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When the owner of information is unsure: Epistemic uncertainty influences evidentiality processing in Turkish

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Abstract

This study deals with the extent to which epistemic uncertainty influences processing of grammatical evidentiality – the linguistic reference to information source – in Turkish native speakers. Across a series of sentence reading experiments administered to groups of Turkish adult native speakers, this study showed that indirect evidentiality in firsthand witnessing contexts evoked greater post-interpretive disruptions (Experiment 1), and were found largely unfavourable (Experiment 2), suggesting that in Turkish, speaking about one's own information with indirect evidentiality leads to an inherent effect. Furthermore, a first-person's witnessed information marked with direct evidentiality is found to be rather unacceptable or unsettling under low epistemic certainty conditions, where the speaker is unsure of his/her own witnessing (Experiment 3), whilst a non-first-person's information blends well with uncertainty constraints for which, Turkish readers strongly favour the assumption marker (Experiment 4). This study indicates that Turkish speakers' sensitivity to uses of evidentiality is influenced by the 'uncertainty of information owner'. There is a semantic overlap and a complex interface between evidentiality and epistemic modality in Turkish, and this interface is mediated by the ownership of information (first-person versus non-first-person) and the owner's uncertainty about his/her information. Further implications are discussed.

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Keywords: Evidentiality; Epistemic modality; Uncertainty; Turkish; Sentence comprehension

1. Introduction

Evidentiality refers to the linguistic marking of the types of information sources a speaker has access to for the event being referred to in one's statement (see, e.g., Aikhenvald, 2004, Lazard, 2001, Willett, 1988, Plungian, 2001, Aikhenvald, 2003, Johanson and Utas, 2000). Information sources encoded in grammar can be first-hand sources, such as one's own witnessing, or second-hand sources, including reports from other speakers. This paper addresses the interface of evidentiality and epistemic certainty. Consider the choice of modal verbs and adverbs in English: "*Probably it might/may/will rain tomorrow afternoon.*" The certainty of a state can be expressed via lexical adverbs (e.g., 'probably') or through grammaticalized modal verbs (e.g., 'might') and affixes. Epistemically modal expressions are framed under 'epistemic

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modality', which involves the speaker's evaluation or attitude to the likelihood that an event or state might occur (Nuyts, 2001a, Halliday, 1970, Palmer, 2001, Papafragou, 2006, Lyons, 1977).

Whether or not evidentiality is a part of epistemic modality system is a long-standing debate. While the earlier linguistic analyses considered evidentiality under epistemic modality (Palmer, 2001, Chafe and Nichols, 1986, Givón, 1982, Willett, 1988), some others argued that evidentials are best characterized as an independent grammatical category (e.g., Aikhenvald, 2004, De Haan, 1999, Plungian, 2001, De Haan, 2005; see Boye, 2010 for a discussion). Although the latter account does not oppose the idea that the grammatical marking of evidentiality may lead to epistemic connotations, both the categories seem to semantically overlap to differing degrees (see Nuyts, 2001b, Cornillie, 2009, Faller, 2002, Van der Auwera and Plungian, 1998). For example, evidential forms may inherently mark the speaker's epistemic attitude (Dendale and Tasmowski, 2001, Plungian, 2001, Fitneva, 2001). The current study's aim is to test to what extent speakers of Turkish – a language that marks evidentiality obligatorily in its verb inflection system – are sensitive to the speaker's certainty manipulated with epistemically modal predicates during their processing of evidentiality.

Research on nonevidential languages (i.e., languages where evidentiality is not grammaticalized), such as English, has shown that an epistemic state expressed in sentence material affects the sentence processing. This is framed in Clifton and Frazier's Epistemic State Hypothesis (ESH; Clifton and Frazier, 2016, 2018), which holds that comprehenders are sensitive to the epistemic state of the speaker. Using a series of offline questionnaires and eye-tracking-during-reading experiments, Clifton and Frazier (2016) examined English speakers' sensitivity to (dis) conjunctive noun phrases (i.e., John or Bill left. Sam did too. vs. John and Bill left. Sam did too.). Their data showed that those sentence materials connected with 'or' were found to be more unnatural and processed with increased difficulty than when they were connected with 'and'. The authors suggest that skilled readers found sentence materials with an unusual epistemic state rather unnatural, particularly when the speaker being referred to in the proposition had access to partial knowledge regarding an event. Clifton and Frazier (2018), in their Experiment 5, explored the possible effects of the epistemic state on sentence processing using sentence material where the event expressed in the proposition has happened or will happen (i.e., 'Jeff objected/will object to the new policy *or/and* decline/declined to support it'). They found that disjoint clauses (i.e., using 'or') with future tense were more frequently preferred than when the sentence used past tense, suggesting that the epistemic uncertainty expressed in future tense blends well with disjunction.

Research has evidenced that English speaking children's understanding of differing degrees of epistemic stance (i.e., certainty, possibility or necessity) borne out in modal expressions is correlated with children's understanding of beliefs (e.g., Moore et al., 1990, Öztürk and Papafragou, 2015, Robinson and Whitcombe, 2003). A set of acquisition studies paid particular attention to whether and how children are able to monitor the certainty/reliability of information using grammatical evidential forms as cues. Matsui et al. (2006) investigated Japanese children's (aged 3–6) ability to distinguish sentences with the grammatical marking for direct evidence and reported the results. The authors showed that Japanese children were able to use information in evidential particles to understand speakers' epistemic certainty, although the children at these ages were incapable of fully judging other's false beliefs. Papafragou et al. (2007) investigated groups of Korean children (aged 3–4) and showed that children at young ages performed successfully on tasks that require the production of reported and direct evidential forms and on nonverbal source memory tasks, although their comprehension of the evidential forms and judgement of the reliability of information sources were unstable at this stage. Fitneva (2008) examined Bulgarian children's (aged 6–9) reliability monitoring for statements with evidential forms using a design that required children to follow a conversational context including events that occurred between two characters, and a third character in the story needed to decide who to believe among the two. The children's task was to identify who the third character believed, and the results showed that the children rely more on first-hand evidence available through direct experience than second-hand evidence such as reported inferences (i.e., inferential deductions made by another speaker) while monitoring the reliability of information.

1.1. Evidentiality and epistemic certainty in Turkish

Turkish – an *evidential language* – has two forms of grammatical evidentiality for referring to sources of information, direct and indirect evidential information sources, as illustrated in (1) and (2), respectively. To describe a past event, Turkish speakers are obliged to choose between the direct and indirect evidential forms. That is, the evidential marking is not an optional category. In (1), the direct evidential, encoded by the morpheme – DI, conveys that the author/speaker has acquired the information regarding this event through directly witnessing it. By contrast, in (2), the use of an indirect evidential, codified by the morpheme – (I)mlş, expresses that the author/speaker has no access to a piece of direct information but has learnt about this event through either the report of another speaker or via inference from some observable evidence (Aksu-Koç and Slobin, 1986, Aksu-Koç, 2000, Slobin and Aksu, 1982, Yavaş, 1980).

- (1) Nurhayat çok güzel bir şarkı söyle-di
 Nurhayat very beautiful one song say-DIRECTEVID
 'Nurhayat sang a very beautiful song' [witnessed]
- (2) Nurhayat çok güzel bir şarkı söyle-miş
 Nurhayat very beautiful one song say-INDIRECTEVID
 'Nurhayat sang a very beautiful song' [non-witnessed, reported/inferred]

It is important to acknowledge that most studies in Turkish linguistics define the indirect evidential as having two distinct functions. The inferential *-miş* signals that the speaker has acquired the knowledge expressed in his/her statement through inference either by making a logical deduction based on world knowledge or available prior knowledge or by observing the resultant states of a finished action or state; the reportative *-(l)miş*, however, indicates that the speaker acquired knowledge on an event through the reports of another speaker (see [Csató, 2000](#) for an overview). When the indirect evidential form is marked on bare verb stems, however, there is no clear morphological distinction between different functions; hence, one needs contextual information to distinguish between reportative and inferential functions.

In line with the standpoint of [Palmer \(2001, pp. 8\)](#), who asserted that 'epistemic and evidential systems are two types of propositional modality', many scholars in Turkish linguistics often regarded evidentiality as a modal system (see [Erguvanli-Taylan, 1997](#), [Uzun, 1998](#) for discussions). [Johanson \(2000\)](#) postulates that the Turkish indirect evidential (*-(l)miş*) can be epistemic with regard to the expression of indirect experience, but it does not convey the speaker's attitude regarding the truth of the propositional content. As previously stated, whether evidential marking in Turkish falls within the broader concept of epistemic modality or whether evidentials constitute their own grammatical category has been subject to debate (e.g., [Aksu-Koç, 2016](#), [Boye, 2010](#), [Cornillie, 2009](#), [Aikhenvald, 2004](#)). Under either view, evidential marking in Turkish may lead to epistemic connotations that indicate uncertainty. In other words, evidentiality marking is confounded by the presence of epistemic connotations in Turkish since direct information stemming from one's own experience constitutes a more reliable source than indirect information based on the knowledge of others. Therefore, a more reliable information source conveyed through direct evidentiality often indicates greater certainty that the event expressed in the proposition has occurred than when that event is communicated in an utterance marked for indirect evidentiality (for arguments on this, see [Lucas et al., 2013](#), [Karaslaan et al., 2018](#)).

Epistemic uncertainty is typically expressed using lexical adverbs in Turkish. For example, adverbs such as *belki* 'perhaps' and *herhalde* 'supposedly' have epistemic readings indicating the speaker's partial information or lack of certainty regarding whether the events expressed in the proposition have occurred or will occur, such as in (3). By contrast, adverbs including *mutlaka* 'surely' and *kesinlikle* 'absolutely' convey a high certainty of the speaker, such as in (4). Importantly, the epistemic uncertainty of the speaker can be expressed via verb semantics, and certain verbs denoting a degree of certainty (e.g., *sanmak* 'to assume/to think' and *emin olmak* 'to be certain') often function as modal predicates, such as in (5). See [Kerimoğlu \(2010\)](#) for a list of adverbs and verbal predicates that convey epistemic uncertainty.

- (3) Şengül belki bizimle konser-e gel-ir
 Şengül perhaps US_GEN-COMM concert_DAT come-AOR
 'Perhaps Şengül comes to the concert with us'
- (4) Nihal kesinlikle beyaz şarap iç-er
 Nihal absolutely white wine drink-AOR
 'Nihal absolutely drinks white wine'
- (5) Sevgi-nin eşin-den boşan-acağı-ını san-ıy-or-um
 Sevgi-GEN spouse-ABL divorce- FUTPART-3SG-ACC assume-PRESPROG-1SG
 'I assume that Sevgi is going to divorce her spouse'

The suffix *-Dir* marks the degrees of the epistemic certainty of the speaker and signals that information about an event being uttered is based on the speakers' logical deduction or assumption ([Göksel and Kerslake, 2005](#), [Kornfilt, 2013](#)), such as in (6). Additionally, the habitual aspect 'aorist' marker (*-Ar*) is often used to express a number of connotations affiliated with uncertainty including deduction, probabilistic analysis and speculation depending on the context of use ([Temürçü, 2007](#)), as shown in (7).

- (6) Perihan ev-de dinlen-iyor-dur
 Perihan home-_{LOC} rest-PRESPROG-EPISTEMIC
 'Perihan must be resting at home'
- (7) Tülay bun-a çok üzül-ür
 Tülay this-_{DAT} very sadden-_{AOR}
 'Tülay will be very sad for this.'

Although studies on epistemic meanings in Turkish have been scarce, children's acquisition of evidentiality is well established, and the previous studies indicated that young Turkish children typically acquire direct evidential forms earlier than their indirect counterparts from 2–3 years of age (see, e.g., Aksu-Koç et al., 2009, Öztürk and Papafragou, 2016, Aksu-Koç, 1988, Uzundağ et al., 2018). For instance, Öztürk and Papafragou (2016) report on an examination of monolingual Turkish children (aged 5–7) using elicited production, semantic/pragmatic comprehension and source memory tasks. The authors showed that at young ages, children tend to overextend uses of the direct evidentials to contexts that do not signal direct evidence, and their ability to distinguish the speakers' choice of an indirect evidential may indicate that a *less reliable* information source develops at around the age of 6. It should be noted that the direct evidential form appears to be privileged over the indirect form in both linguistic and source memory tasks during children's development (see Ünal and Papafragou, 2020 for an overview). Acquiring evidential morphology is challenging since it takes children a long time to have full control over their evidentiality system, which also seems to apply to the adults studied under artificial language learning circumstances (Saratsli et al., 2020).

There is further emerging research focusing on the processes involved during the interpretation of evidential forms using techniques to examine the per millisecond time course of these processes in adult Turkish speakers (Arslan et al., 2015, 2017). Using the eye-tracking-during-listening paradigm, Arslan et al. (2015) found that a monolingual group of Turkish speakers had a greater number of fixations towards the picture portraying an ongoing version of an action during their processing of the direct evidential form, although they considered the finished version of the action to be correct (since the direct evidential conveys a past time reference). These findings confirmed that Turkish speakers need to witness an event to properly use a direct evidential. Arslan et al. (2017) used a sentence verification experiment to examine whether Turkish speakers are sensitive to evidentiality–information source mismatches using sentence materials where the owner of the information and marking for the evidential form are mismatched (e.g., *Yerken gördüm/ Yerken görmüşler, az önce adam yemeği yedi/yemiş** 'I/They saw the man eating. He ate the food DIRECT/INDIRECT*').¹ The authors showed that monolingual Turkish speakers present an asymmetric pattern in their sensitivity with faster responses to first-hand information source–indirect evidential mismatches compared to non-first-hand information–direct evidential mismatches, suggesting that the use of an indirect evidential in first-person first-hand information context is rather more counterintuitive and native Turkish speakers immediately notice these mismatches. See Arslan (2020) for a recent overview.

1.2. Relevant studies on epistemic – evidentiality interface and the current study

Aksu-Koç (2016) presents an interface model of evidentiality and epistemic modality, building on Palmer's (2001) framework where evidentiality is treated as an independent modal category, with support from empirical data on Turkish children's acquisition of evidential and epistemic forms. The model addresses the indirect evidential form that marks reportative and inferential readings (i.e., –mlş), and the assumption marker (–Dir). The first line of data reported by Aksu-Koç et al. (2009) showed that 4- to 6-year-old Turkish children encounter difficulties in identifying the sources of novel facts that they acquired through the reports of others (see also Öztürk and Papafragou, 2016). The second line of data reported by Aksu-Koç and Alici (2000) was based on Turkish children's (aged 3–6) processing of the assumption marker (–Dir) and the direct evidential (–DI). This study measured whether children are able to discriminate that a speaker expresses a degree of certainty with the assumption marker and direct evidence with the direct evidential marker. Their data showed

¹ Please note that the information source – evidential mismatches here do not constitute clear-cut ungrammaticality, but they do expose pragmatic effects that are often unsettling. These mismatches can intentionally be used under rather infrequent but meaningful contexts. For instance, a direct evidential in a non-first-hand context may be interpreted as consolidated information in which the validity of the event the occurred is well assumed, although the information has been received through a third-party source. By contrast, uses of indirect evidential in first-hand contexts, which suggest that the speaker has not directly acquired his/her own information, are rather unintuitive but can occasionally occur when one recounts a dream in which events are rather unlikely or incompatible with actual series of events (e.g., *Rüyamda, denize gitmişiz* 'In my dream, we went to the seaside – INDIRECT').

that Turkish children are equally able to evaluate that the direct evidential expresses a form of direct evidence and that the assumption marker signals a degree of certainty, suggesting that acquisition of evidential and epistemic connotations develop equally similarly in young Turkish children. Based on these findings, [Aksu-Koç \(2016\)](#) states for Turkish that, at least for children, a boundary remains between epistemic and evidential distinctions in the uses of the reported/inferred evidential (-mlş) and the epistemic modal form for assumption (-Dlr).

Another recent study by [Tosun and Vaid \(2018\)](#), using offline sentence judgement tasks, examined groups of Turkish and English native speakers' sensitivity to the certainty that events actually occurred (and how they would know that) in sentences marked for evidentiality (i.e., hearsay, inference, and assumption²) and epistemic modality (i.e., necessity, probability, and possibility). An outcome of this study is that Turkish speakers judged sentences marked for assumption (-Dlr) and hearsay (-(l)mlş) as expressing lower certainty than sentences marked for inference, consistent with the idea that the ownership of information (inference vs. hearsay) impacts the certainty and reliability of the information conveyed; English speakers, however, showed the opposite pattern by judging hearsay-marked sentences with high certainty. [Tosun and Vaid \(2018\)](#) make a strong claim that their data disprove the account that evidentiality is a disjoint category from epistemic modality, proposing that evidentiality and epistemic modality are "not independent linguistic properties from each other, nor are they the same structures conveying the same meaning" (p. 153).

[Karaslaan et al. \(2018\)](#) took a probabilistic approach and built an epistemic Bayesian model for Turkish speakers' trust of different kinds of information sources. The authors used dialogues containing two characters discussing a particular topic. Participants were asked to follow these dialogues and provide a rating whether they agree with the conclusions of one of the characters regarding the topic. The participants showed a trend that Turkish speakers found statements marked with direct evidentials more convincing than those with indirect evidentials and evidentiality-neutral sentences, suggesting that marking for direct evidence increases the source reliability.

The current study addresses evidentiality processing in Turkish and how it is potentially influenced by different epistemic conditions. This study reports on four experiments where the epistemic certainty of the speaker is neutral (Experiment 1), manipulated with epistemic adverbs only for direct witnessing relevant to first-hand information contexts (Experiment 2), and manipulated with epistemic adverbs under both first-hand and non-first-hand information source contexts (Experiment 3). A fourth experiment, using a short story completion task, was conducted to control for whether first-hand witnessing is unnatural within statements with low epistemic certainty (Experiment 4).

An aim of this study is to understand how and to what extent evidential forms are unacceptable within incompatible information source contexts. The findings of [Arslan et al. \(2017\)](#) from a speed sentence verification experiment showed that indirect evidentiality in first-person first-hand information source contexts is not favoured by native Turkish speakers and judged as inappropriate very quickly during sentence listening. In Experiment 1, timed sentence acceptability judgements were obtained to examine whether Turkish readers perceive information source and evidentiality mismatches as acceptable during reading comprehension. Under the assumption that indirect evidentiality is rather less natural or incompatible within the speaker's first-hand information context, lower acceptability scores are then expected for this condition.

The second aim of this paper is to test the claim that the presence of an epistemically uncertain load hinders evidential processing. In other words, we examined whether direct and indirect sources of knowledge are still judged to be equally acceptable when complemented with epistemically modal predicates that express low or high certainty of the speaker. This is based on the ESH ([Clifton and Frazier, 2016, 2018](#)), which holds that skilled readers should be sensitive to epistemic uncertainty in statements. It is already known from children's language acquisition research that epistemic certainty and reliability conditions interact with evidentiality processing and acquisition ([Matsui et al., 2006](#), [Papafragou et al., 2007](#), [Fitneva, 2008](#), [Aksu-Koç, 2016](#)). However, if the tenets of the ESH are true, we may observe that Turkish adults' sentence interpretation is inherently biased to the direct evidential since this form was shown to be epistemically more reliable (see, e.g., [Karaslaan et al., 2018](#)), and lower certainty conditions should prove less acceptable than their high certainty counterparts. These issues are addressed for first-hand information contexts in Experiment 2 and for both first-hand and non-first-hand contexts in Experiment 3.

² Please note that [Tosun and Vaid \(2018\)](#) appear to treat -Dlr as a marker of "inference from reasoning" that signals a form of non-first-hand evidence ([Tosun and Vaid, 2018](#), pp. 131). The inferential/assumptive status of -Dlr is well-grounded in Turkish; however, more recent accounts define -Dlr an interface phenomenon marking epistemic modality and evidentiality (see [Aksu-Koç, 2016](#) for a discussion).

2. Experiment 1

2.1. Participants

A total of 41 native Turkish speakers (24 females) with a mean age of 25.22 (SD = 3.39, range = 18–35) years participated in this experiment. The participants were recruited via the web using the Ibex Farm platform (Drummond, 2013) and were asked to give electronic informed consent confirming that they were native Turkish speakers and had not been living abroad for a significant duration at the time of testing. A language background questionnaire revealed that all of the participants were residing in different regions in Turkey and were all university students completing their bachelor's or master's degrees at the time of testing. Individuals who reported to have lived abroad or were non-native Turkish speakers were excluded from the analyses. One participant's data were lost due to a technical error and hence the data from the remaining 40 individuals were reported. Participation was voluntary and participants were not monetarily remunerated. All stages of this experiment were in line with the ethical requirements for human subjects (the Declaration of Helsinki).

2.2. Materials and procedures

A sentence stimulus set containing 24 sentences was created in four conditions (see the Supplementary Materials for the full list of the sentence stimuli). Two conditions contained pragmatically plausible and acceptable sentences where the given information source context matches the verb evidentiality used, such as in (8a) and (8b). The other two conditions contained a verb evidentiality that mismatched the information source context, such as (8c) and (8d). The information source contexts were set by using short introductory clauses at the beginning of each sentence. For witnessing contexts, the clause read *Ben gözümle gördüm* 'I saw with my eye', indicating that the author of the sentence visually eye-witnessed the event, and for reportative information contexts, the first clause was *Ben Merve'den duydum* 'I heard from Merve', signalling that the author of the sentence has been told about the event from another person.

(8) a. Witness–Direct (Match)

| | | | | | | | |
|-----|----------------|-----------------|-------|----------|--------------------|------------|---------|
| Ben | göz-üm-le | gör-dü-m | Hilmi | balıĝ-ı | yakala-dı | piknik-ten | önce. |
| I | eye-POSS-INSTR | see-DIREVID-1SG | Hilmi | fish-ACC | catch-DIREVID-#3SG | picnic-ABL | before. |

'I saw with my own eye that Hilmi caught the fish before the picnic.'

b. Report–Indirect (Match)

| | | | | | | | |
|-----|-----------|-----------------|-------|----------|----------------------|------------|---------|
| Ben | Merve'den | duy-du-m | Hilmi | balıĝ-ı | yakala-mıř | piknik-ten | önce. |
| I | Merve-ABL | see-DIREVID-1SG | Hilmi | fish-ACC | catch-INDIREVID-#3SG | picnic-ABL | before. |

'I heard from Merve that Hilmi caught the fish before the picnic.'

c. Witness–Indirect (Mismatch)

| | | | | | | | |
|-----|----------------|-----------------|-------|----------|----------------------|------------|---------|
| Ben | göz-üm-le | gör-dü-m | Hilmi | balıĝ-ı | yakala-mıř | piknik-ten | önce. |
| I | eye-POSS-INSTR | see-DIREVID-1SG | Hilmi | fish-ACC | catch-INDIREVID-#3SG | picnic-ABL | before. |

'I saw with my own eye that Hilmi caught the fish before the picnic.' (the author suggests that s/he witnessed an indirectly known event)

d. Report–Direct (Mismatch)

| | | | | | | | |
|-----|-----------|-----------------|-------|----------|--------------------|------------|---------|
| Ben | Merve'den | duydum | Hilmi | balıĝ-ı | yakala-dı | piknikten | önce. |
| I | Merve-ABL | see-DIREVID.1SG | Hilmi | fish-ACC | catch-DIREVID.#3SG | picnic-ABL | before. |

'I heard from Merve that Hilmi caught the fish before the picnic.' (the author suggests that s/he heard his/her own directly known event from Merve – a third person reporter)

Prior to the experimental sentences, an evidentiality-neutral clause (e.g., *Kovada büyük bir balık var.* 'There is a big fish in the bucket.') was presented in order to neutralize any expectations for either of the evidential forms at the beginning of the sentence since when participants read the 'information source' clause, they may begin expecting an evidential form. Thus, these evidentiality-neutral clauses help minimize and delay any potential predictions. In addition, 30 filler sentences were used in each list to avoid repetition effects and prevent the participants from developing strategies. The filler sentences contained 10 semantically and 10 grammatically incongruent sentences and 10 congruent sentences. The sentence stimuli were presented in four lists, each of which contained an equal number of sentences from each condition and the filler sentences; thus, a participant read 54 sentences in total. The critical sentences were presented in a moving-window paradigm, where each word was shown for 500 ms in the centre of the screen. Once the presented word disappeared, the next word appeared. The participants needed to hold the words in their memory and construct the

Table 1

End-of-sentence acceptability judgement rates in proportions and response times in milliseconds (SD = standard deviation) across all the three experiments.

| Experiment 1 | | | | |
|---------------|------------------|------------------|------------------|------------------|
| | Match | | Mismatch | |
| | Direct | Indirect | Direct | Indirect |
| Acceptability | 0.91 (0.28) | 0.89 (0.30) | 0.76 (0.42) | 0.72 (0.45) |
| RTs | 1201.70 (664.45) | 1099.84 (619.29) | 1115.85 (626.68) | 1279.91 (722.21) |
| Experiment 2 | | | | |
| | High certainty | | Low certainty | |
| | Direct | Indirect | Direct | Indirect |
| Acceptability | 0.86 (0.34) | 0.60 (0.49) | 0.78 (0.41) | 0.66 (0.47) |
| RTs | 1257.28 (897.14) | 1205.15 (894.21) | 1194.70 (893.35) | 1254.21 (921.52) |
| Experiment 3 | | | | |
| | High certainty | | Low certainty | |
| | First person | Third person | First person | Third person |
| Acceptability | 0.84 (0.37) | 0.76 (0.43) | 0.47 (0.50) | 0.71 (0.45) |
| RTs | 1277.81 (607.29) | 1498.63 (953.30) | 1783.63 (865.25) | (725.18) |

sentence meaning. Then, when the sentence presentation ended, an acceptability judgement task requiring participants to provide a post-interpretative acceptability judgement appeared. The participants were instructed to read the sentences word-by-word, evaluate the acceptability of the sentences in terms of their meaning and integrity, and respond to the end-of-sentence acceptability judgement question by pressing (f) for unacceptable and (j) for acceptable. There were no time-outs. The next sentence began with a fixation cross after the participants provided their response. Four practice items were given before the actual experiment started in order to ensure that the participants understood the task. The acceptability and reading time data were analyzed using (generalized) linear mixed-effects models and judgement accuracies with mixed-effects logistic regressions (Baayen et al., 2008). Following an a priori screening, response times shorter than 200 ms and longer than 3600 ms were removed, and the data were log-transformed before statistical analyses.

2.3. Results and discussion

Table 1 demonstrates the mean judgement acceptability rates and response times (RTs) for the end-of-sentence acceptability task. Table 2 exhibits the statistical outputs from the linear mixed-effects regression models computed using these data. The native Turkish readers' acceptability judgement scores showed that they were sensitive to the mismatches between the information source given and the evidential form appended at the critical verb. Significant fixed effects of mismatches (see Table 2) suggest that the acceptability judgement scores were lower in the mismatch conditions than when the sentence stimuli had an appropriate information source context, irrespective of which evidential verb form was used.

The statistical outputs from the linear regression model on the RT data, however, show significant interaction effects between the evidentiality and mismatch conditions. A post hoc comparison, using Tukey tests, showed that the interaction between mismatch and evidentiality marking seems to be modulated by the presence of evidentiality condition differences in the responses to the mismatching sentence stimuli ($\beta = 0.15$, $SE = 0.058$, $z = 2.65$, $p = 0.007$). That is, the Turkish readers took longer to respond when witnessed information source contexts are violated with an indirect evidential form than when a direct evidential violates reported information source contexts. No differences were found in the Turkish readers' response times to direct and indirect evidential verb form matching their corresponding contextual information ($\beta = -0.05$, $SE = 0.06$, $z = -0.86$, $p = 0.38$).

A purpose of Experiment 1 was to test the extent to which native Turkish speakers are sensitive to verb evidentiality mismatches to given information source contexts. The findings from Experiment 1 demonstrated that Turkish readers judged those mismatches as unacceptable 72% of the time when an indirect evidential is used in a first-hand witnessing

Table 2

Statistical outputs from mixed-effects linear regression models computed with acceptability scores and response times data from Experiment 1. (SE = Standard error, p -values in the linear models were calculated with the Satterthwaite's method).

| Acceptability | <i>b</i> | <i>SE</i> | <i>z</i> | <i>p</i> |
|--------------------------|----------|-----------|----------|-----------|
| Intercept | 2.50 | 0.37 | 6.61 | <0.001*** |
| Evidentiality | -0.18 | 0.47 | -0.37 | 0.70 |
| Mismatch | -1.22 | 0.42 | -2.88 | 0.003** |
| Evidentiality × Mismatch | -0.08 | 0.57 | -0.14 | 0.88 |
| Response times | <i>b</i> | <i>SE</i> | <i>t</i> | <i>p</i> |
| Intercept | 6.91 | 0.07 | 95.84 | <0.001*** |
| Evidentiality | -0.04 | 0.06 | -0.69 | 0.48 |
| Mismatch | -0.09 | 0.06 | -1.52 | 0.12 |
| Evidentiality × Mismatch | 0.19 | 0.08 | 2.21 | 0.02 * |

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

context and 76% of the time when a direct evidential is used in report contexts. Further, mismatches via an indirect evidential led to longer disruptions, as measured by longer end-of-sentence judgement response times. The data reported here are in line with the findings of Arslan et al. (2017) who observed that monolingual native Turkish speakers show immediate sensitivity to mismatches via an indirect evidential in first-hand information contexts, proposing that an indirect evidential form is rather incompatible in first-hand information source contexts referring to one's own witnessed information. The empirical data provided are therefore fully compatible with the idea that stating one's own witnessed information as though it was reported by someone else is *counterintuitive* (Aikhenvald, 2014, Curnow, 2002).

3. Experiment 2

3.1. Participants

Fifty-eight native Turkish speakers (33 females) with a mean age of 26.35 years (SD = 7.31, range = 18–59) were recruited, following a similar procedure as in Experiment 1, using the Ixex Farm platform. These participants did not take part in any other experiment reported in this paper. They were all born and raised in Turkey, and they reported not having lived abroad for a significant duration. Two individuals who reported to have acquired Turkish as a second language were excluded; hence, the data from 56 participants were reported.

3.2. Materials and procedures

Twenty-four sentence stimuli were created with four conditions where the degree of certainty and evidential form used were manipulated. In this experiment, all sentences contained a contextual clause indicating visually witnessing the relevant first-hand evidence. Two conditions (9a and 9c) included sentence material that started with a clause expressing the high certainty of the speaker (i.e., *Ben gördüğümüne eminim* 'I am sure I saw that'). Two other conditions (9b and 9d), however, contained a clause that conveyed lower certainty of the speaker (*Ben gördüğümü sanıyorum* 'I suppose I have seen that'). That is, in conditions 9a and 9c, the speaker is highly certain to have witnessed the event expressed in the rest of the sentence, while in conditions 9b and 9d, the speaker only supposes to have witnessed the event, which implies relatively less reliable information. In half of the sentences, the evidential form used at the critical verb was a direct evidential, the use of which is compatible with the first-hand witnessing contexts (9a and 9b), whereas in the other half of the sentences, an indirect evidential was used, which is not compatible with a first-hand information source context. The experimental procedures regarding participant recruitment and stimulus presentation procedures were the same as in Experiment 1.

(9) a. High certainty – direct

Ben gör-düğ-üm-e emin-im Hilmi balıĝ-ı yakala-dı piknik-ten önce.
 I see-PASTPART-1SG-DAT sure-1SG Hilmi fish-ACC catch-DIREVID-3SG picnic-ABL before.
 'I am certain to have seen that Hilmi caught the fish before the picnic.'

b. Low certainty – direct

Ben gör-düğ-üm-ü san-iyor-um Hilmi balığ-ı yakala-dı piknik-ten önce.
 I see-PASTPART-1SG-ACC suppose-PRES-1SG Hilmi fish-ACC catch-DIREVID3SG picnic_ABL before.
 'I suppose I have seen that Hilmi caught the fish before the picnic.'

c. High certainty – indirect

Ben gör-düğ-üm-e emin-im Hilmi balığ-ı yakala-mış piknik-ten önce.
 I see-PASTPART-1SG.DAT sure-1SG Hilmi fish-ACC catch-İNDEVID-3SG picnic_ABL before.
 'I suppose I have seen that Hilmi caught the fish before the picnic.'

d. Low certainty – indirect

Ben gör-düğ-üm-ü san-iyor-um Hilmi balığ-ı yakala-mış piknik-ten önce.
 I see-PASTPART-1SG-ACC suppose-PRES-1SG Hilmi fish-ACC catch-İNDEVID-3SG picnic_ABL before.
 'I suppose I have seen that Hilmi caught the fish before the picnic.'

3.3. Results and discussion

Table 1 presents the end-of-sentence acceptability judgement rates and response times. A mixed-effects regression model of the acceptability scores showed significant fixed effects of evidentiality ($\beta = -1.55$, $SE = 0.28$, $z = -5.09$, $p < 0.001$) but nonsignificant fixed effects of epistemic uncertainty ($\beta = -0.45$, $SE = 0.32$, $z = -1.38$, $p = 0.16$) and a nonsignificant interaction term between the two factors ($\beta = 0.66$, $SE = 0.41$, $z = 1.60$, $p = 0.11$). These results evidenced that Turkish readers' acceptability preferences were significantly greater for direct evidentials than indirect evidentials in both high and low certainty conditions. This pattern for greater acceptability scores for direct evidentials in visual witnessing contexts was independent of epistemic certainty manipulations since the responses for direct evidentials did not differ in both the low and high epistemic certainty conditions ($\beta = -0.01$, $SE = 0.03$, $z = -0.32$, $p = 0.74$). Regarding the end-of-sentence response times, no critical differences were found since all the comparisons were nonsignificant (all $ps > 0.23$).

The findings of Experiment 2 further confirmed that uses of indirect evidentiality are less compatible than direct evidentiality in first-hand witnessed contexts and the presence of high and low epistemic uncertainty, indicating that the speaker's attitude towards his/her first-hand knowledge did not influence this pattern. In other words, disregarding whether the speaker is certain to have witnessed or only thinks they have witnessed the event expressed in the proposition, indirect evidentiality in first-hand witnessing contexts elicits lower acceptability scores. Turkish readers' sensitivity to the incompatibility of indirect evidentiality within first-hand witnessing contexts overrides the uncertainty of the speaker's own witnessing, casting doubt on the idea that indirect evidentiality in Turkish inherently implies a lower degree of reliability. However, the main focus of this experiment was on readers' sensitivity to direct/indirect evidentiality in first-hand witnessing contexts. Without non-first-hand contexts that require uses of indirect evidentiality, potential influences of epistemic uncertainty of the speaker may not immediately be visible. Therefore, a third experiment was designed with both first-hand and non-first-hand source contexts and no evidentiality mismatches.

4. Experiment 3

4.1. Participants

Thirty-five native Turkish speakers participated (20 females, mean age = 30.63, $SD = 8.47$, range = 22–58). The participants were recruited through the same web-based platform, Ibex Farm, and none of them took part in Experiment 1 or 2. All the participants reported to have been born and raised in Turkey and were native Turkish speakers, and none had lived abroad for a significant duration.

4.2. Materials and procedure

Twenty-four pragmatically acceptable sentence stimuli were created with four conditions where the owner of the information (first versus third person) and epistemic certainty conditions (high vs. low) were manipulated. In one condition, statements were based on the first-person contexts, signalling that the speaker has direct access to the information mentioned in this statement, such as in (10a). However, in a second condition, the information belonged to a third-person, conveying that the speaker had been told about this event, such as in (10b). Across the experimental stimuli, the epistemic certainty of the speaker was manipulated as high and low by using verb semantics (i.e., *eminim* 'I am sure' vs. *sanıyorum* 'I

think/suppose'). The experimental procedures regarding participant recruitment and the stimulus presentation procedures were the same as in Experiment 1. The same filler items were used.

(10) a. High/Low epistemic certainty in first person context

| | | | | | | |
|-------|----------------------|-------------------------------|-----------------------------|----------------------------|---|------------------------------|
| Ben | o-nun | balığ-ı | yakala-dığ-in-ı | gör-düğ-üm-e | emin-im/gör-düğ-üm-ü | san-ıyor-um. |
| I | him ^{-POSS} | fish ^{-ACC} | catch ^{-PASTPART-} | see ^{- PASTPART-} | sure ^{-1SG/see^{-PASTPART-}} | suppose ^{-PRES-1SG} |
| | | | ACC | 1SG-DAT | 1SG-ACC | |
| Hilmi | balığ-ı | yakala-dı | piknik-ten | önce. | | |
| Hilmi | fish ^{-ACC} | catch ^{-DIREVID-3SG} | picnic ^{-ABL} | before. | | |

'I am sure/I suppose that I have seen him catching the fish. Hilmi caught the fish before the picnic.'

b. High/Low epistemic certainty third person reported context

| | | | | | | |
|-------|----------------------|---------------------------------|-----------------------------|---------------------------|---|------------------------------|
| Merve | o-nun | balığ-ı | yakala-dığ-in-ı | gör-düğ-ün-e | emin/gör-düğ-ün-ü | san-ıyor. |
| Merve | him ^{-POSS} | fish ^{-ACC} | catch ^{-PASTPART-} | see ^{-PASTPART-} | sure ^{-1SG/see^{-PASTPART-}} | suppose ^{-PRES-3SG} |
| | | | ACC | 3SG-DAT | 1SG-ACC | |
| Hilmi | balığ-ı | yakala-mış | piknik-ten | önce. | | |
| Hilmi | fish ^{-ACC} | catch ^{-INDIREVID-3SG} | picnic ^{-ABL} | before. | | |

'Merve is sure/Merve supposes that she has seen him catching the fish. Hilmi caught the fish before the picnic.'

5. Results and discussion

Table 1 presents the mean end-of-sentence responses and response times, and Table 3 presents the outputs from the linear mixed-effects regression models computed with acceptability and the RT data. The model outputs for the acceptability rating data show significant fixed effects of epistemic uncertainty and an interaction between epistemic uncertainty and the information source. This indicates that the Turkish readers found epistemically uncertain statements to be unacceptable to a greater extent than they did for epistemically certain statements. The interaction between epistemic uncertainty and the information source was because the high certainty in the first-person context condition (84%) was judged as largely more acceptable than the low certainty in the first-person context condition (i.e., 47%; $\beta = -0.35$, $SE = 0.09$, $z = -3.52$, $p < 0.001$). Furthermore, the low certainty in first-person context condition proved to be significant different from the low certainty in third-person context condition (71%; $\beta = 0.21$, $SE = 0.11$, $z = 2.01$, $p = 0.04$). That is, epistemic uncertainty about an event being true is more compatible with non-first-person (i.e., non-first-hand) information source contexts that require the use of indirect evidentiality when compared to first-person information source contexts requiring direct evidentiality. Regarding the response time data, the model outputs mirrored the acceptability rate data since there were significant fixed effects of epistemic certainty and an interaction of this factor with the information source. The Turkish readers responded slower to the end-of-sentence acceptability judgement questions in sentences denoting epistemic uncertainty compared to those that denote epistemic certainty. Within the sentences expressing first-hand witnessed information, the lower certainty condition was responded to with longer response times compared to the

Table 3

Statistical outputs from mixed-effects linear regression models in Experiment 3. (SE = Standard error, p -values in the linear models were calculated with the Satterthwaite's method).

| Acceptability rates | b | SE | z | p |
|---|-------|------|-------|-----------|
| Intercept | 0.83 | 0.06 | 12.38 | <0.001*** |
| Information Source | -0.07 | 0.09 | -0.75 | 0.45 |
| Epistemic Certainty | -0.35 | 0.10 | -3.48 | <0.001*** |
| Information Source \times Epistemic Certainty | 0.29 | 0.14 | 2.08 | 0.03* |
| Response times | b | SE | t | p |
| Intercept | 7.08 | 0.08 | 82.85 | <0.001*** |
| Information Source | 0.03 | 0.10 | 0.32 | 0.74 |
| Epistemic Certainty | 0.28 | 0.10 | 2.70 | 0.007** |
| Information Source \times Epistemic Certainty | -0.31 | 0.14 | -2.13 | 0.03* |

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

higher certainty condition ($\beta = 0.29$, $SE = 0.09$, $t = 3.22$, $p = 0.001$). This comparison, however, was insignificant for sentences with non-first-hand information contexts ($\beta = -0.01$, $SE = 0.11$, $t = -0.15$, $p = 0.87$). Similar to the acceptability data, the Turkish readers' end-of-sentence response times to the sentences with first-person information complemented with modal predicates expressing epistemic uncertainty elicited longer response times (1783 ms) than sentences with non-first-person information ($\beta = -0.27$, $SE = 0.11$, $t = -2.45$, $p = 0.01$). This difference between first-hand and non-first-hand information was not significant for epistemically certain sentences ($\beta = 0.03$, $p = 0.71$).

The findings from Experiment 3 suggest that Turkish readers find sentence contexts expressing one's own witnessed information with low certainty rather less acceptable (e.g., *Ben onun balığı yakaladığını gördüğümü sanıyorum, Hilmi balığı yakaladı* 'I suppose I've seen that Hilmi caught_{DIRECTEVIDENTIAL} the fish'). A possible reason for low acceptability scores on these sentences may be a result of semantic and/or pragmatic effects. Specifically, the speaker thinks that s/he might have witnessed an event marked with direct evidentiality, resulting in an unsettling pragmatic effect where the proposition denotes epistemic uncertainty of one's own witnessing, but the use of a direct evidential suggests otherwise. Therefore, uses of a non-first-hand source marked with indirect evidentiality in such circumstances are more acceptable in Turkish. The results from this study indicate that when a first-person speaker talks about his/her direct evidence within a statement that expresses low epistemic certainty, thereby signalling that the speaker is unsure of his/her own witnessing, uses of direct evidentiality are rather unacceptable. However, these lower acceptability scores observed may be simply due to the readers' expectancy of an assumption marker at the critical verb (i.e., -Dir) instead of a direct evidential marker. Hence, a fourth experiment with a forced-choice ministry completion design was conducted to explore which of the three evidential and epistemic markers (direct, indirect evidential and assumption) are naturally preferred in first-hand witnessing contexts with different uncertainty conditions.

6. Experiment 4

6.1. Participants

A total of 31 native Turkish speakers (19 females, mean age = 23.90, $SD = 1.99$, range = 17–28) voluntarily participated in Experiment 4. The participants were asked to complete a small questionnaire about their language background. They reported to have been living in Turkey at the time of testing and reported no extended stays abroad. None of these participants participated in the previous experiments described above.

6.2. Materials and procedure

Twelve pieces of discourse material were chosen to create two-sentence ministories across two conditions (i.e., a total of 24 items). In each sentence pair, an evidentiality-neutral contextual clause was used (e.g., *Dolaptaki yemek ortada yok*. 'The food is not in the fridge'). After this contextual clause, a critical sentence was manipulated in either epistemically low certainty (11a) or high certainty conditions (11b).

(11) Firsthand direct witnessing with high/low certainty conditions

- | | | | | | | | |
|----|--|----------|----------|------------------|----------------------|----------------------|------------------|
| a. | Ben | o-nun | yemeğ-i | ye-diğ-in-i | | gör-düğ-üm-den | emin-im. |
| | I | him-POSS | food-ACC | eat-PASTPART-ACC | | see-PASTPART-1SG-ABL | sure-1SG |
| | 'I am sure I have seen him eating the food.' | | | | | | |
| b. | Ben | o-nun | yemeğ-i | ye-diğ-in-i | gör-düğ-üm-ü | | san-ıyor-um. |
| | I | him-POSS | food-ACC | eat-PASTPART-ACC | see-PASTPART-1SG-ACC | | suppose-PRES-1SG |
| | 'I suppose I have seen him eating the food.' | | | | | | |

These ministories were programmed via a web browser using the Google Forms platform and presented to each participant individually through the internet with the distant supervision of Turkish-speaking research assistants. Each ministry was presented on a single window with three sentence lines. The context and critical sentences were shown on the screen in separate lines; and the third line was truncated (i.e., _____), signalling that the participants need to complete the story with a sentence. Underneath the presented ministories, three answer options were given to the participants to choose from and their task was to respond by clicking on the most appropriate answer option according to their intuition. The answer options included a simple declarative Subject-Object-Verb sentence where the verb was marked with either a direct evidential (12a), an indirect evidential (12b), or an assumption marker (12c). The experiment allowed the participants to respond by clicking on only one answer option.

(12) Response options

- a. Mualla yemeğ-i ye-di.
 Mualla food-ACC eat-DIRECTEVID
 'Mualla ate the food' [witnessed]
- b. Mualla yemeğ-i ye-miş.
 Mualla food-ACC eat-INDIRECTEVID
 'Mualla ate the food' [inferred/reported]
- c. Mualla yemeğ-i ye-miş-tir.
 Mualla food-ACC eat-INDIRECTEVID-ASSUMPTION
 'Mualla must have eaten the food.'

The participants' numbers of responses were quantified as to whether they completed the ministories with direct evidentials (12a), indirect evidentials (12b) or assumption markers (12c). The raw numbers of responses were initially summarized in a 3×2 contingency table with epistemic certainty manipulations (low vs. high certainty) and different answer options (direct vs. indirect vs. assumption markers). Then, the data were subjected to a chi-squared test of independence. Pairwise condition comparisons were computed using the Wilcoxon signed-rank test with per participant occurrence counts of each answer option across the high and low certainty conditions. The Bonferroni correction was applied to the p -values.

6.3. Results and discussion

Table 4 demonstrates the counts and percent responses to the ministory completion task. The data pattern clearly indicates that in the high certainty condition, the Turkish respondents favoured using a direct evidential (81.4%) among all possible answer options. In the low certainty condition, by contrast, the most frequently favoured answer option was the assumption marker (67.7%). A chi-squared test of independence showed a significant relationship between epistemic certainty (high vs. low) and different response options ($X^2(2) = 124.86, p < 0.001$). See Table 4 for the contingency table data. Pairwise comparisons show that the direct evidential form was chosen as an answer option more frequently in the high certainty than in the low certainty condition (81.4% vs. 12.9%, $W = 406, N = 31, p < 0.001$) and that the assumption marker was favoured more frequently as an answer option in the low certainty than in the high certainty condition (7.3% vs. 67.7%; $W = 4.5, N = 31, p < 0.001$). However, the frequencies of the participants' choices of an indirect evidential form as an answer option did not show any differences under high and low certainty conditions (11.3% vs. 19.3%; $W = 56; N = 31, p = 0.18$).

An aim of Experiment 4 was to control which evidential form native Turkish speakers prefer in first-hand witnessing contexts expressing low versus high certainty of the speaker. The results from the current experiment showed that for statements that express first-hand witnessing and low certainty at the same time, native Turkish speakers prefer neither direct nor indirect evidential, but they show a strong preference for assumption markers. Therefore, it can be concluded that uses of direct evidentials are inconsistent or least favoured in contexts where the speaker expresses uncertainty over his/her own witnessing.

7. Summary and general discussion

This study investigated to what extent evidentiality processing in Turkish is influenced under different epistemic certainty conditions related to the speaker's own witnessing and information ownership in order to address two overarching aims. The first aim was to understand how sensitive Turkish readers are to mismatches between evidential

Table 4

Percent responses (frequency of counts in parentheses) to the mini-story completion task. Max possible response per condition is 124. In squared brackets X^2 statistics are presented for each cell.

| Answer option | High certainty | Low certainty |
|---------------------|---------------------|--------------------|
| Direct evidential | 81.4% (101) [30.88] | 12.9% (16) [30.88] |
| Indirect evidential | 11.3% (14) [1.32] | 19.3% (24) [1.32] |
| Assumption marker | 7.3% (9) [30.24] | 67.7% (84) [30.24] |
| Total | 100% (124) | 100% (124) |

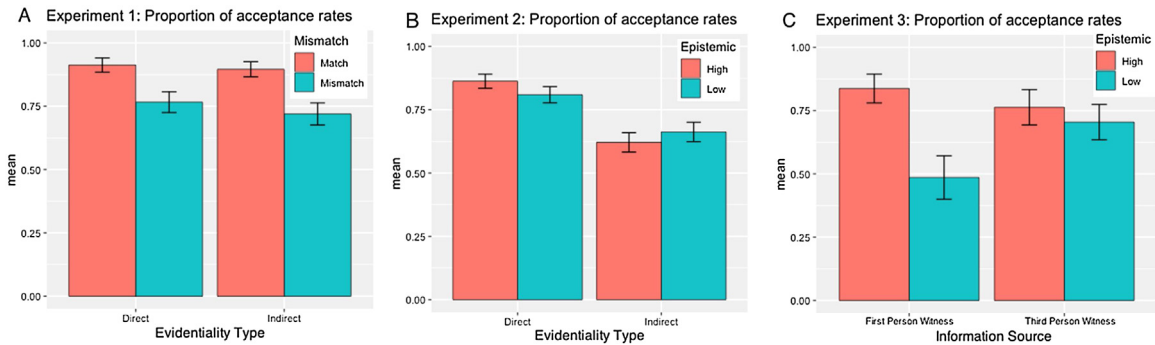


Fig. 1. A summary of acceptability scores across Experiments 1–3. Mismatch in 1A refers to match/mismatch condition manipulations between information source contexts and the evidential form, and Epistemic in 1B and 1C refers to epistemic certainty manipulations.

marking and information source contexts. In other words, if one uses an indirect evidential in Turkish for an event that s/he witnessed, is that acceptable? The second aim was to identify whether the degree of epistemic uncertainty of the speakers' own information impacts evidentiality processing. That is, when the owner of the information is not sure that s/he knows that information, what happens?

Fig. 1 summarizes the end-of-sentence acceptability judgement responses across Experiments 1–3. Recapitulating the key results from this study, Experiment 1 showed that evidentials that mismatch an appropriate information source are less acceptable overall and that uses of indirect evidentials in first-hand witnessing contexts elicit greater post-interpretive response disruptions during sentence reading than uses of direct evidentials in non-first-hand information source contexts. Experiment 2 showed that indirect evidentiality is rather incompatible in first-hand witnessed contexts, further informing that the speaker's certainty over his/her witnessing does not influence this incompatibility to a significant extent. That is, Turkish readers find direct evidentials to be more compatible in first-person direct witnessing situations, disregarding whether the speaker is sure s/he witnessed this situation or only assumes to have witnessed it. The findings from Experiment 3 suggested that first-person witnessing marked with direct evidentiality is rather unacceptable when expressed under low epistemic certainty conditions (i.e., the speaker is unsure of his/her own witnessing), possibly due to a semantic-pragmatic effect since one's own witnessed information with low certainty is rather unfavoured (as low as 47%, see Fig. 1C). Experiment 4 confirmed that the Turkish readers strongly favour the direct evidential when the sentential context expresses high certainty of the first-person witness; but for low certainty of first-person witness conditions, Turkish speakers strongly prefer the evidential/epistemic assumption marker complex (–mİş + –Dir).

Regarding the first aim, this study clearly concludes that Turkish speakers are sensitive to information source–evidential form mismatches and that there is an asymmetry in their post-interpretive acceptability judgements. That is, indirect evidential form mismatching to a first-hand information source context evoked greater disruptions as measured by longer response times than direct evidential mismatching to non-first-hand information. Specifically, the direct evidential in a non-first-hand context may be interpreted as 'expected news' or consolidated information, and hence it may have been processed as acceptable by the Turkish readers. Furthermore, an indirect evidential in a first-hand context is rather unsettling, although under some infrequent circumstances, one can use such a contextual mismatch to describe a dream. This is fully compatible with the findings of Arslan et al. (2017) that indicated that a group of native Turkish speakers showed immediate sensitivity to mismatches using an indirect evidential in first-hand information contexts. Please note that Arslan et al. (2017) report shorter response times for this condition because they used a go/no-go design where their participants were instructed to provide a response as quickly as possible to information–evidentiality mismatches during sentence listening (or no response if the sentence has no mismatch); hence shorter responses in this type of experiment indicate immediate and robust sensitivity. In the current study, however, a word-by-word presentation was used in which the participants need to hold words in memory and construct the sentence meaning at the end before they can judge the acceptability of the sentences. This design involves post-interpretive processes (i.e., offline consideration of the participants' intuition over the presented sentence) where longer response times indicate a greater disruption in applying these processes. Therefore, the findings from the current study point to the same conclusion as the earlier data that indirect evidentiality is rather unacceptable in first-hand information contexts since Turkish speakers notice this type of mismatch immediately and quickly during listening (Arslan et al., 2017), and they exhibit longer offline response times to end-of-sentence acceptability judgements (the current study, Experiment 1). Uses of indirect evidentiality in reference to one's own information are in fact unintuitive in a number of other evidential languages (see Aikhenvald, 2004 for an overview).

Regarding the second aim, where the central question was whether epistemic uncertainty conditions influence evidentiality processing, the results from Experiments 2–4 indicate that the owner's degree of uncertainty over the

information does impact evidentiality processing. However, the influence of epistemic uncertainty on evidentiality is not simple and straightforward, so there is a complex interface between the two notions where the owner of the information also matters. Experiment 2 showed that first-person witnessing contexts manipulated for either low and high epistemic certainty of the speaker do not straightforwardly influence the preference for a direct evidential. Nonetheless, Experiment 3 showed that uses of direct evidentials when the speaker is unsure of his/her own witnessing are not favoured by Turkish speakers. The outcomes from these two experiments seem to conflict. A possible reason for this is that the contextual sentences were different in these two experiments. In Experiment 2, rather short contextual clauses were used (i.e., *Ben gördüğümü sanıyorum* 'I suppose I saw') and the evidential form either matched (direct evidential) or mismatched (indirect evidential) this contextual clause. In Experiment 3, the contextual clauses were presented in two conditions, information expressed in the proposition owned by a first-person (10a) and non-first-person perspective (10b), and the evidential verb used was appropriate to the information source. This allowed both owner perspectives to be explored during sentence reading. Comparing the findings from Experiments 2 and 3, it is imaginable that contextual information affects Turkish readers' acceptability responses for sentences with indirect evidentials during their post-interpretive judgements as to whether or not indirect evidentiality codifies lower uncertainty. An anonymous reviewer stated that the lexical aspectual values of verbs may be an issue here, which is a limitation of the current study since the lexical aspects of the verbs used in this study were not controlled for, although almost all verbs used were accomplishment or achievement verbs. For instance, accomplishment verbs (e.g., to catch a fish) encode a culmination point and evident consequences based on which one can infer that the event in the proposition happened without overtly observing the actual event, in turn intensifying the speaker's certainty about an event being true. Thus, a future study may examine the interaction between the lexical aspect and evidentiality processing with regard to epistemic uncertainty. A common outcome from the experiments reported in this study, however, seems to suggest that the epistemic uncertainty of the speaker/information owner influences evidentiality processing. While a direct evidential is appropriate under a scenario where a first-person information owner certainly witnessed the event, an indirect evidential (or the assumption marker) is acceptable in reference to a non-first-person's uncertainty regarding his/her information.

Findings from this study support Clifton and Frazier's (2016, 2018) Epistemic State Hypothesis, under which Turkish readers were expected to judge the sentence stimuli expressing epistemically uncertain connotations to be virtually unacceptable. This was shown in Experiment 3, where epistemically uncertain sentences were rated as rather unacceptable and elicited longer response times than epistemically certain sentences. Furthermore, in Experiment 2, lower acceptability scores for sentences with indirect evidential forms compared to those with direct evidential forms can be taken as converging support for the ESH's line of reasoning assuming that an indirect evidential often expresses a lower degree of epistemic certainty.

According to a widespread view in Turkish linguistics, the assumption marker (–Dir) is treated as an epistemic modal form signifying a continuum of certainty (Aksu-Koç and Alici, 2000, Aksu-Koç, 2016, Temürçü, 2007, Tura, 1986 among others). The finding from Experiment 4 that the Turkish speakers favoured assumption markers (i.e., –miş + –Dir) in the low certainty condition particularly fits in with an interface framework for epistemic modality and evidentiality (Aksu-Koç, 2016). According to Aksu-Koç (2016, pp 149), "when a statement with –miş is further marked with –Dir, the evidential statement making a factual assertion becomes epistemically modalized, and is interpreted as a speculation [...].". The epistemically modal status of an assumption marker (–Dir) can be accommodated when the notion of subjectivity is applied (Lyons, 1977, Nuyts, 2001b), where the speaker has no quality evidence for an epistemic evaluation of the event being true. Furthermore, direct evidentials seem to involve certainty connotations of the speaker's knowledge given the findings from the current study, which consistently showed when a first-person speaker is certain of his knowledge, a direct evidential is always preferred. This is also compatible with Karaslaan et al. (2018) who suggested that direct evidentiality is related to increased source reliability. If certainty is a scale that goes from certain to uncertain, based on the empirical data provided above, it may be possible to position the evidential markers according to their epistemic values on the certainty scale: direct evidentials (full evidence), indirect evidentials (partial evidence), and assumption markers (nonevidence).

This analysis by no means concerns the grammaticalization debate on evidentiality and epistemic modality. However, it should be recognized that in certain languages, evidential markers expose epistemic meanings (e.g., Nuyts, 2001b, Cornillie, 2009, Faller, 2002, Van der Auwera and Plungian, 1998, Dendale and Tasmowski, 2001), and in fact, it is not uncommon that evidential markers have epistemic values (Vilas, 2020). See the volumes in Lee and Park (2020) for further discussions. Based on the results from the current study, which are fully reconcilable with Aksu-Koç's (2016) interface model, the most ideal conclusion for the nature of evidentials in Turkish is that evidentiality is influenced by the 'certainty of the information owner'. That is, there is an interaction between the person who owns the information (first-person or non-first-person) and how certain the owner is about his/her information. When the owner is the first-person, hence making the use of a first-hand evidentiality acceptable, low certainty regarding the knowledge is rather unexpected or unsettling. However, when the owner is non-first-person, uncertainty regarding the knowledge is relatively more compatible.

Conflicts of interest

The author declare no potential conflicts of interest.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <https://doi.org/10.1016/j.lingua.2020.102989>.

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