

## Activation of Source and Stance in Interpreting Evidential and Modal Expressions in Turkish and English

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### Abstract

Languages differ in whether and how they mark the source of evidence about a narrated event (evidentiality), with some languages (e.g., Turkish) requiring users to distinguish between firsthand and nonfirsthand sources in their grammar and others (e.g., English) allowing source to be signaled optionally at the lexical level. Information conveyed firsthand is generally accorded more epistemic weight (i.e., more likely to be believed) than nonfirsthand information. However, the relationship between source type and belief that the asserted event occurred has not been examined for nonfirst hand evidential sources (hearsay, inference, assumption, conjecture), or for various modal categories (necessity, advice, probability, possibility). To address this gap, the present research compared Turkish vs. English users' source and confidence (stance) judgments for sentences presented in each of four source categories and four modal types. Our results suggest that, besides indicating source type, evidential markers also convey the epistemic value of the reported proposition and that epistemic modal markers, besides indicating source reliability, also indicate source type. Moreover, Turkish users showed a more demarcated system of interpretation of evidential markers (with inference and assumption differentiated from hearsay and conjecture) while English speakers showed a more homogeneous hearsay source interpretation. The findings provide empirical support for theorized claims about the close relationship between evidential and modal structures, while also uncovering some intriguing group differences.

**Keywords:** Evidentiality, epistemic modality, Turkish, English, source of evidence, modal auxiliaries

### 1. Introduction

Evidentiality is a linguistic property found in many languages. It primarily indicates the *source* of knowledge of an asserted proposition (e.g. Aikhenvald, 2004; Aksu-Koc & Slobin, 1986; Chafe, 1986; Plungian, 2001). The source may be firsthand, based on *sensory* information (witnessing some occurrence), or nonfirsthand information, such as *inference* (from observable or tangible evidence), *assumption* (based on intuition, logical reasoning, previous experience, or general

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knowledge), *conjecture* (based on second hand information but the source was unspecified), or *hearsay* (hearing about the described situation from someone else). Source of evidence may be marked morpho-syntactically in the grammar to distinguish obligatorily the sources how the information is acquired (see Aikhenvald, 2004 for further discussion of typological differences in the coding of evidentiality). Alternatively, languages may not require users to mark source of evidence in the grammar but allow this information to be conveyed optionally, in the lexicon.

Some scholars have suggested that evidentiality does not just signal source of evidence of an asserted event but also the speaker's stance or belief about the certainty regarding the occurrence of the event and/or the reliability of the source (e.g., Chafe, 1986; DeLancey, 2001; Faller, 2002; Palmer, 1986; van der Auwera & Plungian, 1998). To date, discussions of the nature and scope of the construct of evidentiality and its relation to epistemic modality<sup>1</sup> have largely relied on logical reasoning or on evidence drawn from linguistic data (e.g., de Haan, 1999, 2004) without investigating how actual language users interpret evidential and modal expressions. The present study seeks to take a psycholinguistic approach to this issue by considering how actual users of a language interpret evidential and modal structures. Specifically, our study assesses *the relative degree to which source and stance/certainty information is co-activated when interpreting evidential and modal expressions*. We further examine how such expressions are interpreted in a language in which evidentiality markers are grammaticalized (Turkish) versus simply lexicalized (English). This comparison allows us to ask if obligatory vs. optional marking of source information differentially affects the pattern of activation of source and stance information in response to modal and evidential expressions.

Our study sought to test how native speakers of two different languages - Turkish and English - interpret evidential and modal expressions in their respective language. Specifically, we compared the two groups' interpretations of expressions framed using four different types of evidential adverbs (*reportedly*, *apparently*, *presumably*, and *supposedly*, and their Turkish verbal and/or morphosyntactic counterparts) and four different types of modal auxiliary forms, representing different levels of certainty (*must have*, *should have*, *could have*, *might have*, and their Turkish counterparts).

Providing language users' judgment data to bear on the issue of the relationship between evidentiality and epistemic modality contributes to the longstanding theoretical debate on the nature of evidentiality as a property of language. Yet apart from its theoretical significance, the issue of how language users interpret evidential expressions also has practical significance. Consider, for example, if in a presidential debate, one of the candidates says: "As recently reported by [some agency], the inflation rate reportedly dropped during my presidential term." The voters may interpret this to mean that there was a decrease in the inflation rate, as determined by an outside agency. In this case, they would interpret the evidential marker (*reportedly*) as indicating the source of knowledge only. Thus, they may credit the candidate with honesty in indicating the source or basis for their claim. On the other hand, voters may interpret the candidate's use of *reportedly* as suggesting that the inflation rate decrease was not likely to have happened, because it was described secondhand. This interpretation accords epistemic value to an evidential source (hearsay in the example) and may change how voters regard the candidate. There is also a stance interpretation here – e.g., the speaker could be using an ironic tone. Thus, it is crucial in the political sphere to understand the range of possible interpretations of utterances containing evidential markers as they may lead to very different attributions of a politician. This issue is equally important in other spheres of life, such as doctor-patient interactions, as when a patient is told that a particular medication *could have* or *probably* has certain side effects (see

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<sup>1</sup> Linguistically, modality can be classified in different ways such as deontic, alethic or epistemic. Alethic and epistemic modality is most often associated. Alethic modality refers to "the truth in the world" and epistemic modality refers to "the truth in an individual's mind". In this study we focus on epistemic modality.

Segalowitz et al., 2016). These examples underscore the way in which the theoretical debate about the relative independence of evidentiality and epistemic modality could have very real consequences. Before turning to our study, it is important to review how evidentiality and epistemic modality operate in English and Turkish, and to consider how the relationship between evidentiality and epistemic modality has been theorized. We also consider previous studies of relevance.

### 1.1. Evidentiality in Turkish and English

The prevailing definition of *evidentiality*, and one that we will adopt for the present study, is that it is an independent property of language that marks (variously, in the grammar or the lexicon) the source of evidence of an asserted event (Aikhenvald, 2004). Languages may differ in how they code source of evidence and to what degree they distinguish between different types of sources. The distinction of relevance for the languages of interest in the present study is between obligatory, morpho-syntactic coding of firsthand versus nonfirsthand accounts of a past event, and optional, lexical coding of an event.

In Turkish, evidentiality is coded in the grammar; that is, expressing the source of evidence for an asserted event is obligatory. Turkish is an example of what Aikhenvald (2004) refers to as two-choice evidential languages; it makes a distinction between firsthand and all other sources of knowledge. Aksu-Koc and Slobin (1982, 1986) refer to the two as ‘direct’ vs. ‘indirect’ sources of knowledge.

*Firsthand source expression.* The Turkish firsthand source marker *-di* (realized as *-di, -di, -dü, -du, -ti, -ti, -tü, -tu*)<sup>2</sup> conveys directly experienced source of knowledge (Slobin & Aksu, 1982). Directly experienced sources refer only to visual sensory sources of evidence.

- (1) *Handan okul-a git-ti.*  
Handan school-DAT go-EVID.  
‘Handan went to school, I saw.’

In (1), the speaker saw when Handan was leaving home to go to school.

According to Aksu-Koc and Slobin (1986), first-hand source markers are also used to express knowledge that is expected or unsurprising.

- (2) *Köprü tadilat-ı trafiğ-i alt-üst et-ti.*  
Bridge construction-GEN traffic-ACC upside-down make-EVID  
‘Construction of the bridge disturbed the traffic.’

In example (2), the speaker uses the firsthand marker even though she has not witnessed the traffic jam, because it would not be surprising at all that there would be a traffic jam when the bridge is under construction. Another example of firsthand marker usage for non-witnessed events is news reports. Even though the speakers, themselves, do not witness the event, they report it using the firsthand marker.

Choosing the firsthand marker shows that the speaker intends to indicate that she witnessed the event firsthand and/or intends to convey her certainty about the event (Aksu-Koc, 2000; Kornfilt, 1997).

*Nonfirsthand source expression.* Nonfirsthand sources in Turkish are marked with the suffix *-miş* (realized as *-miş, -miş, -müştü, -muş*) on the verb. This marker is derived from the resultative and stative suffix *-miş* (Slobin & Aksu, 1982). The same marker is used to cover three different information sources: reportative, inferential, and perceptive/mirative (Johanson, 2000, 2003).

In the reportative source, the information is acquired from someone else; in such cases, the corresponding proposition is marked using the nonfirsthand source marker (Aikhenvald, 2004).

<sup>2</sup> The variations in the suffixes are due to vocal harmony.

- (3) *Handan okul-a git-miş.*  
 Handan school-DAT go-EVID.  
 ‘Handan reportedly went to school.’

In example (3), the speaker heard from someone else that Handan went to school, as she herself did not see Handan leaving home to go to school. English equivalents of reportative source include *reportedly*, *allegedly*, *as they say/said*, and all of the reported speech versions.

The basis of the inferential source is reflection and reasoning arising from inference from results and/or from reasoning *per se*. In a different context the same sentence (3) may have a different interpretation.

- (4) *Handan okula gitmiş.* ‘Handan apparently went to school.’

In the example (4) the speaker inferred that Handan went to school. She could not find Handan and her school bag at home or she knew that Handan had a class at the time, thus she inferred that Handan went to school without seeing personally when this happened. English equivalents of inferential *-miş* include *apparently*, *presumably*, *as far as ... understand/understood* etc. (Johanson, 2003).

The basis of the perceptive/mirative source is direct sensory perception other than visual sensory knowledge such as smelling, or hearing, or else unexpected information (Johanson, 2003). Similarly as the sentence (4), the same sentence may be interpreted differently in a different context.

- (5) *Handan okula gitmiş.* ‘Handan went to school, I was surprised to hear’

In example (5) the speaker heard when Handan closed the door and left home or she saw Handan in the school but she also knew that Handan was sick and was not expected to be on campus on that day. English equivalents of the perceptive source include *it appears/appeared that*, *it turns/turned out that*, *as....can/could see that*, *hear* etc. The perceptive use of the evidential is also interpreted in terms of relative novelty, sudden discovery, and new knowledge with an unprepared mind (Aksu-Koc & Slobin, 1986; Johanson, 2000).

*Compound structure option.* The suffix *-miş* is also used in compound form with two other suffixes, *-miş* or *-dir*, to convey the source of information.

- (6) a. *Handan okul-a git-miş-miş.*  
 Handan school-DAT go-EVID-EVID  
 ‘Handan reportedly/supposedly has/had gone to school.’  
 b. *Handan okul-a git-miş-tir<sup>3</sup>.*  
 Handan school-DAT go-EVID-IND  
 ‘Handan presumably went to school.’

In example (6) the doubling of the suffix *-miş* is used to represent a situation that already happened in the past with a nonfirsthand source and it is also reported (Johanson, 2003). Thus, it is a thirdhand evidential. This type is mostly used sarcastically. The speaker uses this form if she believes that Handan never actually went to school.

In example (6b), the suffix *-dir* is attached after the nonfirsthand suffix and represents inference from reasoning, previous knowledge and knowledge about habitual events (Aksu-Koc, 2009, Aksu-Koc & Alici, 2000). In this example, in the context, because Handan always leaves home at 8:00 am for school, the speaker indicated that Handan presumably went to school when she found out that it was already 8:30 am.

In contrast to Turkish, English is an example of a language in which evidentiality has no mandatory grammatical encoding. Rather, speakers can choose to indicate if they witnessed something firsthand or heard about it from some other person, or assumed it had occurred. These

<sup>3</sup> Due to vocal harmony, the suffix *-dir* turns to *-tir*.

different possibilities are signaled through lexical choices (e.g., adverbs like *reportedly*, *presumably*, or through phrases such as, *I heard that*, or *I saw that*).<sup>4</sup>

## 1.2. Epistemic Modality in Turkish and English

Epistemic modality has been variously defined. Givón (1982) defines it as a probability of the proposition on a scale between *necessary* (which has a probability of 1.0) and *impossible* (which has a probability of zero), where *probable* and *possible* are in the middle (with a probability of 0.5). Aijmer (1980) defines it as “the speaker’s evidence and, degree of certainty” (p. 11). Palmer (1986) defines the term *epistemic* as the “degree of commitment by the speaker to what he says” (p. 51). According to Chafe (1986), epistemic modality codes the speaker’s attitude toward his/her knowledge of a situation. Van der Auwera and Plungian (1998) define epistemic modality as the judgment of the speaker. According to Nuyts (2001), epistemic category is evaluation of the chances of an event’s occurrence.

Thus, we see that epistemic modality has been defined as attitude; judgment or commitment of the speaker towards how likely it is that the situation described would occur in a possible or actual world. For the purpose of the present study, epistemic modality is defined as *a language user’s degree of certainty or confidence in whether the asserted event actually occurred*.

In terms of how epistemic modality operates in the languages under study, this topic has not received as much attention in the literature, particularly as regards Turkish. Kerimoglu (2010) noted that there is a close relationship between evidentiality and certain modals in Turkish. The morpho-syntactic marker *-miş olabilir*<sup>5</sup> (used to signal *could* or *might*) has a probability meaning, whereas the marker *-miş olmalı* (used to indicate *must*) represents deduction and is used for strong possibilities; finally, the marker *-malı* (used to indicate *should*) has the meaning of obligation. Moreover, Kerimoglu stated that, along with the modal markers, the value of certainty is also manipulated by lexical markers, such as the Turkish equivalents of the lexical items *probably*, *possibly*, *usually*, *absolutely*, and *perhaps*. The grammaticalized markers of modality (*-miş olmalı*, *-miş olabilir*) were specifically proposed to convey the source of inference and assumption as well. Kerimoglu (2010) and Kornfilt (1997) further suggested that the suffix *-dir* is a modal expression, whereas Aksu-Koc (2009) refers to it as an evidential marker indicating assumption. To date there has been no empirical investigation of the interpretation of epistemic modals in Turkish.

Epistemic modality in English has been the subject of more work (see Palmer, 2013, for detailed review). Although many modal forms exist, of particular interest of past events for the present study are those that use the auxiliary *have* before the past tense of the main verb, as in *She must have left by now*. The modal *must*, classified as epistemic necessity, conveys the speaker’s confidence about the occurrence of a reported event. *Should*, *could* and *might* are classified as tentative forms of epistemic modals. *Should* conveys extreme likelihood of occurrence of the asserted event. *Could* denotes possibility of occurrence. *Might* indicates a little less certainty about the reported event. Although in some contexts *could* is replaceable by *might*, *might* is more likely to be interpreted in a tentative sense.

In summary, epistemic modality in Turkish relies on the use of three morpho-syntactic markers attached to the past tense of a verb which contrast *must*, *should*, and *could/might*, and on

<sup>4</sup> One person may receive the same information from different sources and indicate only one source while conveying the information. Which of the sources is preferred to indicate is more of an issue of the hierarchy of the sources (for more information about evidential hierarchy please see Willett, 1988 and de Haan, 1998). Rather than evidential hierarchy, what we aimed to measure is whether language users systematically select one specific source for a specific expression.

<sup>5</sup> The morpheme *-miş* in modals serves as a past participle suffix to change a verb to an adjective – it is not in this case interpreted as an evidential morpheme.

lexical items. In English, some epistemic modals may be represented as verb auxiliary forms. Although *must* is acknowledged to represent the highest level of certainty, there is less consensus on the relative interpretation of the other forms.

### 1.3. How Evidentiality and Epistemic Modality May Be Related

There are five possible ways in which evidentiality and epistemic modality could be related in principle. We term these complete disjointment, inclusion (epistemic modality as a subtype of evidentiality), inclusion (evidentiality as a subtype of epistemic modality), overlap and identity. The positions outlined below have derived in large part from linguists' own intuitions or from reliance on logical argument and comparative analyses. We regard these proposals as largely heuristic in value: They present potentially testable claims about the possible relationship between evidentiality and epistemic modality. To more fully examine the relationship between evidentiality and epistemic modality and the effect of epistemic value on evidentiality it would be informative to look at how actual speakers interpret evidential and modal expressions and whether different interpretations are made by users of different languages, reflecting how evidentials and modals are marked.

#### 1.3.1. Complete Disjointment

Those authors who claim a complete disjointment of evidentiality and epistemic modality (Aikhenvald, 2004; de Haan, 1999; Lazard, 2001; Oswald, 1986) argue that the two structures convey different kinds and nature of information: Epistemic modality refers to the judgment of truth or probability of the asserted event, while evidentiality refers simply to the source of information. In this view, all types of evidential sources are equally likely to be true and none of the sources are superior to the others in terms of the statement's probability (see Figure 1a).

The most common example that source of knowledge and belief are separate is given by Givón (1982) in referring to an account by a religious leader of the *Life of the Buddha* using the hearsay suffix. Although Buddhists consider the story as the truest of all stories, because they have not personally witnessed Buddha's life, they need to use the hearsay evidence marker while narrating it. This example illustrates how evidentiality may convey the source of knowledge independently of epistemic judgment about the narrative.

#### 1.3.2. Inclusion

This view argues that one of the categories is a subtype of the other (Dendale & Tasmowski, 2001).

*Epistemic modality is a subtype of evidentiality.* In this view all epistemic modals are evidentials, but not all evidentials are epistemic modals (see Chafe, 1986; Matlock, 1989). The main problem with this view is the difficulty of demonstrating that *all* epistemic modals are evidentials (see Figure 1c). Logically, finding only one epistemic modal without an evidential meaning is enough to falsify this view.

*Evidentiality is a subtype of epistemic modality.* According to this view, evidentiality is considered a subtype of epistemic modality (Bybee, 1985; Mithun, 1999; Palmer, 1986, Willett, 1988); evidence sources imply some degree of certainty about the described situation. Thus, all evidentials are epistemic modals, but not all epistemic modals are evidentials (Plungian, 2001) (see Figure 1c). A criticism of this view is that finding only one evidential without an epistemic meaning is enough to falsify the view.

#### 1.3.3. Overlap

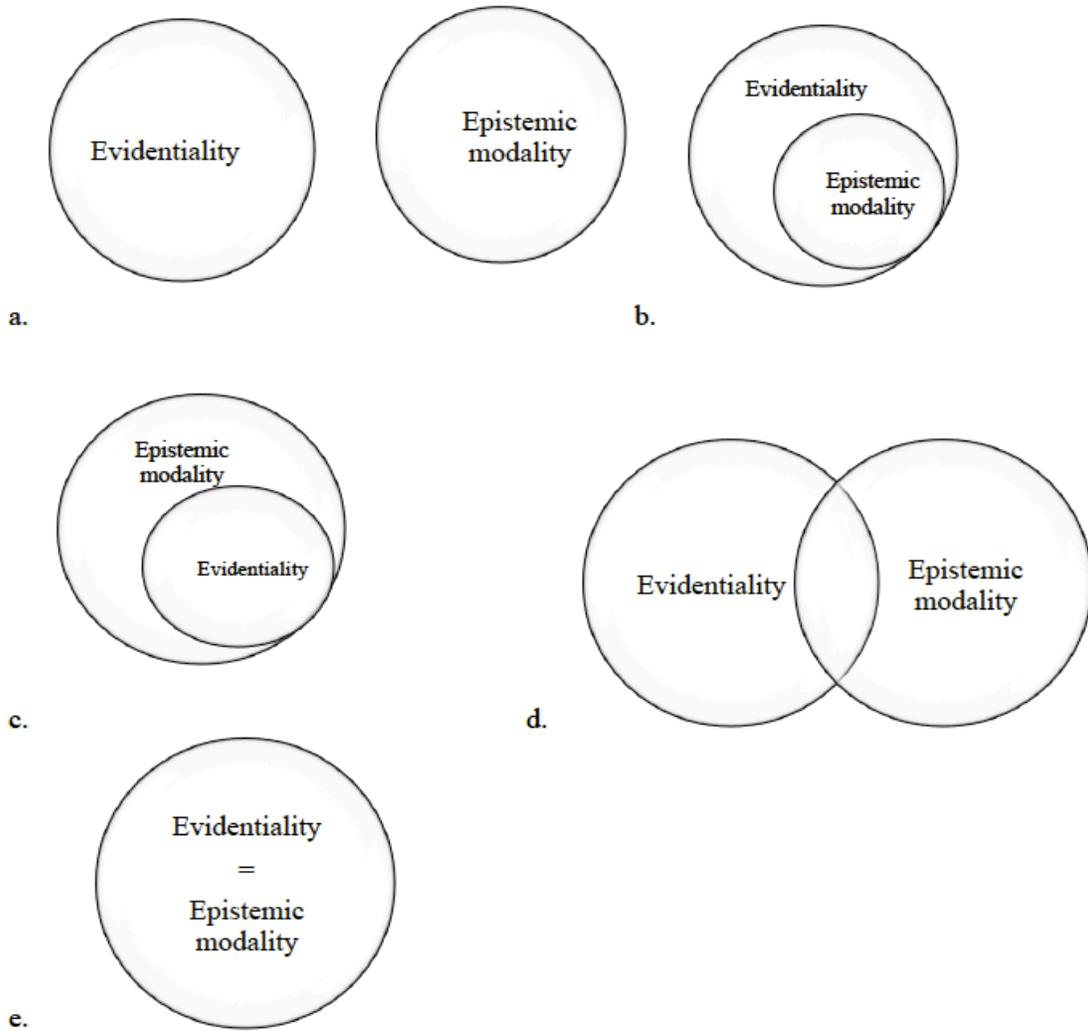
According to the overlap view, some markers may convey pure evidentials or modals, but others may be ambiguous, signalling both (de Lancey, 2001; Faller, 2002; van der Auwera & Plungian, 1998) (see Figure 1 d). For example, pure modals, such as English 'may', do not convey any evidential meaning. When a person says, "Jo may be the thief" the speaker is just talking about

the possibility of the propositions without indicating the source of information. Similarly, pure evidentials do not convey any epistemic value; an example is in Givón’s (1982) example of the *Life of the Buddha*.

Ambiguous markers, such as inferential markers, convey both epistemic value and evidential value. For example, the English epistemic necessity marker, *must*, also expresses inferential evidentiality (Faller, 2002; van der Auwera & Plungian, 1998). Similarly, in Turkish, the third-hand evidential marker, *-mismis*, is not just a source marker but conveys an epistemic value as well. Because the overlap view contends that there are pure epistemic modals and pure evidentials besides some ambiguous markers, it addresses the criticisms of the inclusion view.

**1.3.4. Identity**

The final position, as exemplified by Matthewson (2010), is that all evidentials are epistemic modals and all modals are evidentials (see Figure 1e). Logically, finding only one pure epistemic modal without an evidential meaning or pure evidential use without epistemic meaning is enough to falsify this view.



**Figure 1.** This figure demonstrates the theoretical views on the relationship between evidentiality and modality. Plot a depicts *complete disjointment* view, Plot b and c depict *inclusion* views (respectively), Plot d depicts *overlap* view and Plot e depicts *identity* view.

#### 1.4. Previous Empirical Investigations of Evidentiality and Modality

Findings from a number of studies<sup>6</sup> demonstrate that in various languages<sup>7</sup> with grammatical evidential markers, evidentiality is indeed related to epistemic modality: Firsthand source markers make the information perceived as more likely to happen, while nonfirsthand source markers are perceived to be less likely and less reliable. For example, Aksu-Koc and Alici (2000) presented three- to six-year-old Turkish speaking children with a dialog between a Teddy bear and the experimenter. The key sentence was either in firsthand form (*Banyoya girdi*. ‘She entered the bath’) or nonfirsthand form (*Banyoya girmiştir*. ‘She must have entered the bath’). After children heard the dialogue, they were asked how certain the teddy bear was. Sentences presented in firsthand form were perceived as being more certain than those presented in nonfirsthand source marker form.

Using the hidden objects task, Öztürk and Papafragou (2005) presented five- to seven-year-old Turkish-speaking children with two puppets who are talking about what is in a closed box. One says there is an airplane in the box; the other says there is a helicopter in the box. One of the puppets uses the firsthand source marker while the other puppet uses the nonfirsthand source marker. Then the children are asked what they think is in the box. The authors found that, in all age groups, children say the object was what the puppet who uses the firsthand source marker said was in it. Further, as the age of the children increased, their reliance on the information presented with the firsthand marker also increased.

Likewise, Tibetan-speaking children and adults demonstrate a similar effect in a hidden objects task; after the age of five, they rely on the information conveyed by the firsthand source marker more than on that conveyed by the nonfirsthand source marker (de Villiers & Garfield, 2009). On the other hand, Papafragou et al. (2007), testing Korean-speaking children, did not find a difference in reliability judgments between firsthand and nonfirsthand sources. This inconsistent finding disappears with adult participants, who prefer to rely on firsthand markers over nonfirsthand markers. Considering that previous studies point to the age of comprehension of evidentiality at six years, the inconsistent finding of Korean children might be explained by the fact that the oldest child group was four years old.

Similar findings have been reported in child speakers of Bulgarian (Fitneva 2008; 2009) and in Japanese-speaking children and adults (Matsui, Yamamoto & McCagg, 2006; Matsui & Miura, 2009). In Fitneva’s studies children were asked to listen to a story about four people, in which Person A asks Person B and C about Person D. Persons B and C answer her question in two different ways using different source markers. Then the children are asked what they think about where and what Person D is doing. Fitneva found that children rely more on the information conveyed by the firsthand source marker over that conveyed by the nonfirsthand source marker.

Moore, Bryant and Furrow (1990) examined English-speaking children’s comprehension and attention to mental verbs using the hidden object task. The hidden object’s location is described in different ways: *I know it’s in the red box* vs. *I think it’s in the blue box*. In a similar task, Moore, Pure and Furrow (1990) manipulated modal verbs such as *must* and *might* and found that by the age of five, children rely on *must* statements, more than *might* statements.

Based on a corpus study, Biber and Finegan (1989) conclude that evidentiality is a type of stance, indicating certainty and doubt. Some adjectives (e.g. *obvious*, *true*), verbs (e.g. *conclude*), adverbs (e.g. *assuredly*), emphatics (e.g. *for sure*) and predictive modals (e.g. *will*) refer to certainty, while some adjectives (e.g. *alleged*), verbs (e.g. *assume*), adverbs (e.g.

<sup>6</sup> Although the present study investigated adult speakers, we gave examples from developmental studies because most of the previous empirical investigations were conducted on children speakers.

<sup>7</sup> The languages studied with evidential marking (Turkish, Bulgarian, Japanese, Tibetan and Korean) do not share the exact same non-first hand distinctions in their grammar, but they all make a distinction between first-hand and non first-hand sources of evidence.

*supposedly*), hedges (e.g. *maybe*), possibility modals (e.g. *might*), and necessity modals (e.g. *should*) refer to doubt.

Considering modal auxiliaries as a form of evidentiality in English, Francis and Wales (1994) asked adult participants to listen to sentences with various modal auxiliaries (e.g. *must*, *can*) and to rate the sentences in terms of certainty and obligation. They found that the modal auxiliary *must* was rated the most certain modal and received the highest obligation ratings. In certainty ratings, *can*, *would*, *should* follow *must*, respectively. In obligation ratings, the order differs a bit from certainty. *Should* follows *must* in obligation ratings, whereas *would* and *can* receive almost equal rating points. The modal *might* receives the lowest certainty and obligation ratings.

Tosun and Vaid (2012) investigated the influence of English adverbs referring to evidential sources on reasoning and decision-making processes. Participants were asked to read a short biography about a hypothetical politician. In this biography the key point is the part that mentions that he took hush money. All of the participants received the same biography with one difference being the key point statement's adverb: *Edward apparently took hush money*. The adverb was changed from direct (no adverb), to *apparently*, *allegedly*, *presumably*, *reportedly* and one modal, *must have*. After reading the biography participants were asked the question, *How much do you think Edward took as hush money?* Participants who received the biography in the direct version gave the highest estimate whereas those who received *reportedly*, *presumably* and *must have* versions estimated a significantly smaller amount of money.

Taken together, a range of studies shows that for language users evidential markers carry epistemic value as well. Evidential source markers influence people's reliability and certainty judgments. Firsthand sources are considered more reliable and trustworthy than nonfirsthand sources. However, whereas previous studies mainly tested the difference between firsthand and nonfirsthand source of evidence, differences between the various nonfirsthand sources of information (e.g., assumption, inference) have not been sufficiently examined.

Moreover, previous investigations demonstrate the relation *only from the perspective of epistemic value in evidential marking*. In order to fully understand the relation between source and stance, we also need to look into epistemic modals and ask whether they are interpreted as carrying evidential (source) information as well. For example, is the situation described by, "John *must have* washed his hands" interpreted as expressing simply that John probably washed his hands or as expressing the speaker's inference that John *apparently* washed his hands? By simultaneously examining source interpretations for modals and certainty interpretations for evidentials, one can directly address the hypothesized claims about the relation between evidentiality and epistemic modality.

Finally, there is a need to clearly understand how users of different languages interpret evidential and epistemic modal expressions. Are speakers of languages in which the coding of source of evidence is required by the grammar more likely to invoke source for modal expressions as well, as compared to speakers of languages in which source information is not obligatorily coded? Alternatively, are speakers of an evidentiality-marked language more likely to accord greater confidence to sources deemed higher in the evidential hierarchy than are those of a language that does not grammaticalize evidentiality? We turn now to the present research, which was designed to address these issues.

### 1.5. The Present Research

Our study examined the nature of the relationship between evidentiality and modality in speakers of Turkish vs. English by means of a sentence interpretation task in which two types of judgments were elicited: judgments about the source of evidence and judgments about confidence in whether the asserted event had occurred. Each sentence described an event and was framed in eight possible ways, using four different evidential forms and four different epistemic modal forms (e.g., *Jack reportedly passed the math test / Jack must have passed the math test*). Source and

confidence judgments were elicited for each sentence form. An option was also provided to opt out of a response, if the participant considered that the sentence did not provide enough information to allow a judgment of source or confidence.

The present study is the first that directly investigates *both* the source and degree of confidence interpretations of both evidential and modal sentences and does so in speakers of two different languages, Turkish and English (see Appendix A).

### 1.5.1. Rationale and Hypotheses

It was hypothesized that Turkish and English speakers alike would report that there was enough information provided in the sentences to make both types of judgments (source and certainty) for both evidential and modal sentences. If this is the case, it would show that language speakers can derive source information from modal sentences and epistemic value from evidential sentences. This in turn would provide support for the position that there is a close relationship between evidentiality and modality.

It is further hypothesized that Turkish speakers' source and confidence judgments of evidential sentences will show more variation across the different evidential expressions. That is, because evidentiality marking is required by the grammar, certain markers are assigned for certain sources of knowledge. Turkish speakers will interpret the sources of each evidential expression depending on how they are defined in the grammar. Similarly, if each source conveys different degrees of certainty, then Turkish speakers will also interpret the degree of certainty of evidence expressions at various levels, e.g., they will show higher levels of certainty for certain evidential expressions than for others. Since modal expressions in Turkish have not been studied empirically or claimed to have clearly specified degrees of certainty, there was no basis to predict how Turkish speakers would interpret modal expressions.

On the other hand, modal expressions in English are defined more meticulously and it was already demonstrated that there is a variation in conveying degree of certainty across modal expressions (Francis & Wales, 1994). We therefore expect that English speakers would interpret the source of modal expressions in accordance with their perceived degree of certainty. Further, because evidentiality is not signaled in the grammar of English, the meaning or the source of evidential expressions will be interpreted according to how speakers use them. The English expressions used in the study (*reportedly*, *apparently*, *presumably* and *supposedly*) were selected based on linguistic scholars' predictions (e.g., Aikhenvald, 2004; Chafe, 1986; Gisborne & Holmes, 2007; Izvorski, 1997; Mushin, 2001). Although there is a consensus on the source of evidence of some adverbs, such as *reportedly* as hearsay and *presumably* as assumption, there are some adverbs over which linguistic scholars have not reached an agreement yet, such as *apparently*. Similarly, *supposedly* is considered as conjecture in some contexts and as hearsay within a different context (Chafe, 1986). The present study will shed light on this issue by bringing empirical observations to bear on whether the linguists' intuitions are borne out by ordinary language users' interpretations.

## 2. Method

An experimental design was conducted to test the hypothesis.

### 2.1. Participants

A total of 50 Turkish-speaking participants (45 females) and 60 English-speaking participants (40 females) were recruited from a major city in Turkey and from a large research university in the southwestern region of the U.S. Turkish speakers' ages ranged from 19 to 27, with a mean age of 22.6 years. As determined on the basis of a language background questionnaire administered to screen out individuals who may have known other languages that could have influenced their performance on the languages of interest in the study, participants from Turkey all reported using Turkish as their first and primary language. Although most of these participants had also studied

English and/or Arabic, they considered themselves as essentially monolingual because their knowledge of these other languages was at a beginner level. English speakers' ages ranged from 17 to 20 with a mean age of 18.6 years. Although some had studied another language in high school they also self-identified as essentially monolingual speakers.

## 2.2. Materials and Design

Per language, stimuli consisted of a total of 80 declarative sentences presented in active voice, third person singular form and containing a verb in the past tense. The 80 sentences were generated from a set of 10 sentences, each presented in 8 versions to represent four evidential forms and four different modal forms. The evidential categories were Hearsay (*reportedly*), Inference (*apparently*), Assumption (*presumably*), and Conjecture (*supposedly*). Because the Turkish evidential marker for hearsay and inference is the same (*-miş*), two lexical items (*duyduğuma göre* 'reportedly' and *görünüşe göre* 'apparently') were added to the Turkish sentences to make the intended meaning clear. The modal categories were Necessity (*must*), Weak necessity (*should*), Probability (*could*), and Possibility (*might*). Note that the Turkish modals *could* and *might* have the same marker. Sample stimuli per language are given below, with the relevant evidential or modal marker in italics, for purpose of illustration.

### Sample Evidential Stimuli

- Hearsay: *Reportedly* the girl worked out for an hour yesterday.  
*Duyduğuma göre* kız dün bir saat spor yapmış.
- Inference: *Apparently* the girl worked out for an hour yesterday.  
*Görünüşe göre* kız dün bir saat spor yapmış.
- Assumption: *Presumably* the girl worked out for an hour yesterday.  
 Kız dün bir saat spor yapmıştır.
- Conjecture: *Supposedly* the girl worked out for an hour yesterday.  
 Kız dün bir saat spor yapmışmış.

### Sample Modal Stimuli

- Necessity: The girl *must have* worked out for an hour yesterday.  
 Kız dün bir saat spor yapmış olmalı.
- Weak necessity: The girl *should have* worked out for an hour yesterday.  
 Kız dün bir saat spor yapmalıydı.
- Probability: The girl *could have* worked out for an hour yesterday.  
 Kız dün bir saat spor yapmış olabilir.
- Possibility: The girl *might have* worked out for an hour yesterday.  
 Kız dün bir saat spor yapmış olabilir<sup>8</sup>.

The Form variable (Evidential vs. Modal) was manipulated within subjects. The 80 sentences were arranged in such a way that 10 sentence blocks were presented, representing each of the 8 types (four types per form condition). Participants saw each sentence only once in one of the eight conditions. The condition of sentences was counterbalanced between participants. Within each block, sentences were presented in a fixed random order. Dependent variables were "not enough information judgments", source type judgments and epistemic value (confidence) judgments.

*Source Type Judgments.* For source judgments, participants were instructed to decide on the source of information of each sentence based on 4 designated options: Hearsay, Inference, Assumption, and Conjecture. They were informed that "Hearsay" would indicate that the information is based on hearing it from someone else; "Inference" would indicate that the person

<sup>8</sup> Turkish allows a way of distinguishing between possibility and probability using lexical or morphological cues. However, in this study we did not apply the lexical cues in modals.

who reported the information saw some signs related to the information but did not see what happened; “Assumption” would indicate that the person who reported the information did not see what happened but reasoned what must have happened based on some knowledge; and “Conjecture” would indicate that the person who stated that information did not see the event, but also the source of information was unspecified. Importantly, participants were also able to choose the option of “Not enough information for a decision” if they did not feel the sentence provided enough information for them to identify the type of source.

*Confidence Judgments.* For confidence judgments, participants were instructed to decide how confident they were that the event referred to in the sentence actually happened, based on how the sentence was structured. The response options were: Extremely, Quite, Somewhat, or Not at all confident. They also had an option of choosing “Not enough information for a decision.”<sup>9</sup>

Participants were reminded that there were no right or wrong answers in the test and that we were simply interested in seeing how listeners interpret sentences conveying information about an event. The two tasks (source judgments and confidence judgments) were conducted 1 or 2 days apart and the order of the task was counterbalanced. The experiment was paper-pencil based. Participants were tested only in their primary language (Turkish or English).

### 2.3. Procedure

Participants were tested in groups. Per session, they received a booklet containing 80 different sentences with instructions that directed them to make either source or confidence judgments for that sentence (see Appendix A). One or two days after they completed the first task they received the other task. Sentences across tasks were presented in the same order. A language background questionnaire was administered last.

### 2.4. Data Coding and Analysis

The data from the two tasks (source judgments and confidence judgments) were analyzed separately.

*Judgments of ‘Not Enough Information’.* An initial analysis was conducted of the relative proportion of the ‘not enough information’ (NEI) response option selected for each of the form types. For example, the proportion of NEI responses to the hearsay sentence form was computed for the 10 sentences with the adverb ‘reportedly’. The same computation was done for all other sentence forms. Further, the same NEI computation was followed for the confidence judgment analysis. After that, an overall mean NEI proportion was computed for evidential sentences, which included the four evidential sentence forms and the four modal types. Two separate 2x2 analyses of variance were conducted, one for source judgments and one for confidence judgments, each examining the influence of sentence type (Evidential vs. Modal) and language (Turkish vs. English).

*Judgments of Source of Evidence.* A second set of analyses was then performed on the source judgments per form type by comparing the relative proportion of each source option selection out of the total source judgments made for each evidential and modal sentence form, excluding the NEI option. For example, for hearsay sentences (with the adverb ‘reportedly’ for English) the relative proportion of hearsay judgments was examined based on the total number of source judgments. The same computation was done for each source response for each sentence form. This detailed coding made it easier to see the pattern of choices for each evidential source and modal.

*Judgments of Confidence in Event Occurrence.* A third set of analyses examined confidence judgments per sentence type. These were computed by weighting the judgments.

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<sup>9</sup> While we are asking them to judge their own confidence, they are presumably basing their judgments on the degree of confidence/certainty as conveyed in the sentence.

‘Extremely confident’ responses were given a weighting of 3, ‘quite confident’ were weighted as 2 and ‘somewhat confident’ as 1; with ‘not at all confident’ responses weighted as 0. The total points were then standardized as percentages so that the highest confidence level would be 100% and the lowest confidence level would be 0%.

To summarize, three analyses were conducted. The first compared Turkish and English speaking participants’ relative use of the ‘not enough information’ response option for source and confidence judgments. The second compared Turkish and English speakers’ responses on source judgments. Finally, the third analysis examined participants’ belief/confidence judgments that the event described in the sentence had actually occurred.

For all analyses, significance was set at  $p < .05$  and partial eta  $\eta_p^2$  is reported as the measure of effect size.

### 3. Results

The results are presented as classified in the previous section.

#### 3.1. Analysis of ‘Not enough information’ Response Option

A 2 (Sentence form type: Evidential vs. Modal Sentence) x 2 (Language: Turkish vs. English) repeated measures ANOVA was conducted for the “not enough information” (NEI) responses for the source judgments and for the confidence judgments (in separate ANOVAs). For the purpose of this analysis, responses were averaged across the four subtypes of each sentence form. See Table 1 for a summary of the mean percent response.

*Source judgments.* A significant effect of Sentence Type was observed,  $F(1, 94) = 7.29$ ,  $p < .01$ ,  $\eta_p^2 = .07$ , which indicated that the “not enough information” response was given more frequently to modal than evidential sentences. Language was also significant,  $F(1, 94) = 34.3$ ,  $p < .001$ ,  $\eta_p^2 = .27$ , indicating that Turkish speakers gave significantly more NEI responses than did English speakers. A sentence form by language interaction, however, did not emerge,  $F(1, 94) = .002$ ,  $p = .97$ .

*Belief/Confidence judgments.* A main effect of Language,  $F(1, 93) = 18.68$ ,  $p < .001$ ,  $\eta_p^2 = .17$  showed that Turkish speakers showed a higher number of ‘not enough information’ responses than English speakers. There was no main effect of Sentence form,  $F(1, 93) = .72$ ,  $p = .4$ . Further, the sentence form by language interaction was not significant,  $F(1, 93) = 1.26$ ,  $p = .26$ .

Judgment	Sentence Type	Turkish (n=50)	English (n=60)
Source	Evidential	8.32 (9.61)	.46 (1.34)
	Modal	11.18 (12.08)	3.34 (8.23)
Confidence	Evidential	8.83 (12.99)	1.21 (4.73)
	Modal	8.55 (9.88)	3.17 (7.13)

Note. Standard deviations are indicated in parentheses.

**Table 1.** Turkish and English Speaking Participants’ Mean Percent NEI Responses on Source and Confidence Judgments to Evidential and Modal Sentence Forms.

Taken together, the results of these analyses show that, on the whole, participants judged there to be sufficient information on which to base both judgments of source and judgments of confidence that the asserted event had occurred; the “not enough information” option was selected at most 10% of the time and in some cases hardly at all. Further, participants were more likely to state there was not enough information when asked to make source judgments for sentences with modal structures than for those with evidential structures. Finally, for both sentence types and across both tasks, Turkish speakers were more likely to state there was not enough basis on which to respond than English speakers were.

### 3.2. Analyses of Source Judgment Responses Excluding NEI Response Option

In this analysis, a 4 (Judgment Type: Hearsay v. Inference v. Assumption v. Conjecture) x 2 (Language: Turkish v. English)<sup>10</sup> repeated measures ANOVA was conducted for the evidential sentences, and for the four subtypes of modal sentences, in separate ANOVAs per sentence type condition. The results are displayed in Figure 2 for evidential sentence types and in Figure 3 for modal sentence types.

#### 3.2.1. Evidential Condition

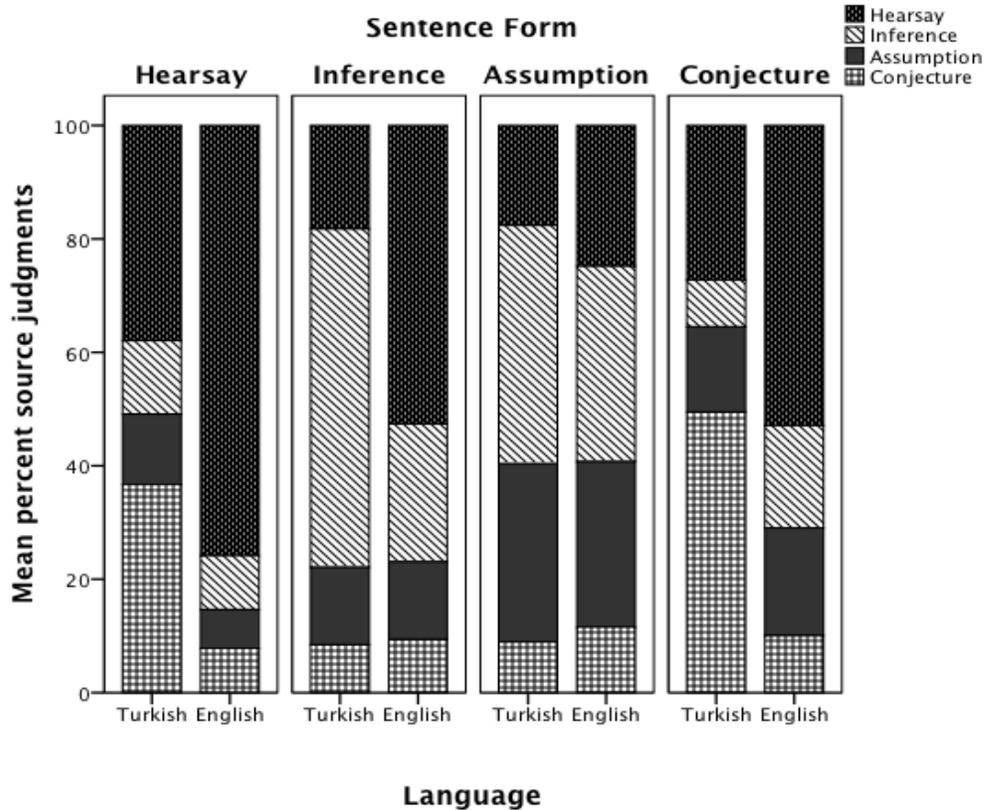
*Hearsay sentence type* The analysis of source judgments for sentences containing the hearsay type (e.g. *Reportedly Jack passed the math test*) revealed a significant source judgment type main effect,  $F(3, 324) = 64.16, p < .001, \eta_p^2 = .37$ . When asked to judge the source of sentences with the hearsay sentence form, participants chose Hearsay significantly more frequently than Inference ( $t(109) = 10.09, p < .001$ ), Assumption ( $t(109) = 11.06, p < .001$ ) or Conjecture ( $t(109) = 6.11, p < .001$ ). Conjecture responses were in turn chosen significantly more frequently than Inference ( $t(109) = 2.65, p = .01$ ) or Assumption ( $t(109) = 3.34, p < .001$ ). Inference and Assumption responses did not differ from each other.

There was no main effect of language, but a source judgment response type by language interaction was significant,  $F(3, 324) = 25.61, p < .001, \eta_p^2 = .19$ . Turkish speakers chose Hearsay more frequently than Inference ( $t(49) = 3.47, p < .001$ ) and Assumption ( $t(49) = 3.9, p < .001$ ), but were as likely to choose Conjecture as Hearsay. On the other hand, for English speakers, Hearsay was the most frequent response and it was chosen significantly more frequently than Inference ( $t(59) = 12.94, p < .001$ ), Assumption ( $t(59) = 14.41, p < .001$ ) or Conjecture ( $t(59) = 12.85, p < .001$ ). The other responses did not differ from one another.

*Inference sentence type.* The analysis of source judgments for the Inference sentence form (e.g. *Apparently Jack passed the math test*) demonstrated a significant judgment response main effect,  $F(3, 324) = 35.78, p < .001, \eta_p^2 = .25$ . Overall, Inference responses were chosen significantly more frequently than Assumption ( $t(109) = 6.6, p < .001$ ) and Conjecture ( $t(109) = 8.13, p < .001$ ), but equally frequently as Hearsay responses ( $t(109) = .55, p = .58$ ). Moreover, Hearsay responses were chosen more frequently than Assumption ( $t(109) = 5.49, p < .001$ ) and Conjecture ( $t(109) = 7.05, p < .001$ ). Finally, Assumption responses were chosen more frequently than Conjecture ( $t(109) = 2.09, p < .05$ ).

Further, a judgment response type by language interaction emerged as well,  $F(3, 324) = 27.7, p < .001, \eta_p^2 = .20$ . Turkish speakers' judgments of Inference sentences as Inference were more frequent than Hearsay ( $t(49) = 5.62, p < .001$ ), Assumption ( $t(49) = 6.98, p < .001$ ) or Conjecture ( $t(49) = 8.46, p < .001$ ). There was no difference between Hearsay and Assumption responses ( $t(49) = 1.02, p = .31$ ); however, Hearsay responses were more frequent than Conjecture responses ( $t(49) = 2.32, p = .025$ ). On the other hand, for English speakers, Hearsay responses were the most frequent response to the Inference sentence form and they were significantly higher than Inference ( $t(59) = 3.85, p < .001$ ), Assumption ( $t(59) = 6.31, p < .001$ ) or Conjecture ( $t(59) = 7.57, p < .001$ ). The second common answer was Inference and it was significantly more frequent than Assumption ( $t(59) = 2.68, p < .01$ ) and Conjecture ( $t(59) = 3.84, p < .001$ ). There was no difference between Assumption and Conjecture ( $t(59) = 1.28, p = .2$ ) responses.

<sup>10</sup> A Language main effect was not expected in any sentence type analyses because for both Turkish and English speakers total percentages of the response options added up to 100%.



**Figure 2.** Mean percent source judgment responses to evidential sentence forms of Turkish and English speakers.

*Assumption sentence type.* The results of the assumption sentence forms (e.g. *Presumably Jack passed the math test*) demonstrated a significant judgment response type main effect,  $F(3, 321) = 19.49, p < .001, \eta_p^2 = .15$ . The most frequent source judgment for the assumption sentence form was Inference, and that response was significantly more common than Hearsay ( $t(108) = 3.82, p < .001$ ), and Conjecture ( $t(108) = 8.46, p < .001$ ). The second common response was Assumption and it was significantly more frequent than Hearsay ( $t(108) = 1.98, p = .051$ ) and Conjecture ( $t(108) = 5.83, p < .001$ ). However Inference and Assumption responses did not differ ( $t(108) = 1.72, p = .09$ ). A judgment response type by language interaction did not emerge,  $F(3, 321) = 1.35, p = .26$ . Turkish and English speakers exhibited similar source judgment patterns to Assumption sentences.

*Conjecture sentence type.* The conjecture sentence form (e.g. *Supposedly Jack passed the math test*) analysis revealed a significant judgment response main effect,  $F(3, 324) = 16.75, p < .001, \eta_p^2 = .13$ . Post hoc analyses revealed that the most frequent two responses were Hearsay and Conjecture. Hearsay responses were significantly more frequent than Inference ( $t(109) = 6.01, p < .001$ ), Assumption ( $t(109) = 4.93, p < .001$ ) and Conjecture ( $t(109) = 2.16, p = .033$ ). Conjecture responses were also more frequent than Inference ( $t(109) = 3.44, p < .001$ ) and Assumption ( $t(109) = 2.39, p = .018$ ). Further, there was no difference between Inference and Assumption, ( $t(109) = 1.34, p = .18$ ).

Further, a judgment response type by language interaction was significant,  $F(3, 324) = 21.47, p < .001, \eta_p^2 = .17$ , indicating that the source judgment pattern of Turkish and English speakers was significantly different. Turkish speakers judged conjecture sentences as Conjecture more frequently than Hearsay ( $t(49) = 2.19, p = .022$ ), Inference ( $t(49) = 6.34, p < .001$ ) or

Assumption ( $t(49) = 4.62, p < .001$ ). On the other hand, English speakers judged conjecture sentences as Hearsay more frequently than Inference ( $t(59) = 5.06, p < .001$ ), Assumption ( $t(59) = 4.82, p < .001$ ) or Conjecture ( $t(59) = 7.38, p < .001$ ).

### 3.2.2. Modal Condition

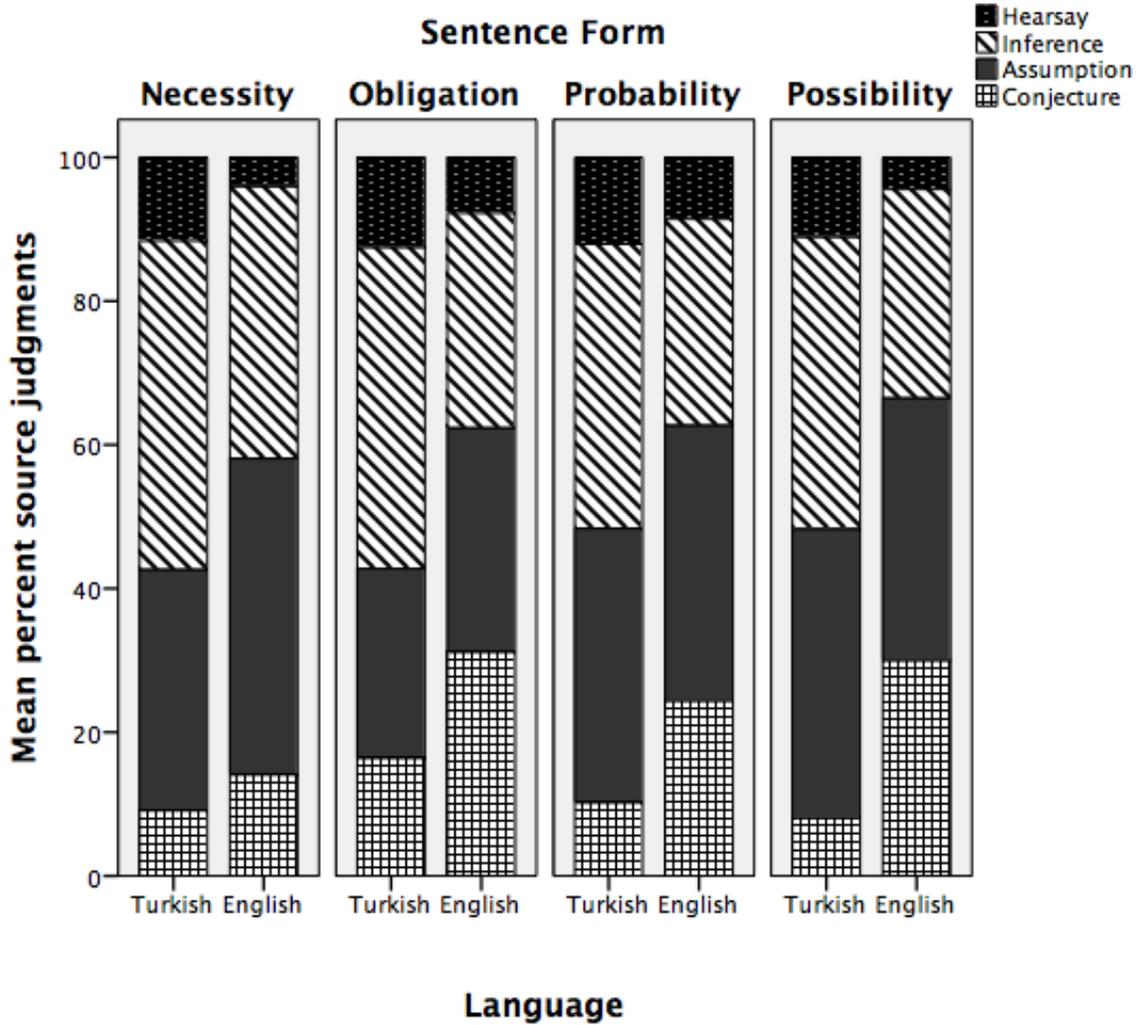
*'Must' sentence form.* The analysis of sentences containing the modal 'must' (e.g. *Jack must have passed the math test*) demonstrated a significant source judgment response type main effect,  $F(3, 321) = 56.89, p < .001, \eta_p^2 = .35$ . The most common judgment responses to 'must' sentences were Inference and Assumption. Both responses were significantly more frequent than Hearsay [Inference v. Hearsay:  $t(108) = 11.18, p < .001$ ; Assumption v. Hearsay: ( $t(108) = 10.29, p < .001$ ] and Conjecture [Inference v. Conjecture:  $t(108) = 8.56, p < .001$ ; Assumption v. Conjecture:  $t(108) = 8.66, p < .001$ ]. The difference between Assumption and Inference was not significant,  $t(108) = .45, p = .65$ .

Further, a judgment response by language interaction was also significant,  $F(3, 321) = 3.85, p < .01, \eta_p^2 = .035$ . Turkish and English speakers were equally likely to judge 'must' sentences as Inference,  $t(107) = 1.55, p = .12$ . However, English speakers selected Assumption more than Turkish speakers, ( $t(107) = 2.14, p < .05$ ). Turkish speakers, in turn, made more Hearsay judgments than English speakers,  $t(107) = 2.99, p < .01$ . There was no difference between Turkish and English speakers' frequency of selection of Conjecture responses,  $t(107) = 1.58, p = .12$ .

*'Should' sentence form.* The results of source judgments for 'should' sentences (e.g. *Jack should have passed the math test*) showed that there was a significant judgment response main effect,  $F(3, 297) = 12.4, p < .001, \eta_p^2 = .11$ . Inference was the most common response and significantly more frequent than Hearsay ( $t(100) = 7.12, p < .001$ ) and Conjecture ( $t(100) = 2.05, p < .05$ ). Although Assumption was significantly more frequent than Hearsay ( $t(100) = 5.03, p < .001$ ), it was equally frequent as Inference ( $t(100) = 1.32, p = .19$ ) and Conjecture ( $t(100) = .8, p = .42$ ).

Further, a judgment response by language interaction emerged,  $F(3, 297) = 3.86, p < .01, \eta_p^2 = .04$ . The pattern of English and Turkish speakers' source judgments was different. For Turkish speakers the most frequent response was Inference and it was a significantly more common response than Hearsay ( $t(40) = 4.78, p < .001$ ), Assumption ( $t(40) = 2.37, p < .05$ ) and Conjecture ( $t(40) = 3.62, p < .001$ ). Assumption was the second most frequent answer and it was more common than Hearsay ( $t(40) = 2.41, p = .02$ ). On the other hand, English speakers' judgments were equally distributed for Inference, Assumption, and Conjecture [Inference v. Assumption:  $t(59) = .19, p = .85$ ; Inference v. Conjecture:  $t(59) = -.18, p = .85$ ; Assumption v. Conjecture:  $t(59) = -.01, p = .99$ ]. Hearsay judgment was the least frequent response [Hearsay v. Inference:  $t(59) = -5.36, p < .001$ ; Hearsay v. Assumption:  $t(59) = -4.5, p < .001$ ; Hearsay v. Conjecture:  $t(59) = -4.35, p < .001$ ].

*'Could' sentence form.* The analysis of source judgments for 'could' sentences (e.g. *Jack could have passed the math test*) revealed a significant judgment response main effect,  $F(3, 303) = 24.7, p < .001, \eta_p^2 = .2$ . The most frequent source responses to 'could' sentences were Inference and Assumption. These were significantly more common than Hearsay and Conjecture [Inference v. Hearsay:  $t(102) = 6.75, p < .001$ ; Inference v. Conjecture:  $t(102) = 3.68, p < .001$ ; Assumption v. Hearsay:  $t(102) = 7.68, p < .001$ ; Assumption v. Conjecture:  $t(102) = 4.89, p < .001$ ]. Inference and Assumption response frequency did not differ from each other,  $t(102) = 1.19, p = .24$ . Finally Conjecture responses were more frequent than Hearsay,  $t(102) = 2.53, p < .05$ .



**Figure 3.** Mean percent source judgment responses to modal sentence forms of Turkish and English speakers.

In addition, a judgment response by language interaction was significant,  $F(3, 303) = 3.81, p < .01, \eta_p^2 = .04$ . The response pattern of English speakers was different from that of Turkish speakers. Turkish speakers judged *could* sentences as Inference and Assumption more frequently than Hearsay and Conjecture [Inference v. Hearsay:  $t(42) = 4.59, p < .001$ ; Inference v. Conjecture:  $t(42) = 5.07, p < .001$ ; Assumption v. Hearsay:  $t(42) = 4.49, p < .001$ ; Assumption v. Conjecture:  $t(42) = 4.85, p < .001$ ]. No difference was found between Inference and Assumption,  $t(42) = .2, p = .84$ ; nor between Hearsay and Conjecture,  $t(42) = .46, p = .64$ . On the other hand, English speakers judged *could* sentences as Assumption more frequently [Assumption v. Hearsay:  $t(59) = 6.23, p < .001$ ; Assumption v. Conjecture:  $t(59) = 2.54, p = .014$ ; Assumption v. Inference:  $t(59) = 1.92, p = .059$ ], followed by Inference and Conjecture. The Inference response was more frequent than Hearsay,  $t(59) = 4.97, p < .001$ ; however, it was as frequent as Conjecture,  $t(59) = .86, p = .39$ . Finally Conjecture responses were more common than Hearsay responses,  $t(59) = 3.36, p < .001$ .

*'Might' sentence form.* The analysis of source judgments for 'might' sentences (e.g. *Jack might have passed the math test*) demonstrated that there was a significant judgment response main effect,  $F(3, 324) = 31.19, p < .001, \eta_p^2 = .22$ . Similar to the 'could' sentence form results,

participants judged ‘might’ sentences more often as Inference and Assumption than Hearsay and Conjecture [Inference v. Hearsay:  $t(109) = 8.79, p < .001$ ; Inference v. Conjecture:  $t(109) = 3.47, p < .001$ ; Assumption v. Hearsay:  $t(109) = 9.42, p < .001$ ; and Assumption v. Conjecture:  $t(109) = 4.46, p < .001$ ]. There was no difference between Inference and Assumption,  $t(109) = .87, p = .39$ . Finally, Conjecture was chosen more often than Hearsay,  $t(109) = 4.15, p < .001$ .

Further, a judgment response by language interaction emerged,  $F(3, 324) = 8.61, p < .001, \eta_p^2 = .07$ . The source judgment pattern of ‘might’ sentences differed among Turkish and English speakers, similar to the other modal sentence forms. English speakers judged ‘might’ sentences equally frequently as Inference, Assumption and Conjecture [Inference v. Assumption:  $t(59) = -1.41, p = .16$ ; Inference v. Conjecture:  $t(59) = -.15, p = .88$ ; Assumption v. Conjecture:  $t(59) = 1.11, p = .27$ ]. Further, all three sources were significantly more frequently selected than Hearsay [Inference v. Hearsay:  $t(59) = 7.3, p < .001$ ; Assumption v. Hearsay:  $t(59) = 9.52, p < .001$ ; Conjecture v. Hearsay:  $t(59) = 6.35, p < .001$ ]. On the other hand, Turkish speakers selected Inference and Assumption sources as the most common, and these sources were more frequent than Hearsay and Conjecture [Inference v. Hearsay:  $t(49) = 5.56, p < .001$ ; Inference v. Conjecture:  $t(49) = 6.54, p < .001$ ; Assumption v. Hearsay:  $t(49) = 4.88, p < .001$ ; and Assumption v. Conjecture:  $t(49) = 6.58, p < .001$ ]. Further, Inference and Assumption ( $t(49) = .05, p = .96$ ) did not differ from each; neither did Hearsay and Conjecture ( $t(49) = .89, p = .37$ ). The overall results of the source judgment analysis are summarized in Table 2.

**3.3. Analysis of Belief/Confidence Judgments (excluding the not enough information response option)**

Participants’ total confidence judgment scores were analyzed separately for the evidential and the modal sentences. Each analysis involved a 4 (Sentence Type) x 2 (Language) ANOVA, with repeated measures on sentence type.

**3.3.1. Evidential Sentences**

The evidential sentence type analysis revealed a significant sentence type main effect,  $F(3, 324) = 35.02, p < .001, \eta_p^2 = .25$ . Hearsay and Inference sentences received the highest confidence scores. The scores of the two source types did not differ from each other ( $t(109) = .63, p = .53$ ), while they were significantly greater than other sentence forms [Hearsay v. Assumption:  $t(109) = 2.14, p = .03$ ; Hearsay v. Conjecture:  $t(109) = 8.03, p < .001$ ; Inference v. Assumption:  $t(109) = 3.42, p < .001$ ; Inference v. Conjecture:  $t(109) = 7.57, p < .001$ ]. Conjecture was judged the lowest in confidence level and significantly less than Assumption ( $t(109) = 5.47, p < .001$ ). The language effect was significant as well,  $F(1, 108) = 13.05, p < .001, \eta_p^2 = .11$ . Overall English speakers’ confidence scores were significantly greater than Turkish speakers.

Sentence Type	Turkish Source Judgments	English Source Judgments
Hearsay	H = C > I = A	H > I = A = C
Inference	I > H = A > C	H > I > A = C
Assumption	I ≥ A > H > C	I ≥ A > H > C
Conjecture	C > H > I = A	H > I = A = C
Necessity	I > A > H = C	A = I > C > H
Weak necessity	I > A > H = C	C = I = A > H
Probability	I = A > H = C	A ≥ I = C > H
Possibility	I = A > H = C	A = I = C > H

Note. H = Hearsay, I = Inference, A = Assumption, and C = Conjecture

**Table 2.** Relative Mention of Each Source Type by Language and Sentence Type

Further, a sentence type by language interaction emerged,  $F(3, 324) = 23.56, p < .001, \eta_p^2 = .18$ . Confidence judgment patterns of evidential sentence types differ for Turkish speakers and English speakers (see Figure 4). Turkish speakers demonstrated more variation in their confidence judgments of evidential sources. For Turkish speakers, Inference sentences elicited the most confident response compared to all other sources (Hearsay:  $t(49) = 4.89, p < .001$ ; Assumption:  $t(49) = 2.48, p = .02$ ; Conjecture:  $t(49) = 7.56, p < .001$ ). The second most confident response was to Assumption, which was significantly greater than Hearsay ( $t(49) = 2.1, p < .05$ ) and Conjecture ( $t(49) = 6.14, p < .001$ ) sources. The third most confident source was Hearsay, which was judged more confident than Conjecture, which had the lowest confidence score ( $t(49) = 4.35, p < .001$ ).

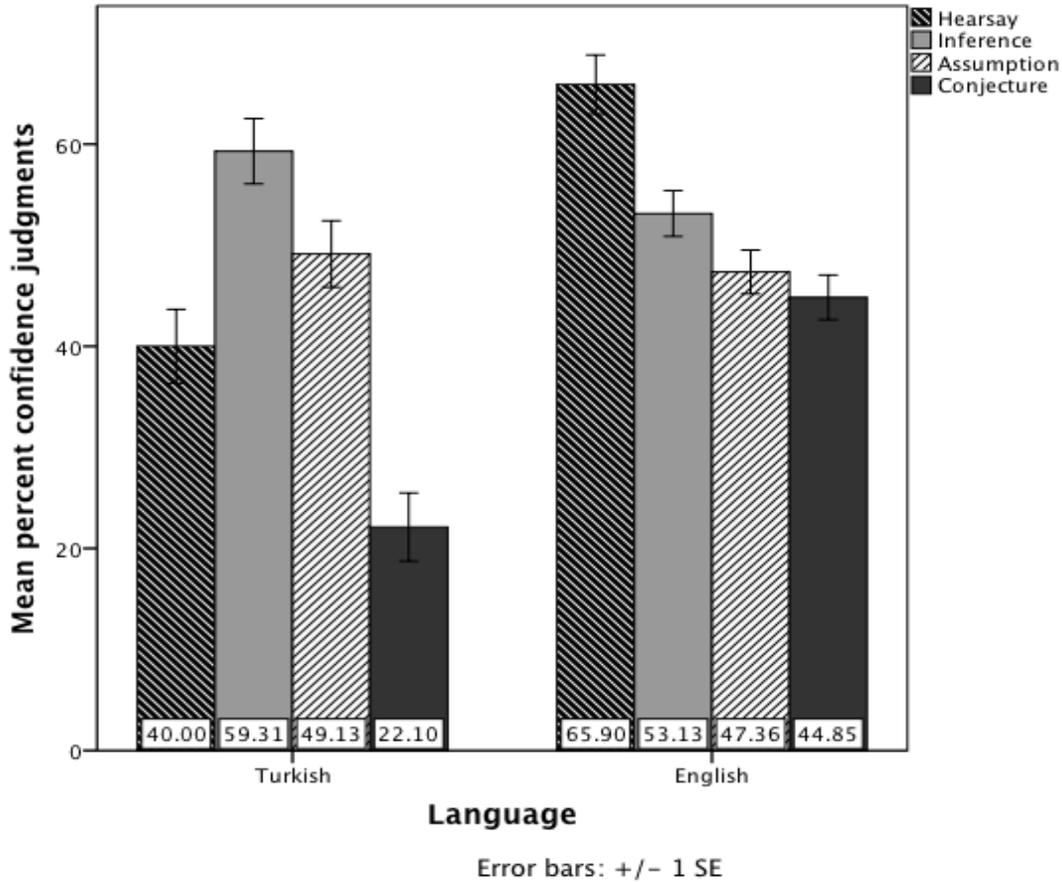
For English speakers by contrast, Hearsay was the most confident source compared to all the other sources (Inference:  $t(59) = 4.18, p < .001$ ; Assumption:  $t(59) = 6.89, p < .001$ ; and Conjecture:  $t(59) = 7.25, p < .001$ ). Inference was the second most confident source and was significantly greater than Assumption ( $t(59) = 2.42, p = .02$ ) and Conjecture ( $t(59) = 4.19, p < .001$ ). However, there was no difference between the sources of Assumption and Conjecture ( $t(59) = 1.44, p = .17$ ).

With respect to group differences, English speakers' confidence scores for Hearsay and Conjecture sources were significantly higher than those for Turkish speakers [Hearsay:  $t(109) = 5.76, p < .001$ ; and Conjecture:  $t(108) = 5.81, p < .001$ ] while the confidence scores of Inference and Assumption did not differ between Turkish and English speakers [Inference:  $t(108) = 1.6, p = .11$ ; Assumption:  $t(108) = .46, p = .64$ ].

### 3.3.2. Modal Sentences

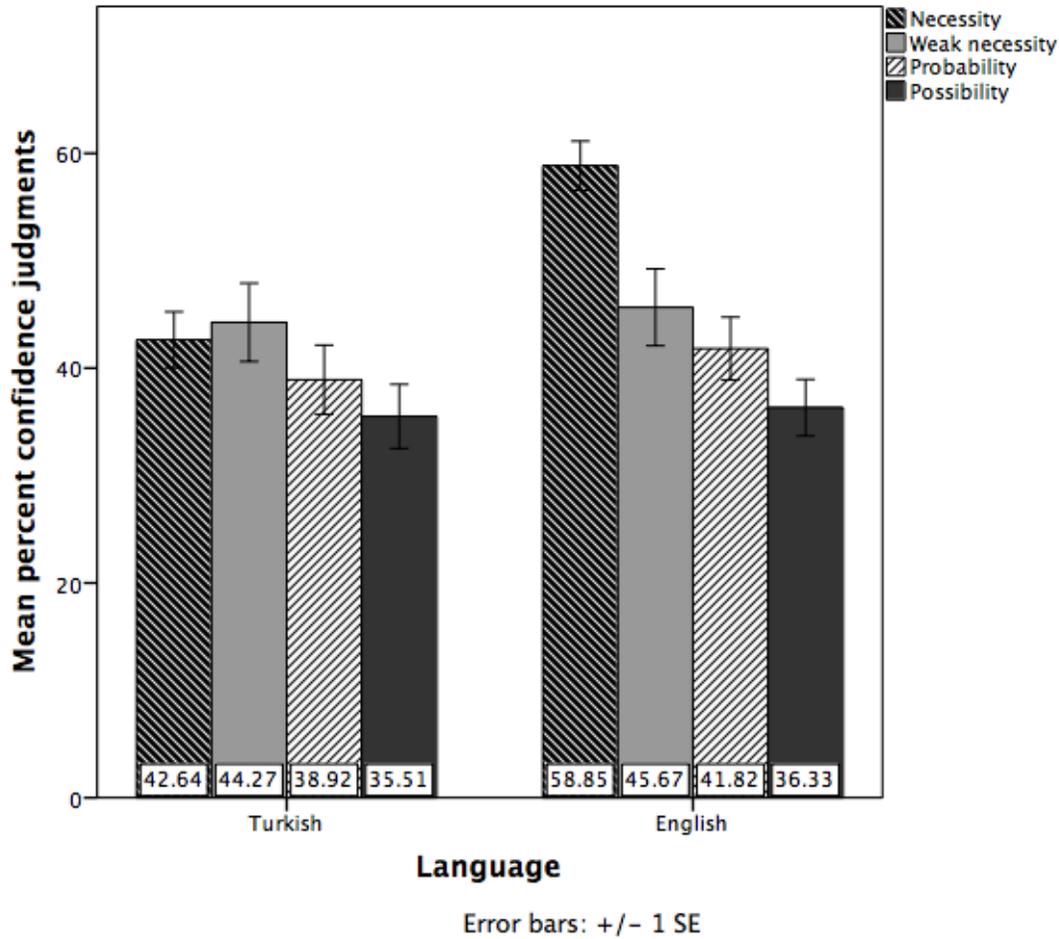
The analysis of confidence judgments for modal sentences (see Figure 5) demonstrated a significant sentence type main effect,  $F(3, 282) = 11.9, p < .001, \eta_p^2 = .11$ . The necessity modal was judged as the most confident modal and its confidence level was significantly higher than that of the other modals [Weak necessity:  $t(102) = 3.01, p = .003$ ; Probability:  $t(102) = 4.84, p < .001$ ; Possibility,  $t(109) = 6.93, p < .001$ ]. Weak necessity and Probability sentence confidence levels did not differ from each other ( $t(95) = 1.76, p = .08$ ), but were significantly higher than Possibility sentences [Weak necessity v. Possibility:  $t(102) = 2.89, p = .005$ ; Probability v. Possibility:  $t(102) = 2.28, p = .03$ ]. The language main effect was not significant,  $F(1, 94) = 2.92, p = .09$ .

A sentence type by language interaction was significant,  $F(3, 282) = 3.94, p < .01, \eta_p^2 = .04$ . Turkish speakers and English speakers demonstrated different confidence patterns for modal sentences (see Figure 5). Turkish speakers judged all modal sentences similarly in terms of the confidence level that they convey. The only difference was between Necessity and Possibility sentences, ( $t(49) = 3.07, p = .004$ ), where Necessity sentences were judged more confident than Possibility sentences. The other modal sentence forms did not differ from one another [Necessity v. Weak necessity:  $t(42) = .15, p = .88$ ; Necessity v. Probability:  $t(42) = 1.61, p = .12$ ; Weak necessity v. Probability:  $t(35) = 1.21, p = .23$ ; Weak necessity v. Possibility:  $t(42) = 1.69, p = .1$ ; Probability v. Possibility:  $t(42) = 1.08, p = .28$ ].



**Figure 4.** Mean percent confidence judgment of evidential sentences by sentence type and group.

On the other hand, English speakers exhibited more variation and a strong confidence order among modal types. The modal Necessity was judged as the most confident type and its confidence level was significantly higher than other modal forms [Weak necessity:  $t(59) = 3.49$ ,  $p < .001$ ; Probability:  $t(59) = 4.81$ ,  $p < .001$ ; Possibility:  $t(59) = 6.7$ ,  $p < .001$ ]. Weak necessity and Probability sentences did not reveal a significant difference in their confidence level,  $t(59) = 1.27$ ,  $p = .21$ ; while their confidence scores were significantly greater than Possibility sentences [Weak necessity v. Possibility:  $t(59) = 2.35$ ,  $p = .02$ ; and Probability v. Possibility:  $t(59) = 2.02$ ,  $p < .05$ ].



**Figure 5.** Mean percent confidence judgment of modal sentences.

#### 4. Discussion

A primary goal of the research was to bring empirical data to bear on various hypothesized views about the relationship between evidentiality (the source of evidence for a narrated event) and epistemic modality (the confidence in whether the event had occurred). A secondary goal was to investigate whether the nature of evidentiality is expressed (i.e., in the grammar vs. in the lexicon) differentially influences speakers' interpretation of different types of evidential and modal expressions.

We will proceed by first discussing the findings for the 'not enough information' analysis followed by the source judgment results and finally the confidence judgment results.

##### 4.1. 'Not Enough Information' (NEI) Responses

The NEI option provides a baseline determination of whether participants would make source judgments at all for modal sentences and confidence judgments at all for evidential sentences. If participants consider that a modal sentence contains enough information to allow one to interpret the source of information, this tells us that modal expressions provide some source-related information. Similarly, if participants find there was enough information from an evidential sentence to interpret the epistemic value of the proposition, that tells us that an evidential expression has some epistemic value. We found that for both source and confidence judgments, and for both Turkish and English speakers, NEI responses were chosen far less often than would

be expected based on chance (20%), suggesting that, on the whole, participants considered there to be enough information on which to make source and confidence judgments.

*Source judgments.* Across both groups, NEI was chosen less often for evidential sentence types than for modal sentence types. This result is entirely to be expected, given that evidential sentence types explicitly code for source. What is nevertheless noteworthy is that selection of the NEI option - even for modal sentences - is fairly low (11.18% for Turkish, 3.4% for English speakers). As such, the results demonstrate that the modal sentence forms did convey source information along with the other meanings.

*Confidence judgments.* Here too, participants showed a very low level of selection of the NEI option (less than 10% of responses were of this type). There was no difference in NEI response rate between evidential and modal expressions: Participants responded to the same degree that there was enough information to judge the epistemic value of the propositions from evidential as from modal expressions. Thus, people appear to interpret evidential expressions as conveying epistemic value along with the other meanings at the same rate as they do for modal expressions.

*Differences between Turkish and English speakers.* Another theoretically interesting aspect of the findings from the NEI analyses was the difference observed between Turkish and English speakers. English speakers showed almost no hesitation in making both source and confidence judgments of evidential sentences, with only a small percent stating that they did not have enough information to make source or confidence judgments of modal or evidential sentences. On the other hand, Turkish speakers were significantly more likely to find the information given was not enough to make the required judgments.

Although it is difficult to explain this somewhat unexpected finding, it does suggest a need for further research to corroborate this group difference of Turkish speakers being apparently more wary about over-interpreting the meaning of a sentence and more inclined to take a cautious approach. While there is some other work suggesting cultural differences whereby individuals based in Western societies demonstrate different procedures and processes while making judgments and decisions than those based in Eastern societies (Matthew & Busemeyer, 2011). Although no two Eastern and Western cultures behave in the same way, some common ground patterns have been found for Western cultures (Americans and Europeans) different than Eastern cultures (from far east to middle east), thus it remains to be seen if those differences are applicable to the present study.

Whatever the reason for the observed group difference, it is theoretically important that the rate of NEI responses was below chance level (20%). This result demonstrates that people judge there to be enough information to determine both the source of information of modal expressions and the epistemic value of evidential expressions. This finding in itself would lead one to reject the complete disjointment view proposed by Aikhenvald (2004), de Haan (1999), Lazard (2001) and Oswald (1986), where the two linguistic properties are considered completely independent from each other. Overall, the results of the NEI analyses demonstrate that modality and evidentiality are neither completely disjoint properties nor are they completely the same. They display as two sets that intersect to a great extent.

A further question asked in the present study was how the intersecting/overlapping areas of evidentiality and modality sets are shaped by specific subtypes of each sentence form, and whether certain evidential and modal subtypes are interpreted and utilized interchangeably. To address this issue we turn to the additional analyses conducted of the source and confidence judgments (after excluding the NEI responses).

#### **4.2. Interpretation of Source Judgments**

The source judgment task was designed first to examine speakers' ability to classify the source type of sentences containing evidential structures (e.g., whether sentences containing the thirdhand suffix in Turkish or the adverb "supposedly" in English would be classified as

conjecture). Examining the pattern of source judgments elicited for modal sentences allowed us to address the question of the nature of the relationship between evidentiality and modality.

The source judgment task with modal expressions was designed to clarify whether speakers could find enough information to make source judgments, and if so, whether their judgments would correspond to theoretical claims proposed by linguists.

*Source Judgments of Evidential Expressions.* The results of the source judgments task demonstrated that Turkish and English speakers interpret evidential expressions differently. Turkish speakers judged the source for HEARSAY sentences equally often as hearsay (37.9%) or as conjecture (36.7%). Relatedly, CONJECTURE sentences were judged as conjecture at the rate of 49%, and as hearsay 27% of the time. This clustering of hearsay and conjecture suggests that for Turkish speakers CONJECTURE is perceived as a kind of thirdhand information, an option that is provided in Turkish grammar. Hence, Turkish speakers could easily interchange hearsay and conjecture. INFERENCE sentences were judged as inference 60% of the time, which demonstrated that Turkish speakers were mostly consistent about this source of inference. However, for ASSUMPTION sentences Turkish speakers made more inference than assumption judgments (42% vs. 31%). This suggests that the ASSUMPTION source marker in Turkish is perceived as conveying inference (the source of information obtained from results) and assumption (the source of information obtained from reasoning) somewhat interchangeably.

English speakers' source judgments of evidential sentences demonstrated less variability than those of Turkish speakers. English speakers uniformly judged evidential sentences containing "reportedly" as hearsay (76%). This finding is consistent with linguists' claims (Aikhenvald, 2004; Chafe, 1986; Mortensen, 2006). However, English speakers rated *apparently* (as inference) and *supposedly* (as conjecture) as hearsay about half of the time (53%). These results support Chafe's claims but not those of Ginsborne and Holmes (2007), Izvorski (1997) and Mortensen (2006). Further, the three evidential adverbs (*reportedly*, *apparently*, *supposedly*) were interpreted as the same in terms of other less frequent source judgments. All follow the order hearsay, inference, assumption and conjecture. Thus, we can conclude that these adverbs were interpreted the same. In contrast, *presumably* (used as assumption) was judged as a mix of inference and assumption. This finding is somewhat consistent with Chafe's presumption on *presumably*. Further, English speakers' interpretation of *presumably* is very similar to Turkish speakers' interpretation of the assumption marker *-dir* (Aksu-Koc & Alici, 2000).

*Source Judgments of Modal Expressions.* The results of source judgments of modal sentences also demonstrated a significant difference between Turkish and English speakers. Turkish speakers interpreted all of the modal forms as the same. This was expected for the *could* and *might* sentence forms because both have the same morpho-syntactic marker. However, the other two modal forms (*must* and *should*) have different markers than *could/might*. Yet, Turkish speakers show no distinction between the modal types, interpreting them all as a combination of inference and assumption, consistent with what was claimed by Kerimoglu (2010) and Kornfilt (2001).

English speakers, on the other hand, demonstrated more variation in source judgments of modal sentences. The modal *must* was interpreted as both inference (37.83%) and assumption (44.01%). This finding partly supports the claim of Chafe (1986), Faller (2002), von Fintel and Gillies (2010) and van der Auwera and Plungian (1998). Contrary to Chafe, however, *should* sentences were not interpreted distinctively as assumption; rather they were equally judged as conjecture (31.14%), inference (29.91%) and assumption (31.18%). *Could* and *might* sentences were interpreted similarly as assumption, followed by inference and conjecture. English speakers' source interpretation of modal sentences, overall, shows a combination of inference, assumption and conjecture at different rates. However, none of the modal interpretations directly correspond to an evidential form's interpretation, which serves as evidence against the identity view.

These findings demonstrate a consistent difference between users of grammaticalized versus lexicalized evidentials. For Turkish speakers, identifying and classifying source of

information is second nature, given that their language requires them to make clear distinctions, at least between firsthand and nonfirsthand sources. The fact that they show clear demarcations even of nonfirsthand sources (whereas English speakers tend to consider most as hearsay) underscores that source distinctions matter for them (see also Tosun et al., 2013). English speakers not only interpret most evidential adverbs as hearsay; they are also more varied in their interpretations of the source of modal expressions. Turkish speakers' source judgment of modal expressions, on the other hand, did not show any variation, with all being interpreted as a mix of inference and assumption. This may be because they already have the grammatical markers to indicate the source of information, and that leads them not to look for other forms of evidence.

#### 4.3. Interpretation of Belief/Confidence Judgments

The belief/confidence judgment task was conducted to examine the epistemic value interpretations of modal and evidential expressions. The epistemic value of English modality was previously investigated by Francis and Wales (1994), who found that each modal marker in English was rated at a different certainty level. *Must* was judged as the most certain modal, which represents epistemic necessity. *Can*, *would*, *should* and *might* followed after *must* in certainty ratings, in that order. The present study thus serves in part as a replication of Francis and Wales's study.

Further, epistemic value ratings of Turkish modal expressions were tested as well. Kerimoglu (2010) discussed Turkish modality in detail, although he did not mention the epistemic value of each marker. He focused on the meaning of the markers separately. The present study is the first empirical investigation of how Turkish speakers rate the epistemic value of modal expressions.

The purpose for obtaining confidence judgments for evidential sentences was to address the theoretical issue of the relationship between modality and evidentiality. It was of interest whether speakers could find enough information to judge the epistemic value of evidential expressions and if so, whether different sources of information would be judged at different levels of certainty. In the evidentiality literature, Willet (1988) and de Haan (1999) have proposed their own answers to this issue. According to Willet, hearsay sources should be more reliable than inference because hearsay conveys information that was directly gathered by whoever first reported the proposition. On the other hand, de Haan argued that inference should be more reliable than hearsay, because the source of inference requires a closer involvement of the speaker herself in the reported event by having to gather proof. Aside from providing empirical data on this issue, another aim of the confidence judgments task was to examine if there would be a difference between Turkish and English speakers in confidence judgments.

The results demonstrated that English and Turkish speakers judged the epistemic value of the modal sentences differently. Consistent with Francis and Wales (1994), English speakers judged the epistemic value of modal expressions in the following order: the modal *must* was judged as the most certain modal (58.85%) followed by *should* (45.67%) and *could* (41.82%). *Might* elicited the lowest confidence judgments (36.32%) by English speakers. On the other hand, Turkish speakers did not show any difference in certainty between the modals. All modal expressions were judged at similar medium confidence levels. The only differentiation they made was for *must* and *might*; *must* (42.64%) was judged to be more confident than *might* (35.51%).

Turkish speakers not only judged the source of all modal sentences equivalently, they also judged the confidence of those modal expressions as equivalent. Thus, we can conclude that for Turkish speakers modals represent one member in an overlapping intersection of evidentiality and modality sets. On the other hand, just as English speakers judged the source of modal expressions variously as inference, assumption and conjecture, they also judged their confidence levels for the modals differently. Thus, we can argue that for English speakers, modal expressions are represented as independent members of the intersection of evidentiality and modality sets.

In terms of the confidence judgments of evidential expressions, similar to the modal sentences, Turkish and English speakers showed different results. Turkish speakers gave highest confidence ratings for the inference sentences (59.31%), followed by assumption sentences (49.13%). Hearsay sentences were judged less confident (40%) than inference and assumption, and the least confident source of information was conjecture (22.10%). Turkish speakers' confidence judgments are consistent with de Haan's (1999) argument in that inference was judged as more reliable than hearsay. On the other hand, English speakers' judgments demonstrated a different ranking. They gave hearsay sources the highest confidence rating (65.9%) followed by inference (53.13%), assumption (47.35%) and conjecture (44.85%), although assumption and conjecture did not differ significantly. English speakers' confidence judgment pattern was consistent with Willet's (1988) argument that hearsay is more reliable than inference. The difference between Turkish and English speakers' confidence judgments of evidential expressions could be related to their source judgments of the same sentences.

Turkish speakers judged each source of evidence as projected in the grammar, and their source judgments varied accordingly. They judged the confidence level of each source consistently with its proximity to the proposition source. In this case, because the speaker is involved in the same environment of the reported event when the source was inference, they also reported more confidence that the event actually happened. In the hearsay source, because the speaker's involvement is more limited than in the case of inference, they reported less confidence than they did for the inference case. Thus, in Turkish speakers' minds evidential sources appear to be represented as independent sets in the intersection of the evidentiality and modality. On the other hand, as English speakers judged all of the evidential sources, except assumption, as hearsay, the difference between the confidence levels of these evidential expressions demonstrated that even one source type could be varied in terms of its reliability. In English speakers' mind, the source hearsay is represented at three different levels of certainty. The certainty level of assumption sentences was independent from hearsay sources.

Before discussing the theoretical implications of the findings, there are some limitations of the study to be noted. First, the study asked participants to make metalinguistic judgments, i.e., to think about their linguistic knowledge. This is not something that language users typically do. It is possible that how participants respond on tasks required explicit metalinguistic judgments. That may not be consistent with how they actually use language in daily life. For example, an English speaker might judge *apparently* as hearsay but might actually use it as inference in her daily language practice. A second limitation is that the stimuli were not presented in a discourse context. In actual language use, contextual cues are usually available to constrain how discourse is interpreted. It is quite likely that the sentences presented in this study would have been judged differently if they had been presented within a given context. Thus, this study might measure metalinguistic knowledge rather than language use. Further work is needed to address how context, including sociopragmatic factors, may interact with particular markers of modality or evidentiality in affecting judgments of source or confidence. A third limitation is that the source of conjecture might lead to some noise due to the vagueness of the source itself. With these limitations in mind, we turn to the theoretical implications of the findings.

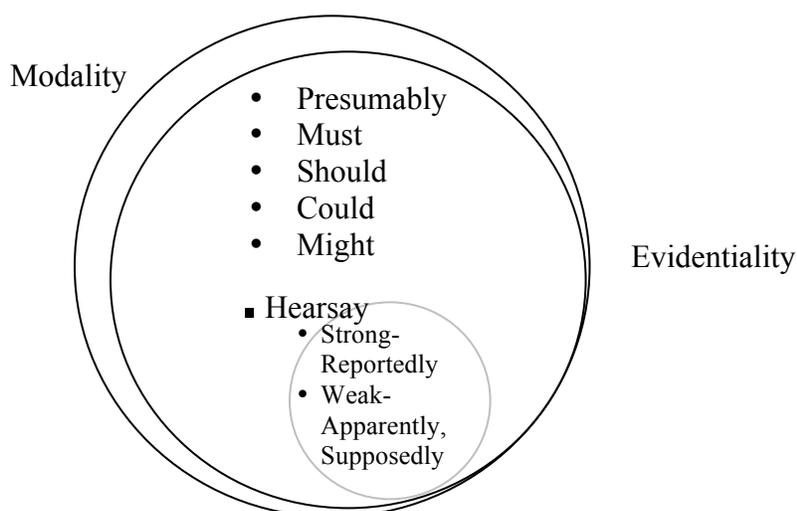
#### **4.4. Theoretical Implications of Overall Findings**

As the not-enough-information analyses demonstrated, evidentiality and modality are in a close relationship. Participants indicated that they had enough information to make source judgments of modal expressions and epistemic value judgments of evidential expressions. This finding disproves the complete disjointment view by Aikhenvald (2004), de Haan (1999), Lazard (2001) and Oswalt (1986). On the other hand, evidential and modal expressions were not used completely interchangeably. For both Turkish and English speakers, modal and evidential expressions were used to indicate different sources of evidence and confidence levels. Thus, the identity view (by Matthewson, 2010) was also disproved. In summary, evidentiality and modality

are neither completely independent linguistic properties from each other, nor are they the same structures conveying completely the same meaning, but they display a close relationship.

Further, the results suggest that Turkish, as a grammaticalized evidential language, and English, as a lexicalized evidential language, exhibit different evidentiality-modality relationships. English speakers' epistemic value judgments of evidential expressions were almost 100%, indicating that each and every evidential expression conveys epistemic value, whereas source judgments of modal expressions yielded more "not enough information" responses than evidential sentences. This pattern supports an inclusion set in which evidentiality is considered a subtype of epistemic modality (see Figure 6), as proposed by Bybee (1985), Palmer (1986), Willett (1988), and Mithun (1999). According to this view all evidential expressions convey epistemic value; however, not all modal expressions convey the source of the evidence.

Further, the source and confidence judgments of English speakers displayed how the members of this subset were shaped. According to the analyses, each modal expression (*must, should, could, might*) was judged differently from one another in both source and confidence judgments, which was displayed as independent members in the English evidentiality-modality set structure. Assumption (*presumably*) as an evidential expression was judged distinctively from other sources and from modals in both source and confidence judgment tasks. Thus, it was displayed as another independent member of the subset. Further, other evidential expressions (*hearsay, inference, conjecture*) were judged as the same source (*hearsay*) but at different epistemic value levels (strong, and weak). Therefore, these sources were displayed as the hearsay subset in the evidentiality subset with three members.

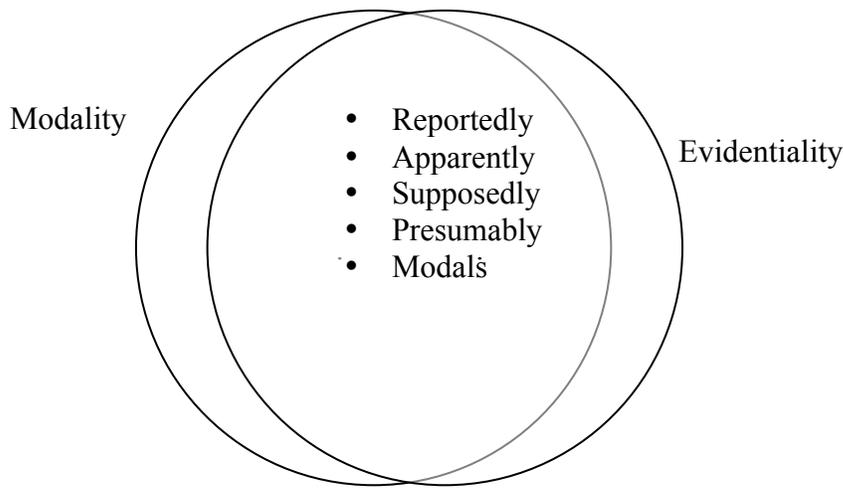


**Figure 6.** The prototypical Venn diagram of the English evidentiality and modality relationship.

On the other hand, Turkish speakers demonstrated a different relationship between evidentiality and modality. For one thing, Turkish speakers indicated more NEI responses than English speakers. Turkish speakers' evidentiality and modality relationship structure appears to be more of an overlapping structure (see Figure 7). The overlap view argues that not all modals convey the source of information and not all evidentials convey epistemic value, however, there is overlap between them where they convey both source and epistemic value information (DeLancey, 2001; Faller, 2002; van der Auwera & Plungian, 1998). Turkish speakers sometimes use evidential expression only to indicate the source of information as in Givón's (1982) *Life of Buddha* example. For example, when the prophets' life is narrated by religious Turkish people they use nonfirsthand marker, although they are quite certain about what happened to the prophets. Similarly, they sometimes use modal markers just to indicate their degree of certainty.

For example, a Turkish speaker might say that “I might have read that book”, regardless of the firsthand source of information, to indicate purely the possibility of the proposition.

Scholarly discussions of the interpretation of source for modals has focused on the modal *must*. However, our source and confidence judgment analyses allowed for an examination of several different modals and it was possible to display how the overlapping section of the relationship was contained. Turkish speakers judged each and every evidential expression independently from one another in terms of both the source and confidence tasks. Thus, all evidential expressions were represented as independent members of the overlap set. Further, all of the modal expressions were judged as the same in terms of both the source and confidence judgment tasks. Thus, all modals were displayed as only one member of the overlapping sets.



**Figure 7.** The prototypical Turkish evidentiality and modality relationship.

In summary, the results suggest a close relationship between evidentiality and modality, although the nature of the relationship depends on the nature of evidentiality and modality indication of the languages.

Tosun and Vaid (2016) tested the influence of evidential markers on decision-making. They found that evidentiality is one variable that in interaction with other variables (e.g., order of the given information, the nature of information) influences trustworthiness of given information and final decisions. The results of this research suggest that the epistemic value of evidential expressions may influence individuals’ decisions. People consider facts reported with firsthand source expressions as having a very strong epistemic value. The underlying meaning of the firsthand expression is that the speaker herself personally witnessed what was reported. Thus, it is considered more secure to rely on the firsthand evidential expressions.

The present study demonstrated that people interpret the reliability of the source of information from the evidential marker. The results of the study are of particular importance in settings where the decisions that are made have a long-lasting impact on individuals’ lives, such as courtrooms, political elections, medical environments, marketing and business, and academia. In these and similar settings linguistic framing can significantly affect decision-making (for more information, see Filipovic, 2013; Matlock, 2012; Tannen, 1993).

Qualitative investigations of discourse and evidentiality demonstrate that evidential expressions are used to indicate assertion and commitment (Berlin, 2011), responsibility, entitlement, certainty of knowledge, denial (as nonfirsthand) of the described situation (Fox, 2008), unbelievable and unreliable situations as fairy tales (Johanson, 2003) and the distance

between the speaker and the described situation (Aksu-Koc & Slobin, 1986). Thus, discourse analysis reveals that evidentiality is used by speakers to frame their stories with the underlying meaning of various evidential sources, which in turn can shape interlocutors' judgments and decisions.

By way of conclusion, the impact of this study can be summarized as follows: First, it was demonstrated that there was a clear relationship between evidentiality and modality. Evidential expressions convey the epistemic value of the propositions along with the source of evidence. By the same token, modal expressions convey the source of evidence along with the epistemic value of the propositions. Second, the classifications of the evidential and modal expressions in the linguistic repertoire of speakers change from language to language depending on how evidentiality and modality are marked in each language. This study, to our knowledge, is the first investigation that aimed to address empirically a long-standing debate on the relationship between evidentiality and modality. Therefore, the findings are a contribution to the evidentiality literature. Further, along with the results of the study, the methodology of the investigations including the materials, design, and procedure is another significant contribution for future investigations.

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**APPENDIX A: SAMPLE RESPONSE FORM****INSTRUCTIONS (Source judgment)**

In this experiment we would like to see how listeners interpret sentences in their language that differ in subtle ways. You will be shown a list of sentences describing some event. Please read each sentence as carefully and closely as you can. Upon reading each sentence, you will be asked to make some judgments, which involve deciding what the source of the reported event is – i.e., is the source hearsay, an inference based on other observation, an assumption or a conjecture. As an example, let’s say the sentence was about someone saying there was a mouse in a house. In this case, “Hearsay” would indicate that the information is based on hearing it from someone else. For example, the person’s friend told him/her that there was a mouse in the house. “Inference” means that the person who reported the information saw some signs related to the information but did not see what happened. For example, the person saw footprints of the mouse but did not see the mouse itself in the house. “Assumption” indicates that the person who reported the information did not see what happened but reasoned what must have happened based on some knowledge. For example the town where the house located was known for its mice. “Conjecture” would mean that the person who stated that information did not see the event, but also the source of information was unspecified. For example, the person heard people talking about a mouse and s/he guessed that there was a mouse in the house.

**INSTRUCTIONS (Confidence judgment)**

In this experiment we would like to see how listeners interpret sentences in their language that differ in subtle ways. You will be shown a list of sentences describing some event. Please read each sentence as carefully and closely as you can. Upon reading each sentence, you will be asked to make some judgments, which involve how confident you feel about whether the reported information actually took place: are you extremely confident, quite confident, somewhat confident or not at all confident. For example, for the example given above, you would indicate how confident you would be that there was actually a mouse in the house if you heard the sentence. Remember that there are no right or wrong answers in this test. We are simply interested in seeing how listeners typically interpret sentences conveying information about an event.

PLEASE MAKE THE SOURCE JUDGMENTS OF THE FOLLOWING SENTENCES

No	Sentence	Hearsay	Inference	Assumption	Conjecture	Not enough information
1	The teacher should have answered the students' questions.					
2	Supposedly the girl drank orange juice at breakfast instead of tea.					
3	The student could have subscribed to the monthly journal.					
4	Presumably he ironed all of his shirts on Sunday.					
5	She might have sworn not to tell anyone.					
6	Presumably the man asked the teacher to stay at his home.					
7	The woman might have gone to the beach to sunbathe.					
8	Reportedly she walked home from school today.					
9	Reportedly the man planted tomatoes and pepper.					
10	Apparently my friend's uncle went into politics.					
11	Supposedly he went to the park for a run this evening.					
12	The boy might have talked in his sleep last night.					

PLEASE MAKE THE CONFIDENCE JUDGMENTS OF THE FOLLOWING SENTENCES

No	Sentence	Extremely confident	Quite confident	Somewhat confident	Not at all confident	Not enough information
1	The teacher should have answered the students' questions.					
2	Supposedly the girl drank orange juice at breakfast instead of tea.					
3	The student could have subscribed to the monthly journal.					
4	Presumably he ironed all of his shirts on Sunday.					
5	She might have sworn not to tell anyone.					
6	Presumably the man asked the teacher to stay at his home.					
7	The woman might have gone to the beach to sunbathe.					
8	Reportedly she walked home from school today.					
9	Reportedly the man planted tomatoes and pepper.					
10	Apparently my friend's uncle went into politics.					
11	Supposedly he went to the park for a run this evening.					
12	The boy might have talked in his sleep last night.					

**APPENDIX B: SOURCE JUDGMENTS**

*A Summary of Turkish and English Speaking Participants' Mean Source Judgment Responses (in Percentage) to Evidential and Modal Sentence Forms*

Source Judgment Responses					
Sentence form	Language	Hearsay	Inference	Assumption	Conjecture
Hearsay	Turkish	37.91 (38.08)	13.01 (22.18)	12.39 (18.18)	36.68 (37.71)
	English	75.83 (28.24)	9.50 (15.00)	6.83 (11.71)	7.83 (16.78)
Inference	Turkish	18.23 (24.29)	59.68 (33.41)	13.64 (18.33)	8.44 (14.90)
	English	52.61 (35.24)	24.33 (25.42)	13.69 (18.77)	9.37 (16.17)
Assumption	Turkish	17.61 (24.72)	42.02 (25.87)	31.41 (27.60)	8.95 (15.33)
	English	24.81 (26.47)	34.46 (27.46)	29.19 (28.10)	11.54 (16.57)
Conjecture	Turkish	27.22 (34.20)	8.26 (14.52)	15.05 (21.68)	49.47 (38.68)
	English	52.89 (36.05)	18.07 (21.95)	18.98 (24.15)	10.06 (16.05)
Necessity	Turkish	11.64 (16.48)	45.78 (26.83)	33.50 (25.40)	9.09 (17.09)
	English	4.07 (9.55)	37.83 (26.27)	44.01 (25.55)	14.08 (15.76)
Weak necessity	Turkish	12.55 (20.81)	44.70 (31.75)	26.37 (25.81)	16.38 (25.79)
	English	7.78 (16.95)	29.91 (27.55)	31.18 (32.62)	31.14 (33.35)
Probability	Turkish	12.08 (19.39)	39.59 (27.40)	38.13 (26.84)	10.19 (18.64)
	English	8.59 (19.50)	28.75 (21.98)	38.34 (25.19)	24.32 (25.50)
Possibility	Turkish	11.11 (19.69)	40.64 (28.51)	40.23 (29.73)	8.02 (13.79)
	English	4.46 (8.94)	29.08 (23.83)	36.52 (24.76)	29.94 (27.30)

Note. Standard deviations are presented in parenthesis.

**APPENDIX C: CONFIDENCE JUDGMENTS**

*A Summary of Turkish and English Speaking Participants' Confidence Judgments of Evidential and Modal Sentence Forms*

Sentence Form		Turkish (n=52)	English (n=60)
Evidenti al	Hearsay	40.00 (25.84)	65.90 (2.65)
	Inference	59.31 (22.92)	53.13 (17.54)
	Assumption	49.13 (23.28)	47.35 (16.8)
	Conjecture	22.10 (23.87)	44.85 (17.1)
Modal	Must	42.64 (15.65)	58.85 (17.74)
	Should	44.27 (21.85)	45.67 (27.7)
	Could	38.92 (19.32)	41.82 (22.67)
	Might	35.51 (17.92)	36.32 (20.38)

Note. Standard deviations are presented in parenthesis.