University of Pennsylvania Working Papers in Linguistics

Volume 14, *Issue* 1 2008 *Article* 23

PROCEEDINGS OF THE 31ST ANNUAL PENN LINGUISTICS COLLOQUIUM

The acquisition of evidentiality in Turkish

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Abstract

This paper is concerned with the acquisition of the semantics and pragmatics of evidential markers in Turkish. Evidential markers encode the speaker's source for the information being reported in the utterance. Turkish grammaticalizes evidentiality in two different past tense markers: -DI (past of direct experience) and –mIş (past of indirect experience). In this article, we report findings from three studies conducted with Turkish learners between the ages of 5 and 7 that test the acquisition of both the semantics of evidentiality (Exp.1-2) and the pragmatic effects associated with evidential markers (Exp.3). Our results show that Turkish-speaking children between the ages of 5 and 7 produce morphemes for past events appropriately but are only beginning to discover the evidential dimensions of these morphemes. Furthermore, of the two evidential morphemes, -DI which encodes direct evidence is understood before –mIş which encodes indirect evidence. We discuss implications of these results for the learning challenges posed by evidentiality.

The Acquisition of Evidentiality in Turkish

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1 Introduction

This paper is concerned with the acquisition of the semantics and pragmatics of evidential markers in Turkish. Evidential markers encode the speaker's source for the information being reported in the utterance. While some languages like English express evidentiality by lexical markers (*I saw that it was raining* vs. *I heard that it was raining*) Turkish grammaticalizes evidentiality through specialized markers. Specifically, for all instances of past reference in Turkish there is an obligatory choice between the following two suffixes: *-DI*[1] (direct experience) and *–mIş*[2] (indirect experience). These morphemes also carry evidential meanings: the morpheme *–DI* is used to describe witnessed events and the morpheme *–mIş* is used to describe information acquired from someone else (hearsay) or some clue (inference):

(1) a. Çocuk oyun oyna -DI
Child game play PAST evid.
'The child played' (I saw it)
b. Çocuk oyun oyna -mIş
Child game play PAST evid.
'The child played' (I heard it or I inferred it)

As mentioned above, on the semantic level evidential morphemes encode source distinctions. On the pragmatic level, evidential markers generate conversational implicatures. Logically, (1a) is compatible with (1b) as both sentences describe the child playing. However, in conversation, (1b) would exclude (1a); hence, it would implicate (2):

(2) Çocuk-un oyna-dik -i-(n)-I gör-me -di -m
Child -GEN play-NOM-poss-ACC see-Neg-DI-1sg.
'I did not see the child play'

Upon hearing sentence (1b) (indirect evidence) the listener realizes that (1a) (direct evidence) is informationally stronger than (1b). However, the speaker did not say (1a). As a good conversation partner, the speaker would be ex-

[1]Realized as *-di, -dı, -du, -dü, -ti, -tı, -tu, -tü* according to the vowel harmony.
[2]Realized as *-miş, -mış, -muş, -müş* according to the vowel harmony.

pected to utter (1a) if she could. Hence, there has to be a reason why she did not utter the sentence with the direct evidential marker (1a). Thus, the implicature given in (2) arises.

Earlier studies which investigated the acquisition of evidentiality in Turkish (Aksu-Koç 1988, Slobin and Aksu 1986) have concluded that the differentiation between the two past inflections on the basis of evidentiality contrasts (witnessed vs. non-witnessed process) emerges only between the ages of 3;6 and 4;6 and is stabilized around the age of 6; before that age, children use these morphemes with past tense interpretations without recognizing their evidential dimension. In this article, we report findings from three studies conducted with Turkish learners between the ages of 5 and 7 that test the acquisition of both the semantics of evidentiality (Exp. 1-2) and the pragmatic effects associated with evidential markers (Exp. 3). These studies systematically target the full range of evidential meanings (direct vs. indirect: hearsay/inference) encoded in the Turkish past tense system and attempt to chart their developmental timetable. The goal of this investigation is to clarify the scope of children's early difficulties with evidentiality and the nature of these difficulties. We are especially interested in whether the two types of evidential meanings (direct-indirect) in Turkish past tense morphology follow different developmental pathways, and hence are acquired at different times. In the studies that follow, we systematically compare children's knowledge of the direct evidence marker in perception contexts to knowledge of the indirect evidence marker in hearsay or inference contexts during both production and comprehension.

2 Experiments

2.1 Participants

A total of 96 monolingual Turkish-speaking children participated in this study. The children were assigned to one of the three groups on the basis of their age: Group 1, mean: 5;10, range: 64-72mo; Group 2, mean: 6;6, range: 73-84mo; Group 3, mean: 7;8, range: 85-96mo. Each group included 32 children. All children came from upper-middle-class families and they were recruited either from a preschool or a grade school in Istanbul, Turkey and tested individually in a quiet room outside their classroom.

2.2 Experiment 1: Production of Evidential Morphology

2.2.1 Stimuli and Procedure

In the production experiment we attempted to elicit children's production of the evidential morphemes for direct (*-DI*) and indirect (*-mIş*) evidence. Stimuli were presented on the screen of a laptop computer and consisted of animated scenarios. The digitized audio for the animations was recorded from the voice of a native Turkish speaker. The participants' task was to say what happened on the screen. There were two between-subjects conditions: **See vs. Infer** and **See vs. Hear**. At the beginning of the experiment half of the participants were randomly assigned to the **See vs. Infer** condition and the other half were assigned to the **See vs. Hear** condition. In each condition we had a total of eight items. In the **See vs. Infer** condition there were four items which involved seeing, and four which involved inference. Similarly, in the **See vs. Hear** condition there were four items which involved seeing, and four which involved hearing. In the *See* trials the participant watched something happen (e.g. a girl jumped over the stone). In the *Hear* trails, the participant heard the character in the animation utter a sentence (e.g. a woman said: "I went shopping today."). In the *Infer* trials, the participant saw some hints indicating something had happened. After each trial the experimenter encouraged the participant to say what happened by beginning to utter a sentence. However, she did not finish the sentence and let the participant finish it:

(3) Kiz tas -in ust -u (n)-den . . .
Girl stone-GEN above-3sg. –abl . . .
'The girl . . . over the stone.'

Turkish is an SOV word order language; hence, the verb's unmarked position is at the end of a sentence. The evidential markers are verbal suffixes. By not finishing the sentence herself the experimenter avoided using the evidential marker and gave the participant the chance to do so. If the participant witnessed the event (*See* trials) the participant was expected to employ the evidential morpheme for direct evidence *-DI*. In the *Hear* and *Infer* trials, however, the participant did not witness the event, hence the indirect evidence morpheme *-mIş* was required.

Two pseudo-random orders of presentation were employed for a total of 8 trials. Materials for the *See* condition were identical in the two between-subjects conditions.

2.2.2 Results

A 3 (Age: Group 1, Group 2, Group 3) x 2 (Condition: **See vs. Hear**, **See vs. Infer**) ANOVA with the percentage of correct responses as the dependent variable revealed a significant main effect of Age ($F(2, 90) = 4.182$, $p<.05$). Overall, children performed better as the age increased ($M_5 = 68.75$, $M_6 = 70.25$, $M_7 = 78.75$). However, no significant main effect of Condition was found. Moreover, the analysis revealed no significant interaction between Condition and Age.

Next, we had a closer look at the performance of each age group per condition. One-sample t-tests revealed that the performance of children in the youngest age group in the **See vs. Hear** condition for the *See* type of items was significantly different from chance ($M=.94$, $t(63)=4.35$, $p<.001$), whereas their performance for the *Hear* type of items was not significantly different from chance ($M=.48$). Similarly, the performance of children in the same age group but in the **See vs. Infer** condition for the *See* type of items was significantly different from chance ($M=.94$, $t(63)=14.35$, $p<.001$), whereas their performance for the *Infer* type of items was not significantly different from chance ($M=.39$).

Performance of children in the next age group in the **See vs. Hear** condition for the *See* type of items was significantly different from chance ($M=.80$, $t(63)=5.857$, $p<.001$), and their performance for *Hear* type of items was also significantly different from chance ($M=.63$, $t(63)=2.049$, $p<.05$). Similarly, the performance of children in the same age group but in the **See vs. Infer** condition for the *See* type of items was significantly different from chance ($M=.83$, $t(63)=6.903$, $p<.001$), whereas their performance for *Infer* type of items was not significantly different from chance ($M=.55$).

Finally, performance of the children in the oldest age group and in the **See vs. Hear** condition for the *See* type of items was significantly different from chance ($M=.92$, $t(63)=12.47$, $p<.001$), similarly their performance for *Hear* type of items was significantly different from chance ($M=.70$, $t(63)=3.529$, $p<.005$). Similarly, the performance of children in the same age group but in the **See vs. Infer** condition for the *See* type of items was significantly different from chance ($M=.94$, $t(63)=14.346$, $p<.001$), whereas their performance for *Infer* type of items was not significantly different from chance ($M=.59$).

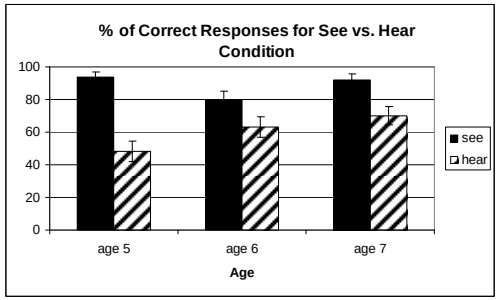

Figure 1. Percentage of correct responses for the **See vs. Hear** condition.

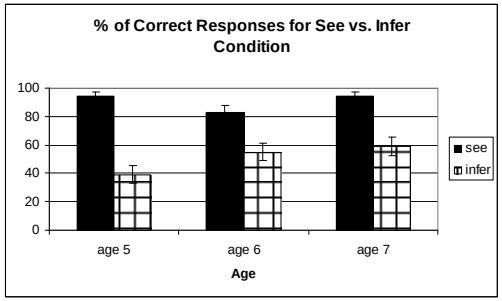

Figure 2. Percentage of correct responses for the **See vs. Infer** condition.

2.2.3 Discussion

Our results indicate that children—even in the youngest age group—produced the direct evidential marker *-DI* with no difficulty for perception cases. Performance for Hearsay and Inference contexts, however, was shown to increase over time, with 7-year-olds still making errors. Taken together, these results support a linguistic-developmental asymmetry between direct and indirect evidence. We return to the significance of this fact in later sections.

2.3 Experiment 2: Semantic Comprehension of Evidentiality

2.3.1 Stimuli and Procedure

This experiment was conducted to see if children can attribute a sentence with an evidential morpheme to a speaker that has appropriate access to information. Stimuli were presented on the screen of a laptop computer and consisted of 8 short video clips.

As before, in two separate conditions we contrasted **seeing** vs. **inferring** and **seeing** vs. **hearing**. Participants were consistently assigned to the same type of condition as in Experiment 1 (**See vs. Infer** vs. **See vs. Hear**).

Each story involved three people. In the **See vs. Infer** trials, one person watched another one do something (e.g. the first person drank lemonade from a bottle and the second person watched her do so). Next, both characters left and a third one came in, she saw some evidence indicating what might have happened in the first scene (e.g. the half-empty lemonade bottle indicating that somebody must have drunk from it). Next, photos of the person who watched what happened and the person who saw a clue about what might have happened appeared on the screen. Then, the experimenter said that one of the people uttered a sentence which contained either the direct evidence morpheme *–DI* or the indirect evidence morpheme *–mIş*:

(4) Kiz limonata ic -DI / -mIs
Girl lemonade-Acc. drink -PAST evid.
'The girl drank the lemonade.' (I saw it. / I inferred it.)

The experimenter then asked the participant: "Who said that?" It was expected that if participants understood the difference in the source meanings associated with the two morphemes they would pick the person that saw what happened when the sentence included the direct evidential morpheme *-DI* and the person that inferred what happened when the sentence included the indirect morpheme *-mIş*.

In the **See vs. Hear** trials, the participant again saw a person do something and another person watch him (e.g. the first person played with dolls, another one watched him, then they both left). Next, a third character came in and he whispered to a fourth character revealing what happened in the previous scene (e.g. the third character told a fourth one that the first character played with the dolls). Next, photos of the person who watched what happened and the person who heard about what might have happened appeared on the screen. The experimenter said that one of the people on the screen uttered the following sentence which used either the direct evidence morpheme *-DI* or the indirect evidence morpheme *-mIş*:

(5) Cocuk bebek oyna -DI / -mIş
Child doll play PAST evid.
'The child played with the dolls.' (I saw it. / I heard it.)

The experimenter then asked the participant: "Which animal said that?" The participant was expected to match the sentence with the evidential morpheme -DI with the animal which had witnessed the event and the indirect

evidence morpheme *-mIs* with the animal which had heard what happened from someone.

Two pseudo-random orders of presentation were employed for a total of 8 trials. As before, materials for the seeing condition were identical in the two between-subjects conditions.

2.3.2 Results

A second 3x2 ANOVA with the percentage of correct responses as the dependent variable revealed a significant main effect of Age ($F(2, 90) = 12.318$, $p<.001$). Overall, children performed better as the age increased ($M_5 = 55$, $M_6 = 58.5$, $M_7 = 73.75$). However, no significant main effect of Condition was found, nor a significant interaction between Condition and Age.

Next, we had a closer look at the performance of each age group per condition. One-sample t-tests revealed that the performance of children in the youngest age group and in the **See vs. Hear** condition for the *See* type of items was significantly different from chance ($M=.67$, $t(63)=2.905$, $p<.005$), whereas their performance for the *Hear* type of items was not significantly different from chance ($M=.42$). Similarly, the performance of children in the same age group but in the **See vs. Infer** condition for the *See* type of items was significantly different from chance ($M=.67$, $t(63)= 2.905$, $p<.005$), whereas their performance for the *Infer* type of items was not significantly different from chance ($M=.44$).

Performance in the next age group and in the **See vs. Hear** condition for the *See* type of items was not significantly different from chance ($M=.55$), as was their performance for the *Hear* type of items ($M=.58$). Similarly, the performance of children in the same age group but in the **See vs. Infer** condition for the *See* type of items was not significantly different from chance ($M=.55$), whereas their performance for the *Infer* type of items was significantly different from chance ($M=.66$, $t(63)= 2.611$, $p<.05$).

Finally, performance of the children in the oldest age group and in the **See vs. Hear** condition for the *See* type of items was significantly different from chance ($M=.78$, $t(63)=5.4$, $p<.001$), and their performance for the *Hear* type of items was significantly different from chance ($M=.69$, $t(63)=3.211$, $p<.005$). Similarly, the performance of children in the same age group but in the **See vs. Infer** condition for the *See* type of items was significantly different from chance ($M=.78$, $t(63)=5.40$, $p<.001$), as well as their performance for the *Infer* type of items ($M=.70$, $t(63)=3.529$, $p<.005$).

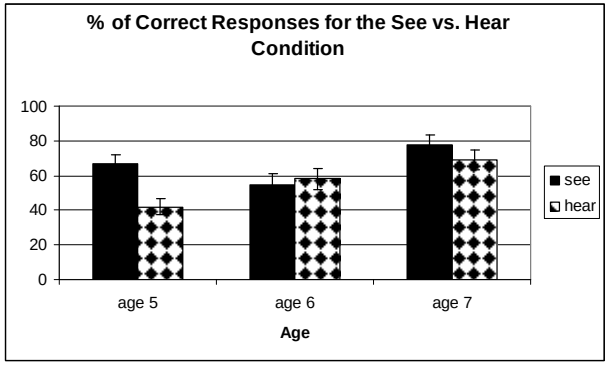

Figure 3. Percentage of correct responses for the **See vs. Hear** condition.

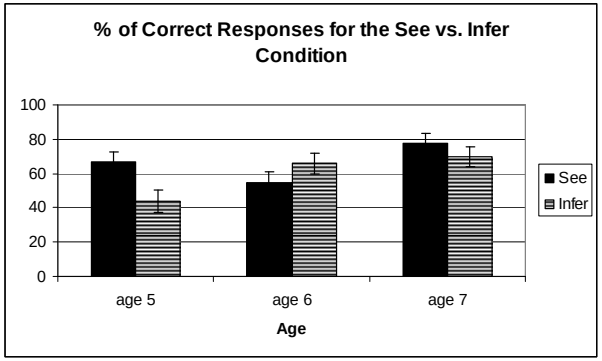

Figure 4. Percentage of correct responses for the **See vs. Infer** condition.

2.3.3 Comparison of the Results of Experiment 1 and Experiment 2

An ANOVA with the percentage of correct responses of each participant as the dependent variable and the Experiment (Experiment 1 or Experiment 2) as the independent variable revealed a significant main effect of Experiment ($F(1, 95) = 1119.56$, $p<.001$). Overall, children performed better in the Production experiment (Experiment 1) than in the Comprehension experiment (Experiment 2) ($M_{comp} = 62.24$, $M_{prod} = 72.53$).

2.3.4 Discussion

Our results indicate that children's comprehension of the evidential markers increased with age. However, children's performance did not differ in terms

of the condition they were assigned to (**See vs. Hear** and **See vs. Infer**). Children in the youngest age group showed some success with comprehension of the direct evidential marker *-DI* but not the indirect marker *-mIş*. In fact, only children in the oldest age group were shown to understand the indirect evidential morpheme.

Overall, children's success rate of comprehension of evidential morphemes was lower than their production rate—a finding reminiscent of production-comprehension asymmetries in other languages with grammaticalized evidentiality (e.g. see Papafragou, Li, Choi and Han 2007, on Korean). It is likely that children have a better command of their own sources of information and are able to produce the evidential morphemes, even if they are not as successful in unpacking others' use of evidential morphology into its conceptual presuppositions (e.g. direct marker = perceptual access).

2.4 Experiment 3: Pragmatic Comprehension of Evidentiality

2.4.1 Stimuli and Procedure

This experiment was conducted to investigate if children are aware of the discourse functions of the evidential markers, i.e. whether children know that a speaker who employed the direct evidence morpheme *-DI* or its full verb counterpart ("I saw that . . .") should be trusted over a speaker that employed the indirect evidential morpheme *-mIs* or its full verb counterpart ("I heard that . . .").

The experiment consisted of 8 stories, each involving one box and two animals. The experimenter informed the participant that they were going to play a game to find out the content of a box. The participant was told that all of the boxes were going to be opened at the end of the game to see whether or not the participant was right in her choice. In the beginning of each story, both animals and the box appeared on the screen. The animals took turns and uttered conflicting statements about the content of the box. In 4 of the 8 trials the sentences the animals produced included the main verbs *gor-mek* 'to see' and *duy-mak* 'to hear':

(6) Bu kutu-da bir helikopter ol-dug -u-n-u gor-du -m
This box -loc one airplane be-Nomin.-3sg.-acc see-past-1sg.
'I saw that there is a helicopter in this box'

(7) Bu kutu-da bir ucak ol-dug -u-n -u duy-du -m
This box -loc one airplane be-Nomin.-3sg.-acc hear-past-1sg.
'I heard that there is an airplane in this box.'

The participant was expected to trust the animal which employed the main

verb *'see'* more than the animal employing the main verb *'hear'*—hence to conclude that there is a helicopter in the box. In the remaining 4 stories, the animals produced sentences with either the direct evidence or the hearsay morpheme:

(8) Bu kutu-da bir helikopter var -mIs
This box-loc one helicopter to.be-evid.
Intended reading: "I heard that there is a helicopter in this box."
(9) Bu kutu-da bir ucak var -di
This box-loc one airplane to.be-evid.
Intended reading: "I saw that there is an airplane in this box."

The participant was expected to trust the animal which employed the morpheme *-DI* more than the animal employing the morpheme *-mIs*—hence to conclude that there is an airplane in the box (in this story).

The left-right position of the animals producing the correct answer was counterbalanced throughout. The two types of stories (Full verb vs. Morpheme) were presented in blocks. Two pseudo-random orders of presentation were employed. Unlike previous studies, there was no Inference counterpart to this study.

2.4.2 Results

A 3 (Age: Group 1, Group 2, Group 3) x 2 (Item type: Full verb vs. Morpheme) ANOVA with the proportion of correct responses as the dependent variable and Item Type as a within subjects factor revealed a significant main effect of Age ($F(2, 381) = 39.192$, $p=.000$): overall children's performance increased with age ($M_5= 58$, $M_6= 65$, $M_7= 90$). Moreover, a significant main effect of Item type was found ($F(1, 381) = 17.386$, $p=.000$): overall, children performed better in the "Full verb" Type of Items ($M_{full}= 77$ vs. $M_{morpheme}= 64$). The analysis revealed no significant interaction between Item Type and Age.

Next, we had a closer look at the performance of each group. One-sample t-tests revealed that the performance of children in all groups was significantly different from chance ($M_5= 58$, $t(255)=2.526$ $p<.05$; $M_6= 65$, $t(255)=5.108$, $p<.001$; $M_7= 90$, $t(255)=21.644$, $p<.001$). Moreover, the performance in the full verb type of items vs. the morpheme type of items was found to be significantly different for all age groups (Group 1: $t(127) = 16.416$, $p<.001$; Group2: $t(127) = 17.343$, $p<.001$; Group 3: $t(127)=46.854$, $p<.001$).

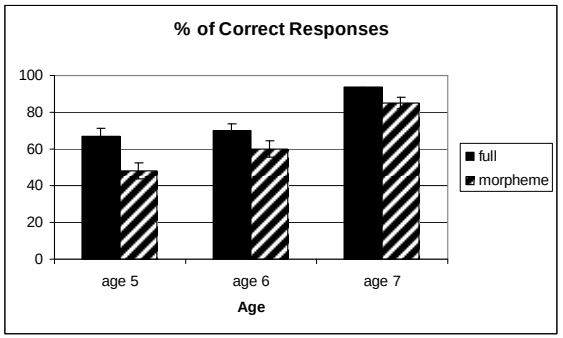

Table 5. Percentage of correct responses for the Full verb and Morpheme conditions

2.4.3 Discussion

The results of the pragmatic comprehension experiment showed that children in all of the age groups are mostly above chance in computing the pragmatic effects associated with the use of evidential markers. However, the performance of the children increases dramatically with age. Children around the age of 7 are at ceiling with this task.

This finding is not so surprising considering the finding of the two earlier studies that children's production and comprehension of evidential morphology increases over time as well. Other studies have shown that five-year-olds have difficulties computing the pragmatic effects associated with related terms such as modal verbs (Noveck 2001, cf. Chierchia, Crain, Guasti, Gualmini and Meroni 2001).

A second interesting result is that children have a better understanding of the pragmatic effects associated with the full source verbs rather than the evidential morphemes. This may indicate that children have acquired the full verbs used in this study earlier than the evidential morphemes; alternatively, or additionally, it might be that stronger alternatives are easier to access for lexical rather than grammatical items.

2.5 General Discussion

Taken together, our studies point at two main findings. First, Turkish-speaking children between the ages of 5 and 7 produce morphemes for past events appropriately but are only beginning to discover the evidential dimensions of these morphemes. Second, there is a linguistic-developmental asymmetry in the domain of evidentiality: of the two evidential morphemes, *-DI*, which encodes direct evidence is understood before *-mIş* which encodes

indirect evidence. These difficulties with evidentiality (also documented in Aksu-Koc 1988; Slobin and Aksu 1986) are somewhat surprising given that, for every past tense event in Turkish, children hear one of the two evidential markers (hence their frequency in the input is quite high). What makes the acquisition of the evidential aspects of these markers so hard?

One possibility is that the linguistic problems we discovered are due to children's cognitive difficulty with reasoning about and reporting the sources of their beliefs (Wimmer, Hogrefe and Perner 1988; Gopnik and Graf 1988; O'Neill and Gopnik 1991). Specifically, the direct-indirect asymmetry might be a direct outcome of the fact that perception is the first and most salient type of information source that children become aware of. We know that children at the age of three understand that seeing leads to knowing (Pillow 1989; Pratt and Bryant 1990): three-year-olds tend to select the character who had visual access to an object hidden inside a box as the one who knows what is hidden inside the box over another character who simply lifted or pushed the box. Moreover, children of this age know that visual access should be trusted over hearsay (Robinson, Mitchell and Nye 1995). However, understanding the effects of other sources of information, such as communication (Robinson 2000) and especially inference (Sodian and Wimmer 1987), develops much later. These findings mirror the direction of the linguistic-developmental findings we reported above.

An alternative, or perhaps additional, explanation for children's linguistic difficulty (especially with the indirect evidential) comes from the fact that there are no transparent cues for mapping evidential language onto the underlying source concepts. In fact, the mapping of a morpheme to perceptual access (rather than to verbal report or inference) might be the easiest for learners to construct. This view predicts that there should be cross-linguistic cases where children may remain unable to acquire the meaning of evidential morphology even after grasping the corresponding concepts. This prediction has recently been confirmed in data from Korean, a language which also has grammaticalized evidentials (Papafragou et al. 2007). It remains to be seen which hypothesis best fits the Turkish data (for further experimentation including non-linguistic tasks, see Ozturk and Papafragou in prep.).

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