third-person judgments might be problematic was investigated by asking participants about their own prior beliefs prior to the administration of the actual questionnaire and it turned out that on the whole there

was almost no interference of personal prior belief in their judgments as third-person. This type of tests is widely used in work on normative studies as well (Tversky & Kahneman, 1980; Bailenson & Rips, 1996; Rips, 1998, 200, cited in Hahn & Oaksford, 2007).

Again, concerning the experimental design, scholars, such as Walton (2004, p. 277; cited in Hahn & Oaksford, 2006b) and Ennis (2004; cited in Hahn & Oaksford, 2006b) argued that expecting participants to assign numerical values to the premises in dialogues (posterior beliefs, on a 11-point Likert scale) would be unhelpful due to concerns about the ambiguity regarding what some number exactly refers to (Thagard, 2009). However, Hahn and Oaksford (2006b) claim that what a specific number refers to can be explained through context and be exposed to sensitivity tests (Gill, 2002). Further, it has been revealed that people prefer assigning numerical probabilities in experimental contexts as they can practically restrict themselves to certain points on a scale (Wallsten et al., 1993; cited in Hahn & Oaksford, 2006b).

Another shortcoming of the study was that in their judgments of the dialogs in the questionnaires, participants were expected to read and respond to all versions of all the stories or all versions of single stories. This would naturally bore or habituate them or help them notice the pattern and respond accordingly, which would not be desirable. In the replication experiment (the first experiment) with 32 dialogs in each questionnaire, the number had to be that way because we needed to follow the experiment scheme in Hahn et al. (2005) strictly. However, in the evidentiality study, to control for this, subjects saw the alternating dialogs for only one topic, but still the number of dialogs were 36 due to the inclusion of one more factor, evidentiality, with three levels. In later studies, this might be overcome by employing the method of Confounded Latin Square, which allows participants to see only some versions of some stories and also requires a special way of statistical testing.

Fallacies, as instantiated in various discourse types – such as spoken or written political discourse, legal discourse, hospital discourse, and the like – in various languages, still compose an important area of investigation (Daylak, 2004). Adoption

of the Bayesian account to understand and account for various types of fallacies in different languages including Turkish can prove fruitful, especially in identifying whether they have universal features which can be explained by a single formal account.

Besides, from a developmental perspective on argumentation in Turkish, it can be explored how children of various ages (e.g., young adolescents, 11-13 years of age, and adolescents, 14-16 years of age) respond to the factors interacting with each other in the evaluation of argument strength or whether school children can reason sensibly about evidence from a fairly early age in areas that are the subject of their experience. In fact, we already have some preliminary work on such a study.

With respect to learning, another study might address whether children and/or adults can be trained to make better or more valid inferences, by exposing them to more examples or showing them the structural argumentative parallels between the domains they are familiar with and the other novel domains. Such an investigation may produce insight into how pedagogues may engage children or adults to "think well", a key educational imperative (Kuhn, 1991; cited in Hahn et al., 2009). By investigating the developmental trajectory argumentation follows, there will be an important contribution to developmental and educational branches of psychology.

Again considering the close relation between emotion and cognition in development and their strong connection in social behavior, it is no big surprise to claim that varying emotional states affect argumentation process. Emotions are studied extensively in psychology, neuroscience, philosophy, and language. Emotion, motivation and cognitive processes are all closely related and one's efficiency in argumentation is also dependent on the ability to become aware of emotions and manage them in the most efficient direction. Considering that emotion is always in the loop of cognition (Caine and Caine, 1991; Damasio, 1994, cited in Restak 2000; Goleman, 1995; Howard, 2000; Pessoa, 2008), a study that explores how varying the emotional impact of the argument content, as in accompanying high *vs.* low or pleasant *vs.* unpleasant emotions, affects the reasoning process may bring about

interesting implications for various fields including law, politics, psychology, philosophy, logic, and language.

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APPENDICES

APPENDIX A – INFORMED CONSENT FORM

Gönüllü Katılım Formu

Bu çalışma, ODTÜ Enformatik Enstitüsü Bilişsel Bilimler Programı doktora öğrencisi Hatice (Bayındır) Karaaslan tarafından yürütülen kültürler ve diller arası bir çalışmadır. Çalışmanın amacı, katılımcıların bir savın ne derece ikna edici olduğunu değerlendirirken dikkate aldıkları kriterleri belirlemektir. Çalışmaya katılım tamamiyle gönüllülük temelinde olmalıdır. Ankette ad-soyad bilgisi istenmeyecektir. Cevaplarınız tamamiyle gizli tutulacak ve sadece araştırmacılar tarafından değerlendirilecektir; elde edilecek bilgiler bilimsel yayımlarda kullanılacaktır.

Anket, genel olarak kişisel rahatsızlık verecek soruları içermemektedir. Ancak, katılım sırasında sorulardan ya da herhangi başka bir nedenden ötürü kendinizi rahatsız hissederseniz cevaplama işini yarıda bırakıp çıkmakta serbestsiniz. Böyle bir durumda anketi uygulayan kişiye, anketi tamamlamadığınızı söylemek yeterli olacaktır. Anket sonunda, bu çalışmayla ilgili sorularınız cevaplanacaktır. Bu çalışmaya katıldığınız için şimdiden teşekkür ederiz. Çalışma hakkında daha fazla bilgi almak için Hatice (Bayındır) Karaaslan (Çankaya Üniversitesi Hazırlık Sınıfı ; Tel: 233 1062; E-posta: bayindirh@cankaya.edu.tr) ile iletişim kurabilirsiniz.

Bu çalışmaya tamamen gönüllü olarak katılıyorum ve istediğim zaman yarıda kesip çıkabileceğimi biliyorum. Verdiğim bilgilerin bilimsel amaçlı yayımlarda kullanılmasını kabul ediyorum. (Formu doldurup imzaladıktan sonra uygulayıcıya geri veriniz).

Tarih   İmza
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APPENDIX B – DEBRIEFING FORM

KATILIM SONRASI BİLGİ FORMU

Bu çalışma daha önce de belirtildiği gibi ODTÜ Enformatik Enstitüsü Bilişsel Bilimler Programı doktora öğrencisi Hatice (Bayındır) Karaaslan tarafından yürütülen kültürler ve diller arası bir çalışmadır. Türkçe'de savlamanın Bayes uslamlama teorisi çerçevesinde değerlendirilmesi başlıklı bu çalışma, katılımcıların bir savın ne derece ikna edici olduğunu değerlendirirken dikkate aldıkları kriterleri araştırmaktadır. Savlama gerek günlük iletişimde gerekse bilimsel çalışmalarda rutin olarak karşımıza çıkan bir olgu olduğu için, öne sürülen savların geçerli olup olmadığı da önemli bir araştırma konusu olmuştur. Bu çalışma, Türkçenin, -DI veya -mIş türünden farklı geçmiş zaman ifadelerinde olduğu gibi, kendine özgü bazı özelliklerinin öne sürülen savın gücünü etkileyip etkilemediğini araştırmayı hedeflemektedir. Ayrıca, uslamlamanın zeka ile olabilecek bağlantıları da çalışmanın ilerleyen aşamalarında ele alınacaktır.

Bu çalışmadan alınacak ilk verilerin Aralık 2011 sonunda elde edilmesi amaçlanmaktadır. Elde edilen bilgiler sadece bilimsel araştırma ve yazılarda kullanılacaktır. Çalışmanın sonuçlarını öğrenmek ya da bu araştırma hakkında daha fazla bilgi almak için aşağıdaki isimlere başvurabilirsiniz. Bu araştırmaya katıldığınız için tekrar çok teşekkür ederiz.

Hatice (Bayındır) Karaaslan (Çankaya Üniversitesi Hazırlık Sınıfı ; Tel: 233 1062; E-posta: bayindirh@cankaya.edu.tr)

APPENDIX C – INFORMED CONSENT FORM

/420-791-81

02//02/2011

ENFORMATİK ENSTİTÜSÜ MÜDÜRLÜĞÜNE

Üniversitemiz Bilişsel Bilimler Anabilim Dalı (COGS) doktora programı öğrencisi Hatice Bayındır'ın 22/11/2010- 03/05/2011 tarihlerinde *"Türkçede Savlamanın Bayes Uslama Teorisi Çerçevesinde Değerlendirilmesi "* başlıklı araştırmasına ilişkin olarak ODTÜ öğrencilerine uygulama yapmak için, öğrencinin isteği doğrultusunda görevlendirilmesi Etik Komite onayı ile uygun görülmüştür.

Uygulamanın yapılabilmesi için gereğini arz ederim.

Saygılarımla.

Nesrin Ünsal
Öğrenci İşleri Daire Başkanı

Ekler:
1- İAEK Başvuru Formu
2-İAEK Başvuru Kontrol Listesi
3-İAEK Başvuru Formu Proje Bilgi Formu
4-Anket

APPENDIX D – Hahn et al (2005) Original (English) Questionnaire

1.

Margaret: Do you think clone technology is a threat for human beings?
Anton: I sort of believe that clone technology is not a threat for human beings.
Margaret: You can do more than sort of believe it; you can be certain that it is not a threat.
Anton: Why do you say that?
Margaret: Because according to a Professor at British Medical Research Council, there have never been any reported harms of the technique on human beings and thus it doesn't present any threats.

*Considering his initial view, how convinced do you think Anton should <u>now</u> be that clone technology is not a threat for human beings? Please indicate your response by putting a tick (√) in the corresponding box in the <u>**0 (not convinced at all) to 10 (totally convinced)**</u> scale below.*

0	1	2	3	4	5	6	7	8	9	10

2.

James: Do you think it is beneficial to privatise public transportation?
Sandra: I am fairly convinced that it is not beneficial to privatise public transportation.
James: You can be more than fairly convinced; you can be certain that it is not beneficial.
Sandra: Why do you say that?
James: Because I read a newspaper interview with the members of a non-governmental research body and they said that it is not beneficial considering the declining service quality and the increase in the overall operating costs.

*Considering her initial view, how convinced do you think Sandra should <u>now</u> be that it is not beneficial to privatise public transportation? Please indicate your response by putting a tick (√) in the corresponding box in the <u>**0 (not convinced at all) to 10 (totally convinced)**</u> scale below.*

0	1	2	3	4	5	6	7	8	9	10

3.

Hilary: Do you think clone technology is a threat for human beings?
George: I am fairly convinced that clone technology is not a threat for human beings.
Hilary: You can be more than fairly convinced; you can be certain that it is not a threat.
George: Why do you say that?
Hilary: Because according to a Professor at British Medical Research Council, there have never been any reported harms of the technique on human beings and thus it doesn't present any threats.

*Considering his initial view, how convinced do you think George should <u>now</u> be that clone technology is not a threat for human beings? Please indicate your response by putting a tick (√) in the corresponding box in the <u>**0 (not convinced at all) to 10 (totally convinced)**</u> scale below.*

0	1	2	3	4	5	6	7	8	9	10

4.

Brenda: Do you think it is beneficial to privatise public transportation?
Adam: I am fairly convinced that it is beneficial to privatise public transportation.
Brenda: You can be more than fairly convinced; you can be certain that it is beneficial.
Adam: Why do you say that?
Brenda: Because I read a newspaper interview with the members of a non-governmental research body and they said that it is beneficial considering the improved service quality and the reduction in the overall operating costs.

*Considering his initial view, how convinced do you think Adam should <u>now</u> be that it is beneficial to privatise public transportation? Please indicate your response by putting a tick (√) in the corresponding box in the <u>**0 (not convinced at all) to 10 (totally convinced)**</u> scale below.*

0	1	2	3	4	5	6	7	8	9	10

5.

Jack:	Do you think it is beneficial to privatise public transportation?
Frank:	I sort of believe that it is not beneficial to privatise public transportation.
Jack:	You can do more than sort of believe it; you can be certain that it is not beneficial.
Frank:	Why do you say that?
Jack:	Because I heard a street interview on TV with a couple of people talking about it and they said that it is not beneficial.

*Considering his initial view, how convinced do you think Frank should <u>now</u> be that it is not beneficial to privatise public transportation? Please indicate your response by putting a tick (√) in the corresponding box in the <u>**0 (not convinced at all) to 10 (totally convinced)**</u> scale below.*

0	1	2	3	4	5	6	7	8	9	10

6.

Clara:	Do you think it is beneficial to privatise public transportation?
Andrew:	I am fairly convinced that it is not beneficial to privatise public transportation.
Clara:	You can be more than fairly convinced; you can be certain that it is not beneficial.
Andrew:	Why do you say that?
Clara:	Because I heard a street interview on TV with a couple of people talking about it and they said that it is not beneficial.

*Considering his initial view, how convinced do you think Andrew should <u>now</u> be that it is not beneficial to privatise public transportation? Please indicate your response by putting a tick (√) in the corresponding box in the <u>**0 (not convinced at all) to 10 (totally convinced)**</u> scale below.*

0	1	2	3	4	5	6	7	8	9	10

7.

Karen:	Do you think clone technology is a threat for human beings?
April:	I am fairly convinced that clone technology is not a threat for human beings.
Karen:	You can be more than fairly convinced; you can be certain that it is not a threat.
April:	Why do you say that?
Karen:	Because I heard a journalist talking about it on TV and he said that it doesn't present any threats for human beings.

*Considering her initial view, how convinced do you think April should <u>now</u> be that clone technology is not a threat for human beings? Please indicate your response by putting a tick (√) in the corresponding box in the **<u>0 (not convinced at all) to 10 (totally convinced)</u>** scale below.*

0	1	2	3	4	5	6	7	8	9	10

8.

Julian:	Do you think clone technology is a threat for human beings?
Andrea:	I am fairly convinced that clone technology is a threat for human beings.
Julian:	You can be more than fairly convinced; you can be certain that it is a threat.
Andrea:	Why do you say that?
Julian:	Because according to a Professor at British Medical Research Council, the long-term effects of the technique are still unknown to a great extent and thus it presents threats for the well-being of future generations.

*Considering her initial view, how convinced do you think Andrea should <u>now</u> be that clone technology is a threat for human beings? Please indicate your response by putting a tick (√) in the corresponding box in the **<u>0 (not convinced at all) to 10 (totally convinced)</u>** scale below.*

0	1	2	3	4	5	6	7	8	9	10

9.

Tom: Do you think it is beneficial to privatise public transportation?
Heidi: I sort of believe that it is beneficial to privatise public transportation.
Tom: You can do more than sort of believe it; you can be certain that it is beneficial.
Heidi: Why do you say that?
Tom: Because I read a newspaper interview with the members of a non-governmental research body and they said that it is beneficial considering the improved service quality and the reduction in the overall operating costs.

*Considering her initial view, how convinced do you think Heidi should <u>now</u> be that it is beneficial to privatise public transportation? Please indicate your response by putting a tick (√) in the corresponding box in the <u>**0 (not convinced at all) to 10 (totally convinced)**</u> scale below.*

0	1	2	3	4	5	6	7	8	9	10

10.

Kate: Do you think it is beneficial to privatise public transportation?
Chris: I am fairly convinced that it is beneficial to privatise public transportation.
Kate: You can be more than fairly convinced; you can be certain that it is beneficial.
Chris: Why do you say that?
Kate: Because I heard a street interview on TV with a couple of people talking about it and they said that it is beneficial.

*Considering his initial view, how convinced do you think Chris should <u>now</u> be that it is beneficial to privatise public transportation? Please indicate your response by putting a tick (√) in the corresponding box in the <u>**0 (not convinced at all) to 10 (totally convinced)**</u> scale below.*

0	1	2	3	4	5	6	7	8	9	10

11.

Britney: Do you think clone technology is a threat for human beings?
Andre: I sort of believe that clone technology is a threat for human beings.
Britney: You can do more than sort of believe it; you can be certain that it is a threat.
Andre: Why do you say that?
Britney: Because according to a Professor at British Medical Research Council, the long-term effects of the technique are still unknown to a great extent and thus it presents threats for the well-being of future generations.

Considering his initial view, how convinced do you think Andre should <u>now</u> be that clone technology is a threat for human beings? Please indicate your response by putting a tick (√) in the corresponding box in the __0 (not convinced at all) to 10 (totally convinced)__ scale below.

0	1	2	3	4	5	6	7	8	9	10

12.

Peter: Do you think it is beneficial to privatise public transportation?
Anita: I sort of believe that it is beneficial to privatise public transportation.
Peter: You can do more than sort of believe it; you can be certain that it is beneficial.
Anita: Why do you say that?
Peter: Because I heard a street interview on TV with a couple of people talking about it and they said that it is beneficial.

Considering her initial view, how convinced do you think Anita should <u>now</u> be that it is beneficial to privatise public transportation? Please indicate your response by putting a tick (√) in the corresponding box in the __0 (not convinced at all) to 10 (totally convinced)__ scale below.

0	1	2	3	4	5	6	7	8	9	10

13.

Maria:	Do you think clone technology is a threat for human beings?
Allen:	I sort of believe that clone technology is not a threat for human beings.
Maria:	You can do more than sort of believe it; you can be certain that it is not a threat.
Allen:	Why do you say that?
Maria:	Because I heard a journalist talking about it on TV and he said that it doesn't present any threats for human beings.

*Considering his initial view, how convinced do you think Allen should <u>now</u> be that clone technology is not a threat for human beings? Please indicate your response by putting a tick (√) in the corresponding box in the **<u>0 (not convinced at all) to 10 (totally convinced)</u>** scale below.*

0	1	2	3	4	5	6	7	8	9	10

14.

Jessica:	Do you think it is beneficial to privatise public transportation?
Albert:	I sort of believe that it is not beneficial to privatise public transportation.
Jessica:	You can do more than sort of believe it; you can be certain that it is not beneficial.
Albert:	Why do you say that?
Jessica:	Because I read a newspaper interview with the members of a non-governmental research body and they said that it is beneficial considering the declining service quality and the increase in the overall operating costs.

*Considering his initial view, how convinced do you think Albert should <u>now</u> be that it is not beneficial to privatise public transportation? Please indicate your response by putting a tick (√) in the corresponding box in the **<u>0 (not convinced at all) to 10 (totally convinced)</u>** scale below.*

0	1	2	3	4	5	6	7	8	9	10

15.

Dave: Do you think clone technology is a threat for human beings?
Alice: I sort of believe that clone technology is a threat for human beings.
Dave: You can do more than sort of believe it; you can be certain that it is a threat.
Alice: Why do you say that?
Dave: Because I heard a journalist talking about it on TV and he said that it presents threats for human beings.

*Considering her initial view, how convinced do you think Alice should <u>now</u> be that clone technology is a threat for human beings? Please indicate your response by putting a tick (√) in the corresponding box in the <u>**0 (not convinced at all) to 10 (totally convinced)**</u> scale below.*

0	1	2	3	4	5	6	7	8	9	10

16.

Sam: Do you think clone technology is a threat for human beings?
June: I am fairly convinced that clone technology is a threat for human beings.
Sam: You can be more than fairly convinced; you can be certain that it is a threat.
June: Why do you say that?
Sam: Because I heard a journalist talking about it on TV and he said that it presents threats for human beings.

*Considering her initial view, how convinced do you think June should <u>now</u> be that clone technology is a threat for human beings? Please indicate your response by putting a tick (√) in the corresponding box in the <u>**0 (not convinced at all) to 10 (totally convinced)**</u> scale below.*

0	1	2	3	4	5	6	7	8	9	10

End of Dialogues

Yaş: Cinsiyet: Uyruk:

Değerli Katılımcılar,
Lütfen aşağıdaki konuları okuyup her konunun altında verilmiş olan soruları ilgili ölçek üzerinde, kendi bilgi seviyenizi ve görüşünüzü yansıtacak şekilde işaretleyiniz (√). Doğru veya yanlış cevap yoktur. Katkılarınız için çok teşekkür ederiz.

KONU 1. Ülke topraklarının yabancılara satılması

(a) Konu ile ilgili ne kadar bilgiye sahipsiniz? ("0" hiç bilgi sahibi olmadığınızı; "10" çok bilgiye sahip olduğunuzu ifade eder; buna göre 0 ile 10 arasında bir sayı tercih ediniz.)

Hiç Bilgim Yok   Çok Bilgiliyim

0	1	2	3	4	5	6	7	8	9	10

(b) Bunun yapılması faydalı mıdır, faydalı değil midir? ("0" hiç faydalı olmadığını; "10" çok faydalı olduğunu ifade eder; buna göre 0 ile 10 arasında bir sayı tercih ediniz.)

Faydalı Değildir   Çok Faydalıdır

0	1	2	3	4	5	6	7	8	9	10

(c) Bu konu sizin ilgi alanınıza ne kadar girmektedir? ("0" hiç ilgilenmediğinizi, "10" çok ilgilendiğinizi ifade eder; buna göre 0 ile 10 arasında bir sayı tercih ediniz.)

Hiç İlgim Yok   Çok İlgiliyim

0	1	2	3	4	5	6	7	8	9	10

(d) Size göre bu konu ne kadar önemlidir? ("0" hiç önemli olmadığını, "10" çok önemli olduğunu ifade eder; buna göre 0 ile 10 arasında bir sayı tercih ediniz.)

Hiç Önemi Yok   Çok Önemli

0	1	2	3	4	5	6	7	8	9	10

    KONU 2. Otobüs, tren, vb. toplu taşım araçlarının özelleştirilmesi
    KONU 3. Nükleer enerji santrallerinin kurulması
    KONU 4. Klonlamaya izin verilmesi
    KONU 5. Bitkilerle tedavi, akupunktur, vb. alternatif tıbbın kullanılması
    KONU 6. Korsan yayına karşı önlemlerin alınması
    KONU 7. Türk okullarında eğitim dilinin İngilizce olması

KONU 8. Küreselleşme süreçlerinin desteklenmesi
KONU 9. İsteyen bireylerin evlat edinebilmesi
KONU 10. Hayvanların deneylerde kobay olarak kullanılması
KONU 11. İş dünyasında insandan ziyade robotların kullanılması
KONU 12. Çocukların bilgisayar oyunları oynaması
KONU 13. İsteyen bireylerin organ bağışlaması
KONU 14. Doğanın korunmasına yönelik tedbirlerin alınması
KONU 15. Bireylere klasik sınıf içi eğitim yerine uzaktan eğitim verilmesi
KONU 16. İdam cezasının uygulanması
KONU 17. Kırsal bölgeden ziyade kentte yaşanılması
KONU 18. Demokraside eğitimden ziyade kuralların ve yasakların kullanılması
KONU 19. Eşcinsel tercihlere izin verilmesi
KONU 20. İklim değişikliğini dikkate alan uygulamalara olanak verilmesi

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- Ankette değinilmemiş, ancak size göre önemli olabilecek konu önerilerinizi belirtiniz:

- Ölçekte ifade edemediğiniz diğer noktaları ve görüşlerinizi belirtiniz:

APPENDIX F – Replication Study - Turkish Questionnaire

1.

Canan:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Kemal:	Pek öyle olduğunu düşünmüyorum.
Canan:	Aslında tehdit oluşturmadığı konusunda emin olmalısın.
Kemal:	Niye öyle düşünüyorsun?
Canan:	Öyle düşünüyorum çünkü İngiliz Tıbbi Araştırmalar Konseyi'nden bir profesöre göre, şu ana kadar klonlamanın insana zarar verdiğine dair herhangi bir bulgu bulunmuyor.

Başlangıçtaki düşüncesini dikkate aldığınızda, Kemal'in, Canan'ın kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

2.

Selma:	Sence idam cezası toplumlar için faydalı mıdır?
Cansu:	Öyle olmadığından epey eminim.
Selma:	Aslında öyle olmadığı konusunda kesin emin olmalısın.
Cansu:	Niye öyle düşünüyorsun?
Selma:	Öyle düşünüyorum çünkü İngiliz Suç ve Adalet Araştırma-Proje Merkezi'nden araştırmacılarla yapılan bir dergi röportajına göre, suçluyu topluma geri kazandıramadığı ve suça eğilim noktasında caydırıcı olmadığı dikkate alınırsa idam cezası faydalı değildir.

Başlangıçtaki düşüncesini dikkate aldığınızda, Cansu'nun, Selma'nın kendisine sunduğu açıklamalar sonrasında idam cezasının toplumlar için faydalı olmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

3.

Sırma: faydalı	Sence iş yerlerinde insanların yerine robotların çalıştırılması toplumlar için mıdır?
Can:	Öyle olmadığından epey eminim.
Sırma:	Aslında öyle olmadığı konusunda kesin emin olmalısın.
Can:	Niye öyle düşünüyorsun?
Sırma:	Öyle düşünüyorum çünkü bağımsız bir araştırma merkezinden temsilcilerle yapılan bir gazete röportajına göre, hizmet kalitesindeki düşüş ve genel maliyetteki artış dikkate alınırsa robotların çalıştırılması faydalı değildir.

Başlangıçtaki düşüncesini dikkate aldığınızda, Can'ın, Sırma'nın kendisine sunduğu açıklamalar sonrasında iş yerlerinde insanların yerine robotların çalıştırılmasının toplumlar için faydalı olmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte **0 (Hiç İkna Olmadı)** *ile* **10 (Tamamen İkna Oldu)** *arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.*

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

4.

Ceyda:	Sence küreselleşme insanlık için bir tehdit oluşturuyor mu?
Sibel:	Öyle olduğundan epey eminim.
Ceyda:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Sibel:	Niye öyle düşünüyorsun?
Ceyda:	Öyle düşünüyorum çünkü televizyonda bir yazar da küreselleşmenin insanlık ya da toplumlar için çeşitli tehditler oluşturduğunu söyledi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Sibel'in, Ceyda'nın kendisine sunduğu açıklamalar sonrasında küreselleşmenin insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte **0 (Hiç İkna Olmadı)** *ile* **10 (Tamamen İkna Oldu)** *arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.*

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

5.

Levent:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Funda:	Öyle olmadığından epey eminim.
Levent:	Aslında öyle olmadığı konusunda kesin emin olmalısın.
Funda:	Niye öyle düşünüyorsun?
Levent:	Öyle düşünüyorum çünkü İngiliz Tıbbi Araştırmalar Konseyi'nden bir profesöre göre, şu ana kadar klonlamanın insana zarar verdiğine dair herhangi bir bulgu bulunmuyor.

Başlangıçtaki düşüncesini dikkate aldığınızda, Funda'nın, Levent'in kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

6.

Arda:	Sence küreselleşme insanlık için bir tehdit oluşturuyor mu?
Selin:	Pek öyle olmadığını düşünmüyorum.
Arda:	Aslında tehdit oluşturduğu konusunda emin olmalısın.
Selin:	Niye öyle düşünüyorsun?
Arda:	Öyle düşünüyorum çünkü televizyonda bir yazar da küreselleşmenin insanlık ya da toplumlar için çeşitli tehditler oluşturduğunu söyledi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Selin'in, Arda'nın kendisine sunduğu açıklamalar sonrasında küreselleşmenin insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

7.

Müge:	Sence iş yerlerinde insanların yerine robotların çalıştırılması toplumlar için
faydalı	mıdır?
Okan:	Öyle olduğundan epey eminim.
Müge:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Okan:	Niye öyle düşünüyorsun?
Müge:	Öyle düşünüyorum çünkü bağımsız bir araştırma merkezinden temsilcilerle yapılan bir gazete röportajına göre, hizmet kalitesindeki artış ve genel maliyetteki düşüş dikkate alınırsa robotların çalıştırılması faydalıdır.

Başlangıçtaki düşüncesini dikkate aldığınızda, Okan'ın, Müge'nin kendisine sunduğu açıklamalar sonrasında iş yerlerinde insanların yerine robotların çalıştırılmasının toplumlar için faydalı olduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

8.

Ebru:	Sence idam cezası toplumlar için faydalı mıdır?
Yağmur:	Pek öyle olduğunu düşünmüyorum.
Ebru:	Aslında öyle olmadığı konusunda kesin emin olmalısın.
Yağmur:	Niye öyle düşünüyorsun?
Ebru:	Öyle düşünüyorum çünkü İngiliz Suç ve Adalet Araştırma-Proje Merkezi'nden araştırmacılarla yapılan bir dergi röportajına göre, suçluyu topluma geri kazandıramadığı ve suça eğilim noktasında caydırıcı olmadığı dikkate alınırsa idam cezası faydalı değildir.

Başlangıçtaki düşüncesini dikkate aldığınızda, Yağmur'un, Ebru'nun kendisine sunduğu açıklamalar sonrasında idam cezasının toplumlar için faydalı olmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

9.

Fatoş:	Sence iş yerlerinde insanların yerine robotların çalıştırılması toplumlar için
faydalı	mıdır?
Kaan:	Pek öyle olduğunu düşünmüyorum.
Fatoş:	Aslında öyle olmadığı konusunda kesin emin olmalısın.
Kaan:	Niye öyle düşünüyorsun?
Fatoş:	Öyle düşünüyorum çünkü televizyonda bir sokak röportajında da bir çift
	robotların çalıştırılmasının faydalı olmadığını söyledi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Kaan'ın, Fatoş'un kendisine sunduğu açıklamalar sonrasında iş yerlerinde insanların yerine robotların çalıştırılmasının toplumlar için faydalı olmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

10.

Gökçe:	Sence küreselleşme insanlık için bir tehdit oluşturuyor mu?
Hakan:	Pek öyle olduğunu düşünmüyorum.
Gökçe:	Aslında tehdit oluşturmadığı konusunda emin olmalısın.
Hakan:	Niye öyle düşünüyorsun?
Gökçe:	Öyle düşünüyorum çünkü televizyonda bir yazar da küreselleşmenin insanlık
	ya da toplumlar için herhangi bir tehdit oluşturmadığını söyledi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Hakan'ın, Gökçe'nin kendisine sunduğu açıklamalar sonrasında küreselleşmenin insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

11.

Sedat:	Sence iş yerlerinde insanların yerine robotların çalıştırılması toplumlar için
faydalı	mıdır?
Elvan:	Öyle olmadığından epey eminim.
Sedat:	Aslında öyle olmadığı konusunda kesin emin olmalısın.
Elvan:	Niye öyle düşünüyorsun?
Sedat:	Öyle düşünüyorum çünkü televizyonda bir sokak röportajında da bir çift robotların çalıştırılmasının faydalı olmadığını söyledi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Elvan'ın, Sedat'ın kendisine sunduğu açıklamalar sonrasında iş yerlerinde insanların yerine robotların çalıştırılmasının toplumlar için faydalı olmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

12.

Özge:	Sence idam cezası toplumlar için faydalı mıdır?
Tarık:	Pek öyle olmadığını düşünmüyorum.
Özge:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Tarık:	Niye öyle düşünüyorsun?
Özge:	Öyle düşünüyorum çünkü radyoda programa telefonla katılan bir konuk da idam cezasının faydalı olduğunu söyledi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Tarık'ın, Özge'nin kendisine sunduğu açıklamalar sonrasında idam cezasının toplumlar için faydalı olduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

13.

Cem:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Ayla:	Öyle olmadığından epey eminim.
Cem:	Aslında öyle olmadığı konusunda kesin emin olmalısın.
Ayla:	Niye öyle düşünüyorsun?
Cem:	Öyle düşünüyorum çünkü televizyonda bir gazeteci de klonlamanın insanlık için herhangi bir tehdit oluşturmadığını söyledi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Ayla'nın, Cem'in kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

14.

Seda:	Sence küreselleşme insanlık için bir tehdit oluşturuyor mu?
Cihan:	Pek öyle olmadığını düşünmüyorum.
Seda:	Aslında tehdit oluşturduğu konusunda emin olmalısın.
Cihan:	Niye öyle düşünüyorsun?
Seda:	Öyle düşünüyorum çünkü İngiliz Toplumbilim Araştırma Merkezi'nden bir profesöre göre, uzun vadede ortaya çıkacak etkileri hala büyük oranda bilinmediği için küreselleşme gelecek nesiller için tehdit oluşturuyor.

Başlangıçtaki düşüncesini dikkate aldığınızda, Cihan'ın, Seda'nın kendisine sunduğu açıklamalar sonrasında küreselleşmenin insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

15.

Janset:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Andaç:	Öyle olduğundan epey eminim.
Janset:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Andaç:	Niye öyle düşünüyorsun?
Janset:	Öyle düşünüyorum çünkü İngiliz Tıbbi Araştırmalar Konseyi'nden bir profesöre göre, uzun vadede ortaya çıkacak etkileri hala büyük oranda bilinmediği için klonlama gelecek nesiller için tehdit oluşturuyor.

Başlangıçtaki düşüncesini dikkate aldığınızda, Andaç'ın, Janset'in kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı | | | | | | | | | Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

16.

Sinem:	Sence idam cezası toplumlar için faydalı mıdır?
Tuna:	Öyle olduğundan epey eminim.
Sinem:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Tuna:	Niye öyle düşünüyorsun?
Sinem:	Öyle düşünüyorum çünkü radyoda programa telefonla katılan bir konuk da idam cezasının faydalı olduğunu söyledi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Tuna'nın, Sinem'in kendisine sunduğu açıklamalar sonrasında idam cezasının toplumlar için faydalı olduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı | | | | | | | | | Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

17.

Mine: faydalı	Sence iş yerlerinde insanların yerine robotların çalıştırılması toplumlar için mıdır?
Aydın:	Pek öyle olmadığını düşünmüyorum.
Mine:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Aydın:	Niye öyle düşünüyorsun?
Mine:	Öyle düşünüyorum çünkü bağımsız bir araştırma merkezinden temsilcilerle yapılan bir gazete röportajına göre, hizmet kalitesindeki artış ve genel maliyetteki düşüş dikkate alınırsa robotların çalıştırılması faydalıdır.

Başlangıçtaki düşüncesini dikkate aldığınızda, Aydın'ın, Mine'nin kendisine sunduğu açıklamalar sonrasında iş yerlerinde insanların yerine robotların çalıştırılmasının toplumlar için faydalı olduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

18.

Ali:	Sence idam cezası toplumlar için faydalı mıdır?
Ayşe:	Pek öyle olmadığını düşünmüyorum.
Ali:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Ayşe:	Niye öyle düşünüyorsun?
Ali:	Öyle düşünüyorum çünkü İngiliz Suç ve Adalet Araştırma-Proje Merkezi'nden araştırmacılarla yapılan bir dergi röportajına göre, topluma geri kazandırılamayacak mahkumlara uygulandığı ve suça eğilim noktasında caydırıcı olduğu dikkate alınırsa idam cezası faydalıdır.

Başlangıçtaki düşüncesini dikkate aldığınızda, Ayşe'nin, Ali'nin kendisine sunduğu açıklamalar sonrasında idam cezasının toplumlar için faydalı olduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

19.

Arzu: faydalı	Sence iş yerlerinde insanların yerine robotların çalıştırılması toplumlar için mıdır?
Demir:	Öyle olduğundan epey eminim.
Arzu:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Demir:	Niye öyle düşünüyorsun?
Arzu:	Öyle düşünüyorum çünkü televizyonda bir sokak röportajında da bir çift robotların çalıştırılmasının faydalı olduğunu söyledi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Demir'in, Arzu'nun kendisine sunduğu açıklamalar sonrasında iş yerlerinde insanların yerine robotların çalıştırılmasının toplumlar için faydalı olduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

20.

Necla:	Sence küreselleşme insanlık için bir tehdit oluşturuyor mu?
Murat:	Öyle olduğundan epey eminim.
Necla:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Murat:	Niye öyle düşünüyorsun?
Necla:	Öyle düşünüyorum çünkü İngiliz Toplumbilim Araştırma Merkezi'nden bir profesöre göre, uzun vadede ortaya çıkacak etkileri hala büyük oranda bilinmediği için küreselleşme gelecek nesiller için tehdit oluşturuyor.

Başlangıçtaki düşüncesini dikkate aldığınızda, Murat'ın, Necla'nın kendisine sunduğu açıklamalar sonrasında küreselleşmenin insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

21.

Birsen:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Cemil:	Pek öyle olmadığını düşünmüyorum.
Birsen:	Aslında tehdit oluşturduğu konusunda emin olmalısın.
Cemil:	Niye öyle düşünüyorsun?
Birsen:	Öyle düşünüyorum çünkü İngiliz Tıbbi Araştırmalar Konseyi'nden bir profesöre göre, uzun vadede ortaya çıkacak etkileri hala büyük oranda bilinmediği için klonlama gelecek nesiller için tehdit oluşturuyor.

Başlangıçtaki düşüncesini dikkate aldığınızda, Cemil'in, Birsen'in kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

22.

Ada:	Sence küreselleşme insanlık için bir tehdit oluşturuyor mu?
Efe:	Öyle olmadığından epey eminim.
Ada:	Aslında öyle olmadığı konusunda kesin emin olmalısın.
Efe:	Niye öyle düşünüyorsun?
Ada:	Öyle düşünüyorum çünkü televizyonda bir yazar da küreselleşmenin insanlık ya da toplumlar için herhangi bir tehdit oluşturmadığını söyledi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Efe'nin, Ada'nın kendisine sunduğu açıklamalar sonrasında küreselleşmenin insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

23.

Berrak:	Sence iş yerlerinde insanların yerine robotların çalıştırılması toplumlar için
faydalı	mıdır?
Mesut:	Pek öyle olmadığını düşünmüyorum.
Berrak:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Mesut:	Niye öyle düşünüyorsun?
Berrak:	Öyle düşünüyorum çünkü televizyonda bir sokak röportajında da bir çift robotların çalıştırılmasının faydalı olduğunu söyledi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Mesut'un, Berrak'ın kendisine sunduğu açıklamalar sonrasında iş yerlerinde insanların yerine robotların çalıştırılmasının toplumlar için faydalı olduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

24.

İlkim:	Sence idam cezası toplumlar için faydalı mıdır?
Caner:	Öyle olmadığından epey eminim.
İlkim:	Aslında öyle olmadığı konusunda kesin emin olmalısın.
Caner:	Niye öyle düşünüyorsun?
İlkim:	Öyle düşünüyorum çünkü radyoda programa telefonla katılan bir konuk da idam cezasının faydalı olmadığını söyledi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Caner'in, İlkim'in kendisine sunduğu açıklamalar sonrasında idam cezasının toplumlar için faydalı olmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

25.

İrfan:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Bahar:	Pek öyle olduğunu düşünmüyorum.
İrfan:	Aslında tehdit oluşturmadığı konusunda emin olmalısın.
Bahar:	Niye öyle düşünüyorsun?
İrfan:	Öyle düşünüyorum çünkü televizyonda bir gazeteci de klonlamanın insanlık için herhangi bir tehdit oluşturmadığını söyledi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Bahar'ın, İrfan'ın kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

26.

Filiz:	Sence idam cezası toplumlar için faydalı mıdır?
Tansel:	Pek öyle olduğunu düşünmüyorum.
Filiz:	Aslında öyle olmadığı konusunda kesin emin olmalısın.
Tansel:	Niye öyle düşünüyorsun?
Filiz:	Öyle düşünüyorum çünkü radyoda programa telefonla katılan bir konuk da idam cezasının faydalı olmadığını söyledi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Tansel'in, Filiz'in kendisine sunduğu açıklamalar sonrasında idam cezasının toplumlar için faydalı olmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

27.

Serdar:	Sence iş yerlerinde insanların yerine robotların çalıştırılması toplumlar için faydalı mıdır?
Ceren:	Pek öyle olduğunu düşünmüyorum.
Serdar:	Aslında öyle olmadığı konusunda kesin emin olmalısın.
Ceren:	Niye öyle düşünüyorsun?
Serdar:	Öyle düşünüyorum çünkü bağımsız bir araştırma merkezinden temsilcilerle yapılan bir gazete röportajına göre, hizmet kalitesindeki düşüş ve genel maliyetteki artış dikkate alınırsa robotların çalıştırılması faydalı değildir.

Başlangıçtaki düşüncesini dikkate aldığınızda, Ceren'in, Serdar'ın kendisine sunduğu açıklamalar sonrasında iş yerlerinde insanların yerine robotların çalıştırılmasının toplumlar için faydalı olmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

28.

Kerim:	Sence küreselleşme insanlık için bir tehdit oluşturuyor mu?
Sıla:	Pek öyle olduğunu düşünmüyorum.
Kerim:	Aslında tehdit oluşturmadığı konusunda emin olmalısın.
Sıla:	Niye öyle düşünüyorsun?
Kerim:	Öyle düşünüyorum çünkü İngiliz Toplumbilim Araştırma Merkezi'nden bir profesöre göre, şu ana kadar küreselleşmenin insanlığa ya da toplumlara zarar verdiğine dair herhangi bir bulgu bulunmuyor.

Başlangıçtaki düşüncesini dikkate aldığınızda, Sıla'nın, Kerim'in kendisine sunduğu açıklamalar sonrasında küreselleşmenin insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

29.

Esen:	Sence idam cezası toplumlar için faydalı mıdır?
Oktay:	Öyle olduğundan epey eminim.
Esen:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Oktay:	Niye öyle düşünüyorsun?
Esen:	Öyle düşünüyorum çünkü İngiliz Suç ve Adalet Araştırma-Proje Merkezi'nden araştırmacılarla yapılan bir dergi röportajına göre, topluma geri kazandırılamayacak mahkumlara uygulandığı ve suça eğilim noktasında caydırıcı olduğu dikkate alınırsa idam cezası faydalıdır.

Başlangıçtaki düşüncesini dikkate aldığınızda, Oktay'ın, Esen'nin kendisine sunduğu açıklamalar sonrasında idam cezasının toplumlar için faydalı olduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

30.

Defne:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Erdem:	Pek öyle olmadığını düşünmüyorum.
Defne:	Aslında tehdit oluşturduğu konusunda emin olmalısın.
Erdem:	Niye öyle düşünüyorsun?
Defne:	Öyle düşünüyorum çünkü televizyonda bir gazeteci de klonlamanın insanlık için çeşitli tehditler oluşturduğunu söyledi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Erdem'in, Defne'nin kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

31.

Gamze:	Sence küreselleşme insanlık için bir tehdit oluşturuyor mu?
Cemal:	Öyle olmadığından epey eminim.
Gamze:	Aslında öyle olmadığı konusunda kesin emin olmalısın.
Cemal:	Niye öyle düşünüyorsun?
Gamze:	Öyle düşünüyorum çünkü İngiliz Toplumbilim Araştırma Merkezi'nden bir profesöre göre, şu ana kadar küreselleşmenin insanlığa ya da toplumlara zarar verdiğine dair herhangi bir bulgu bulunmuyor.

Başlangıçtaki düşüncesini dikkate aldığınızda,Cemal'in, Gamze'nin kendisine sunduğu açıklamalar sonrasında küreselleşmenin insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

32.

Özgür:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Yasemin:	Öyle olduğundan epey eminim.
Özgür:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Yasemin:	Niye öyle düşünüyorsun?
Özgür:	Öyle düşünüyorum çünkü televizyonda bir gazeteci de klonlamanın insanlık için çeşitli tehditler oluşturduğunu söyledi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Yasemin'in, Özgür'ün kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

****Anket Sonu****

APPENDIX G – Questionnaire for Prior Beliefs

Lütfen aşağıdaki cümleleri okuyup konuyla ilgili kendi fikrinizi ifade edecek şekilde her cümlenin altında verilmiş olan 11'lik ölçek üzerinde *Hiç Katılmıyorum (0)* ile *Tamamen Katılıyorum (10)* arasında bir kutuya √ işareti koyunuz. Karar verirken, her cümlede belirtilen fikrin insanlık ya da toplum için avantajlarını ve dezavantajlarını dikkate alınız.

(1) Klonlama faydalıdır.

Hiç Katılmıyorum   *Tamamen Katılıyorum*

0	1	2	3	4	5	6	7	8	9	10

(2) İdam cezası faydalıdır.

Hiç Katılmıyorum   *Tamamen Katılıyorum*

0	1	2	3	4	5	6	7	8	9	10

(3) Küreselleşme faydalıdır.

Hiç Katılmıyorum   *Tamamen Katılıyorum*

0	1	2	3	4	5	6	7	8	9	10

(4) İş yerlerinde insan yerine robot kullanımı faydalıdır.

Hiç Katılmıyorum   *Tamamen Katılıyorum*

0	1	2	3	4	5	6	7	8	9	10

(5) Klonlama faydalı değildir.

Hiç Katılmıyorum   *Tamamen Katılıyorum*

0	1	2	3	4	5	6	7	8	9	10

(6) Küreselleşme faydalı değildir.

Hiç Katılmıyorum   *Tamamen Katılıyorum*

0	1	2	3	4	5	6	7	8	9	10

(7) İş yerlerinde insan yerine robot kullanımı faydalı değildir.

Hiç Katılmıyorum   *Tamamen Katılıyorum*

0	1	2	3	4	5	6	7	8	9	10

(8) İdam cezası faydalı değildir.

Hiç Katılmıyorum   *Tamamen Katılıyorum*

0	1	2	3	4	5	6	7	8	9	10

APPENDIX H – Questionnaire to Identify the Reliability Levels of Different Information Sources

Lütfen aşağıdaki bilgi kaynaklarını güvenilirlik dereceleri bakımından değerlendiriniz. Konuyla ilgili kendi fikrinizi ifade edecek şekilde her bilgi kaynağının altında verilmiş olan 11'lik ölçek üzerinde *Hiç Güvenilir Değil (0)* ile *Çok Güvenilir (10)* arasında bir kutuya √ işareti koyunuz. Her bir bilgi kaynağını kendi içinde değerlendiriniz.

1. Wikipedia

Hiç Güvenilir Değil   *Çok Güvenilir*

0	1	2	3	4	5	6	7	8	9	10

2. Anket Şirketleri
3. Siyasi Partiler
4. Düzenli Takip Edilen Internet Forumları
5. Belgeseller
6. Akademik-Bilimsel Yayınlar
7. Mahalli Gazeteler
8. Haber Ajansları/Portalları
9. Politikacılar/Bakanlar
10. Facebook/YouTube/Twitter
11. Düzenli Takip Edilen Yazarlar
12. GSM Operatörleri
13. Gazetelerin Bilim-Teknik Bölümleri
14. Internet Reklamları
15. Üniversite Veritabanları/Kaynakları

(The list in English: Wikipedia, Political Parties, Poll/Survey Companies, Regularly Followed Internet Forum Sites, Regularly Followed Writers, Local/Regional Newspapers, Academic-Scentific Publications, News Agencies or Portals, Internet Advertisements, GSM Operators, Facebook/YouTube/Twitter, University Databases/Resources, Documentaries, Sci-Tech Sections of Newspapers, Politicians/Ministers)

APPENDIX I – Turkish Questionnaire with Evidentiality Incorporated

1.

Demir: Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Arzu: Öyle olmadığından epey eminim.
Demir: Aslında öyle olmadığı konusunda kesin emin olmalısın.
Arzu: Niye öyle düşünüyorsun?
Demir: Öyle düşünüyorum çünkü konuyla ilgili bir internet forum sitesinde görüşlerini belirten kişilere göre, klonlama insanlar için zararlı değil.

Başlangıçtaki düşüncesini dikkate aldığınızda, Arzu'nun, Demir'in kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

2.

Hakan: Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Gökçe: Pek öyle olduğunu düşünmüyorum.
Hakan: Aslında tehdit oluşturmadığı konusunda emin olmalısın.
Gökçe: Niye öyle düşünüyorsun?
Hakan: Öyle düşünüyorum çünkü bir politikacı konuyla ilgili bir açıklama yapmış. Bazı fikirleri dikkate alarak kendi görüşünü belirtmiş. Ona göre klonlama insanlar için zararlı değilmiş.

Başlangıçtaki düşüncesini dikkate aldığınızda, Gökçe'nin, Hakan'ın kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

3.

Janset:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Andaç:	Öyle olduğundan epey eminim.
Janset:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Andaç:	Niye öyle düşünüyorsun?
Janset:	Öyle düşünüyorum çünkü bilimsel çalışmaların bulunduğu akademik bir yayındaki alanında uzman bir profesörle yapılan bir görüşmeye göre, klonlama insanlar için zararlı.

Başlangıçtaki düşüncesini dikkate aldığınızda, Andaç'ın, Janset'in kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

4.

Levent:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Funda:	Öyle olmadığından epey eminim.
Levent:	Aslında öyle olmadığı konusunda kesin emin olmalısın.
Funda:	Niye öyle düşünüyorsun?
Levent:	Öyle düşünüyorum çünkü bilimsel çalışmaların bulunduğu akademik bir yayındaki alanında uzman bir profesörle yapılan bir görüşmeye göre, klonlama insanlar için zararlı değil.

Başlangıçtaki düşüncesini dikkate aldığınızda, Funda'nın, Levent'in kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

5.

Necla:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Murat:	Öyle olduğundan epey eminim.
Necla:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Murat:	Niye öyle düşünüyorsun?
Necla:	Öyle düşünüyorum çünkü konuyla ilgili bir internet forum sitesinde kişilerin görüşlerine yer verdiler. Kişiler kendi gözlemlerinden hareketle görüşlerini belirttiler. Onlara göre klonlama insanlar için zararlıydı.

Başlangıçtaki düşüncesini dikkate aldığınızda, Murat'ın, Necla'nın kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

6.

İrfan:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Bahar:	Pek öyle olduğunu düşünmüyorum.
İrfan:	Aslında tehdit oluşturmadığı konusunda emin olmalısın.
Bahar:	Niye öyle düşünüyorsun?
İrfan:	Öyle düşünüyorum çünkü konuyla ilgili açıklama yapan bir politikacıya göre klonlama insanlar için zararlı değil.

Başlangıçtaki düşüncesini dikkate aldığınızda, Bahar'ın, İrfan'ın kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

7.

Sırma: Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Can: Öyle olmadığından epey eminim.
Sırma: Aslında öyle olmadığı konusunda kesin emin olmalısın.
Can: Niye öyle düşünüyorsun?
Sırma: Öyle düşünüyorum çünkü bir politikacı konuyla ilgili bir açıklama yapmış. Bazı fikirleri dikkate alarak kendi görüşünü belirtmiş. Ona göre klonlama insanlar için zararlı değilmiş.

Başlangıçtaki düşüncesini dikkate aldığınızda, Can'ın, Sırma'nın kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

8.

Suat: Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Hatice: Öyle olduğundan epey eminim.
Suat: Aslında öyle olduğu konusunda kesin emin olmalısın.
Hatice: Niye öyle düşünüyorsun?
Suat: Öyle düşünüyorum çünkü bir politikacı konuyla ilgili bir açıklama yaptı. Bazı fikirleri dikkate alarak kendi görüşünü belirtti. Ona göre klonlama insanlar için zararlıydı.

Başlangıçtaki düşüncesini dikkate aldığınızda, Hatice'nin, Suat'ın kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

9.

Sıla:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Kerim:	Pek öyle olmadığını düşünmüyorum.
Sıla:	Aslında tehdit oluşturduğu konusunda emin olmalısın.
Kerim:	Niye öyle düşünüyorsun?
Sıla:	Öyle düşünüyorum çünkü bir politikacı konuyla ilgili bir açıklama yapmış. Bazı fikirleri dikkate alarak kendi görüşünü belirtmiş. Ona göre klonlama insanlar için zararlıymış.

Başlangıçtaki düşüncesini dikkate aldığınızda, Kerim'in, Sıla'nın kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

10.

Canan:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Kemal:	Pek öyle olduğunu düşünmüyorum.
Canan:	Aslında tehdit oluşturmadığı konusunda emin olmalısın.
Kemal:	Niye öyle düşünüyorsun?
Canan:	Öyle düşünüyorum çünkü bilimsel çalışmaların bulunduğu akademik bir yayındaki alanında uzman bir profesörle yapılan bir görüşmeye göre, klonlama insanlar için zararlı değil.

Başlangıçtaki düşüncesini dikkate aldığınızda, Kemal'in, Canan'ın kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

11.

İlkim: Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Caner: Öyle olduğundan epey eminim.
İlkim: Aslında öyle olduğu konusunda kesin emin olmalısın.
Caner: Niye öyle düşünüyorsun?
İlkim: Öyle düşünüyorum çünkü bilimsel çalışmaların bulunduğu akademik bir yayında alanında uzman bir profesörle yapılan bir görüşmeye yer vermişler. Profesör klonlamanın uzun vadede ortaya çıkabilecek etkilerinin hala büyük oranda bilinmemesini dikkate alarak görüşünü belirtmiş. Ona göre klonlama insanlar için zararlıymış.

Başlangıçtaki düşüncesini dikkate aldığınızda, Caner'in, İlkim'in kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

12.

Meriç: Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Ela: Öyle olmadığından epey eminim.
Meriç: Aslında öyle olmadığı konusunda kesin emin olmalısın.
Ela: Niye öyle düşünüyorsun?
Meriç: Öyle düşünüyorum çünkü konuyla ilgili bir internet forum sitesinde kişilerin görüşlerine yer verdiler. Kişiler kendi gözlemlerinden hareketle görüşlerini belirttiler. Onlara göre klonlama insanlar için zararlı değildi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Ela'nın, Meriç'in kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

13.

Müge: Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?

Okan: Pek öyle olduğunu düşünmüyorum.

Müge: Aslında tehdit oluşturmadığı konusunda emin olmalısın.

Okan: Niye öyle düşünüyorsun?

Müge: Öyle düşünüyorum çünkü konuyla ilgili bir internet forum sitesinde görüşlerini belirten kişilere göre, klonlama insanlar için zararlı değil.

Başlangıçtaki düşüncesini dikkate aldığınızda, Okan'ın, Müge'nin kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

14.

Sinem: Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?

Tuna: Pek öyle olmadığını düşünmüyorum.

Sinem: Aslında tehdit oluşturduğu konusunda emin olmalısın.

Tuna: Niye öyle düşünüyorsun?

Sinem: Öyle düşünüyorum çünkü bilimsel çalışmaların bulunduğu akademik bir yayında alanında uzman bir profesörle yapılan bir görüşmeye yer vermişler. Profesör klonlamanın uzun vadede ortaya çıkabilecek etkilerinin hala büyük oranda bilinmemesini dikkate alarak görüşünü belirtmiş. Ona göre klonlama insanlar için zararlıymış.

Başlangıçtaki düşüncesini dikkate aldığınızda, Tuna'nın, Sinem'in kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

15.

Cem:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Ayla:	Öyle olmadığından epey eminim.
Cem:	Aslında öyle olmadığı konusunda kesin emin olmalısın.
Ayla:	Niye öyle düşünüyorsun?
Cem:	Öyle düşünüyorum çünkü konuyla ilgili açıklama yapan bir politikacıya göre klonlama insanlar için zararlı değil.

*Başlangıçtaki düşüncesini dikkate aldığınızda, Ayla'nın, Cem'in kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte **0 (Hiç İkna Olmadı)** ile **10 (Tamamen İkna Oldu)** arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.*

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

16.

Serdar:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Ceren:	Öyle olmadığından epey eminim.
Serdar:	Aslında öyle olmadığı konusunda kesin emin olmalısın.
Ceren:	Niye öyle düşünüyorsun?
Serdar:	Öyle düşünüyorum çünkü konuyla ilgili bir internet forum sitesinde kişilerin görüşlerine yer vermişler. Kişiler kendi gözlemlerinden hareketle görüşlerini belirtmişler. Onlara göre klonlama insanlar için zararlı değilmiş.

*Başlangıçtaki düşüncesini dikkate aldığınızda, Ceren'in, Serdar'ın kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte **0 (Hiç İkna Olmadı)** ile **10 (Tamamen İkna Oldu)** arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.*

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

17.

Arda:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Selin:	Öyle olmadığından epey eminim.
Arda:	Aslında öyle olmadığı konusunda kesin emin olmalısın.
Selin:	Niye öyle düşünüyorsun?
Arda:	Öyle düşünüyorum çünkü bilimsel çalışmaların bulunduğu akademik bir yayında alanında uzman bir profesörle yapılan bir görüşmeye yer verdiler. Profesör şu ana kadarki çalışmaları dikkate alarak görüşünü belirtti. Ona göre klonlama insanlar için zararlı değildi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Selin'in, Arda'nın kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

18.

Oktay:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Aslı:	Öyle olduğundan epey eminim.
Oktay:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Aslı:	Niye öyle düşünüyorsun?
Oktay:	Öyle düşünüyorum çünkü konuyla ilgili bir internet forum sitesinde görüşlerini belirten kişilere göre, klonlama insanlar için zararlı.

Başlangıçtaki düşüncesini dikkate aldığınızda, Aslı'nın, Oktay'ın kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

19.

Selma:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Cansu:	Pek öyle olduğunu düşünmüyorum.
Selma:	Aslında tehdit oluşturmadığı konusunda emin olmalısın.
Cansu:	Niye öyle düşünüyorsun?
Selma:	Öyle düşünüyorum çünkü bilimsel çalışmaların bulunduğu akademik bir yayında alanında uzman bir profesörle yapılan bir görüşmeye yer vermişler. Profesör şu ana kadar yapılmış çalışmaları dikkate alarak görüşünü belirtmiş. Ona göre klonlama insanlar için zararlı değilmiş.

Başlangıçtaki düşüncesini dikkate aldığınızda, Cansu'nun, Selma'nın kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

20.

Özgür:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Yasemin:	Öyle olduğundan epey eminim.
Özgür:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Yasemin:	Niye öyle düşünüyorsun?
Özgür:	Öyle düşünüyorum çünkü konuyla ilgili açıklama yapan bir politikacıya göre klonlama insanlar için zararlı.

Başlangıçtaki düşüncesini dikkate aldığınızda, Yasemin'in, Özgür'ün kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

21.

Birsen:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Cemil:	Pek öyle olmadığını düşünmüyorum.
Birsen:	Aslında tehdit oluşturduğu konusunda emin olmalısın.
Cemil:	Niye öyle düşünüyorsun?
Birsen:	Öyle düşünüyorum çünkü bilimsel çalışmaların bulunduğu akademik bir yayındaki alanında uzman bir profesörle yapılan bir görüşmeye göre, klonlama insanlar için zararlı.

*Başlangıçtaki düşüncesini dikkate aldığınızda, Cemil'in, Birsen'in kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte **0 (Hiç İkna Olmadı)** ile **10 (Tamamen İkna Oldu)** arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.*

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

22.

Mine:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Aydın:	Öyle olduğundan epey eminim.
Mine:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Aydın:	Niye öyle düşünüyorsun?
Mine:	Öyle düşünüyorum çünkü konuyla ilgili bir internet forum sitesinde kişilerin görüşlerine yer vermişler. Kişiler kendi gözlemlerinden hareketle görüşlerini belirtmişler. Onlara göre klonlama insanlar için zararlıymış.

*Başlangıçtaki düşüncesini dikkate aldığınızda, Aydın'ın, Mine'nin kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte **0 (Hiç İkna Olmadı)** ile **10 (Tamamen İkna Oldu)** arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.*

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

23.

Elvan:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Sedat:	Pek öyle olduğunu düşünmüyorum.
Elvan:	Aslında tehdit oluşturmadığı konusunda emin olmalısın.
Sedat:	Niye öyle düşünüyorsun?
Elvan:	Öyle düşünüyorum çünkü konuyla ilgili bir internet forum sitesinde kişilerin görüşlerine yer vermişler. Kişiler kendi gözlemlerinden hareketle görüşlerini belirtmişler. Onlara göre klonlama insanlar için zararlı değilmiş.

Başlangıçtaki düşüncesini dikkate aldığınızda, Sedat'ın, Elvan'ın kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

24.

Cenk:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Ece:	Pek öyle olmadığını düşünmüyorum.
Cenk:	Aslında tehdit oluşturduğu konusunda emin olmalısın.
Ece:	Niye öyle düşünüyorsun?
Cenk:	Öyle düşünüyorum çünkü konuyla ilgili bir internet forum sitesinde kişilerin görüşlerine yer verdiler. Kişiler kendi gözlemlerinden hareketle görüşlerini belirttiler. Onlara göre klonlama insanlar için zararlıydı.

Başlangıçtaki düşüncesini dikkate aldığınızda, Ece'nin, Cenk'in kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

25.

Ada:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Efe:	Pek öyle olmadığını düşünmüyorum.
Ada:	Aslında tehdit oluşturduğu konusunda emin olmalısın.
Efe:	Niye öyle düşünüyorsun?
Ada:	Öyle düşünüyorum çünkü bir politikacı konuyla ilgili bir açıklama yaptı. Bazı fikirleri dikkate alarak kendi görüşünü belirtti. Ona göre klonlama insanlar için zararlıydı.

Başlangıçtaki düşüncesini dikkate aldığınızda, Efe'nin, Ada'nın kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

26.

Tuğçe:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Ömer:	Pek öyle olmadığını düşünmüyorum.
Tuğçe:	Aslında tehdit oluşturduğu konusunda emin olmalısın.
Ömer:	Niye öyle düşünüyorsun?
Tuğçe:	Öyle düşünüyorum çünkü konuyla ilgili bir internet forum sitesinde kişilerin görüşlerine yer vermişler. Kişiler kendi gözlemlerinden hareketle görüşlerini belirtmişler. Onlara göre klonlama insanlar için zararlıymış.

Başlangıçtaki düşüncesini dikkate aldığınızda, Ömer'in, Tuğçe'nin kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

27.

Mesut:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Berrak:	Pek öyle olduğunu düşünmüyorum.
Mesut:	Aslında tehdit oluşturmadığı konusunda emin olmalısın.
Berrak:	Niye öyle düşünüyorsun?
Mesut:	Öyle düşünüyorum çünkü konuyla ilgili bir internet forum sitesinde kişilerin görüşlerine yer verdiler. Kişiler kendi gözlemlerinden hareketle görüşlerini belirttiler. Onlara göre klonlama insanlar için zararlı değildi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Berrak'ın, Mesut'un kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

28.

Tarık:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Özge:	Öyle olduğundan epey eminim.
Tarık:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Özge:	Niye öyle düşünüyorsun?
Tarık:	Öyle düşünüyorum çünkü bilimsel çalışmaların bulunduğu akademik bir yayında alanında uzman bir profesörle yapılan bir görüşmeye yer verdiler. Profesör klonlamanın uzun vadede ortaya çıkabilecek etkilerinin hala büyük oranda bilinmemesini dikkate alarak görüşünü belirtti. Ona göre klonlama insanlar için zararlıydı.

Başlangıçtaki düşüncesini dikkate aldığınızda, Özge'nin, Tarık'ın kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

29.

Ebru:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Yağmur:	Pek öyle olduğunu düşünmüyorum.
Ebru:	Aslında tehdit oluşturmadığı konusunda emin olmalısın.
Yağmur:	Niye öyle düşünüyorsun?
Ebru:	Öyle düşünüyorum çünkü bilimsel çalışmaların bulunduğu akademik bir yayında alanında uzman bir profesörle yapılan bir görüşmeye yer verdiler. Profesör şu ana kadarki çalışmaları dikkate alarak görüşünü belirtti. Ona göre klonlama insanlar için zararlı değildi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Yağmur'un, Ebru'nun kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

30.

Filiz:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Tansel:	Pek öyle olmadığını düşünmüyorum.
Filiz:	Aslında tehdit oluşturduğu konusunda emin olmalısın.
Tansel:	Niye öyle düşünüyorsun?
Filiz:	Öyle düşünüyorum çünkü bilimsel çalışmaların bulunduğu akademik bir yayında alanında uzman bir profesörle yapılan bir görüşmeye yer verdiler. Profesör klonlamanın uzun vadede ortaya çıkabilecek etkilerinin hala büyük oranda bilinmemesini dikkate alarak görüşünü belirtti. Ona göre klonlama insanlar için zararlıydı.

Başlangıçtaki düşüncesini dikkate aldığınızda, Tansel'in, Filiz'in kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

31.

Ceyda:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Sibel:	Öyle olmadığından epey eminim.
Ceyda:	Aslında öyle olmadığı konusunda kesin emin olmalısın.
Sibel:	Niye öyle düşünüyorsun?
Ceyda:	Öyle düşünüyorum çünkü bilimsel çalışmaların bulunduğu akademik bir yayında alanında uzman bir profesörle yapılan bir görüşmeye yer vermişler. Profesör şu ana kadar yapılmış çalışmaları dikkate alarak görüşünü belirtmiş. Ona göre klonlama insanlar için zararlı değilmiş.

Başlangıçtaki düşüncesini dikkate aldığınızda, Sibel'in, Ceyda'nın kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

32.

Ali:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Ayşe:	Öyle olmadığından epey eminim.
Ali:	Aslında öyle olmadığı konusunda kesin emin olmalısın.
Ayşe:	Niye öyle düşünüyorsun?
Ali:	Öyle düşünüyorum çünkü bir politikacı konuyla ilgili bir açıklama yaptı. Bazı fikirleri dikkate alarak kendi görüşünü belirtti. Ona göre klonlama insanlar için zararlı değildi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Ayşe'nin, Ali'nin kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

33.

Seda:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Cihan:	Pek öyle olduğunu düşünmüyorum.
Seda:	Aslında tehdit oluşturmadığı konusunda emin olmalısın.
Cihan:	Niye öyle düşünüyorsun?
Seda:	Öyle düşünüyorum çünkü bir politikacı konuyla ilgili bir açıklama yaptı. Bazı fikirleri dikkate alarak kendi görüşünü belirtti. Ona göre klonlama insanlar için zararlı değildi.

Başlangıçtaki düşüncesini dikkate aldığınızda, Cihan'ın, Seda'nın kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için herhangi bir tehdit oluşturmadığı konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

34.

Gamze:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Cemal:	Öyle olduğundan epey eminim.
Gamze:	Aslında öyle olduğu konusunda kesin emin olmalısın.
Cemal:	Niye öyle düşünüyorsun?
Gamze:	Öyle düşünüyorum çünkü bir politikacı konuyla ilgili bir açıklama yapmış. Bazı fikirleri dikkate alarak kendi görüşünü belirtmiş. Ona göre klonlama insanlar için zararlıymış.

Başlangıçtaki düşüncesini dikkate aldığınızda, Cemal'in, Gamze'nin kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

35.

Defne:	Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu?
Erdem:	Pek öyle olmadığını düşünmüyorum.
Defne:	Aslında tehdit oluşturduğu konusunda emin olmalısın.
Erdem:	Niye öyle düşünüyorsun?
Defne:	Öyle düşünüyorum çünkü konuyla ilgili açıklama yapan bir politikacıya göre klonlama insanlar için zararlı.

Başlangıçtaki düşüncesini dikkate aldığınızda, Erdem'in, Defne'nin kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

36.

| Esen: | Sence klonlama teknolojisi insanlık için bir tehdit oluşturuyor mu? |
Emre:	Pek öyle olmadığını düşünmüyorum.
Esen:	Aslında tehdit oluşturduğu konusunda emin olmalısın.
Emre:	Niye öyle düşünüyorsun?
Esen:	Öyle düşünüyorum çünkü konuyla ilgili bir internet forum sitesinde görüşlerini belirten kişilere göre, klonlama insanlar için zararlı.

Başlangıçtaki düşüncesini dikkate aldığınızda, Emre'nin, Esen'in kendisine sunduğu açıklamalar sonrasında klonlamanın insanlık için tehdit oluşturduğu konusunda ne kadar ikna olmuş olduğunu düşünüyorsunuz?Lütfen düşüncenizi, aşağıdaki 11'lik ölçekte 0 (Hiç İkna Olmadı) ile 10 (Tamamen İkna Oldu) arasında düşüncenize karşılık gelecek puanın altındaki kutucuğa (√) işaretini koyarak belirtiniz.

Hiç İkna Olmadı   Tamamen İkna Oldu

0	1	2	3	4	5	6	7	8	9	10

****Anket Sonu****

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Education	
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1995 - 2000	METU - Ankara, Turkey *B.A., Education Faculty, Foreign Language Education*
1991 - 1995	GOP Anatolian Vocational High School − Ankara, Turkey *Computer Section*

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2005 - Present	Çankaya University SEDAM − Ankara, Turkey *Instructor* Taught KPDS, and beginner to advanced EFL Courses
2000-2003	Middle East Technical University − Ankara, Turkey *Research Assistant*
1998 - 2000	Turkish Airlines Ankara Sales Department − Ankara, Turkey *Part-Time Worker (Accounting)*

Presentations & Publications
Karaaslan, H. & Hohenberger, A. (September, 2012*) The role of evidentiality in argumentation in Turkish within a Bayesian reasoning framework: Arguments from ignorance*, Paper presented at 16th International Conference on Turkish Linguistics, METU, Ankara, Turkey.
İnal, B. & Bayındır, H. (Eds) (2011) *Brushing Up On Your English For Proficiency.* Ankara: Çankaya University.
Bayındır, H. & Vegter, S. (March, 2011) *The relationship between language learning strategies and language proficiency*, Paper presented at 1st International ELT Conference: Squaring the Circle, İzmir University of Economics, İzmir, Turkey.
Bayındır, H. (September, 2010) *Argumentation in Turkish within a Bayesian reasoning framework: Arguments from ignorance*, Paper presented at Psycholinguistics Seminar, METU, Ankara, Turkey.
Bayındır, H. & Hohenberger, A. (August, 2010): *Exploring Turkish preschoolers' understanding of ontological categories*, Paper presented at University of Duisburg-Essen, Essen, Germany.
Bayındır, H. (August, 2010) *Ontological categories and property specification: The case with Turkish preschoolers,* Poster presented at University of Luxembourg, Copenhagen, Denmark.
Bayındır, H. & Çelebi, H. (June, 2010) *A contrastive analysis of English friend and Turkish arkadaş*, Paper presented at Abo Akademi University, Turku, Finland.
Bayındır, H. (April, 2010) *A brain-based language teaching model: Is non-brain-based learning possible?* Paper presented at Sharing Issues in ELT, Eskişehir Anadolu University, Eskişehir, Turkey.
Bayındır, H. (April, 2009). *Ontological categories in children*, Proposal presented at In-house Seminars, Cognitive Science Department, METU, Ankara, Turkey.
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References

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TEZ FOTOKOPİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü	☐
Sosyal Bilimler Enstitüsü	☐
Uygulamalı Matematik Enstitüsü	☐
Enformatik Enstitüsü	**X**
Deniz Bilimleri Enstitüsü	☐

YAZARIN

Soyadı   : KARAASLAN

Adı   : HATİCE

Bölümü   : BİLİŞSEL BİLİMLER

TEZİN ADI (İngilizce): **A STUDY OF ARGUMENTATION IN TURKISH WITHIN A BAYESIAN REASONING FRAMEWORK: ARGUMENTS FROM IGNORANCE**

TEZİN TÜRÜ : Yüksek Lisans   ☐   Doktora   **X**

1. Tezimin tamamı dünya çapında erişime açılsın ve kaynak gösterilmek şartıyla tezimin bir kısmı veya tamamının fotokopisi alınsın.   ☐

2. Tezimin tamamı yalnızca Orta Doğu Teknik Üniversitesi kullancılarının erişimine açılsın. (Bu seçenekle tezinizin fotokopisi ya da elektronik kopyası Kütüphane aracılığı ile ODTÜ dışına dağıtılmayacaktır.)   ☐

3. Tezim bir (1) yıl süreyle erişime kapalı olsun. (Bu seçenekle tezinizin fotokopisi ya da elektronik kopyası Kütüphane aracılığı ile ODTÜ dışına dağıtılmayacaktır.)   **X**

Yazarın imzası: Tarih: 14.09.2012