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The Acquisition of Syntactically Encoded Evidentiality

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This article presents several empirical studies of syntactically encoded evidentiality in English. The first part of our study consists of an adult online experiment that confirms claims in Asudeh & Toivonen (2012) that raised Perception Verb Similatives (PVSs; e.g. *John looks like he is sick*) encode direct evidentiality. We then present the results of an acquisition study based on an exhaustive examination of the corpora of 45 American English-speaking children in the CHILDES database (McWhinney & Snow 1985). These results are consistent with the hypothesis that children as young as two behave like adults in their ability to correlate the syntax of these constructions with the type of evidence they have. This claim is supplemented by a direct comparison of children's and adults' PVS constructions in the corpora. Together, the studies constitute preliminary indication of children's ability to track and grammatically encode evidence source, even in "non-evidential" languages like English.

1. INTRODUCTION

Evidentiality is the implicit citing of a source of evidence. Languages differ in how they treat evidentiality: For some languages (like Tariana, Aikhenvald 2004), a semantically well-formed sentence must have an evidential marker, while in others (like Turkish) only some constructions have evidential marking. Languages also differ in their strategies for encoding evidentiality. In certain languages, the evidential marker is a sentence particle (as in Cuzco Quechua, Faller 2002). Other languages mark evidentiality with a morpheme that serves some other purpose. For instance, in Turkish a single morpheme *-mIs* marks evidentiality in some contexts and perfect aspect in others (Izvorski 1997). And languages also differ in how they categorize types of evidence: Some languages juxtapose direct and indirect evidence, while others make fine-grained distinctions with respect to hearsay or inferential evidence (Aikhenvald 2004).

There have been several studies of the acquisition of evidentiality, beginning with the seminal work on Turkish by Aksu-Koç (1988). More recent studies include Ozturk & Papafragou (2008) on Turkish, Papafragou et al. (2007) on Korean, Courtney (2008) on Quechua, Villiers et al. (2009) on Tibetan, Fitneva (2008) on Bulgarian.

While evidential strategies vary from language to language, these studies have focused mainly on languages whose evidential marker encodes evidentiality *as well as* an additional semantic component like tense, aspect, or mood. Because such markers are semantically complex, it is

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hard if not impossible to isolate the point at which the evidential meaning is acquired from the point at which the tense, aspect, etc., meaning is acquired.[1]

We believe that a more ideal starting point for the study of the acquisition of evidentiality is those languages in which evidentiality is encoded in a dedicated strategy, i.e., independently of another component of meaning. In English, as well as some other languages (e.g., Swedish), direct evidentiality is encoded syntactically, in what's been referred to as a "copy-raising construction," as in (1a) (contrast with [1b]; Rogers 1973; Moulton 2011; Asudeh 2012; Asudeh & Toivonen 2012). As we'll explain in detail in Section 2.2, the raised version in (1a) is marked for direct evidentiality, while its unraised counterpart in (1b) is unmarked with respect to evidentiality.

(1) a. John looks like he is sick. *Raised*: direct evidentiality
b. It looks like John is sick. *Unraised*: unmarked for evidentiality

We'll refer to these constructions using the relatively theory-neutral term Perception Verb Similatives (PVSs). Raised PVSs like (1a) typically have full DPs as matrix subjects and coreferring pronouns as embedded subjects. Unraised PVSs like (1b) have *it* or *there* as a matrix subject and a full DP embedded subject.

This article presents several empirical studies of syntactically encoded evidentiality in English. The first consists of an adult online experiment which confirms claims in Asudeh & Toivonen (2012) that raised PVSs encode direct evidentiality. We then present the results of an acquisition study based on an exhaustive examination of the corpora of 45 American English-speaking children in the CHILDES database (McWhinney & Snow 1985). The results of this production study are consistent with the hypothesis that children as young as 2 behave like adults in their ability to correlate the syntax of these constructions with the type of evidence they have. We supplement this claim by directly comparing children's PVS utterances in these corpora to adult utterances in some of the same corpora. In addition to providing some insight into the kind of PVS input children receive, the results of our adult production study provide additional support for our claim that children's use of PVSs is adultlike. The production studies constitute a first step in an ongoing acquisition project that includes a comprehension study (a felicity judgment task) currently in progress.

We'll begin by discussing evidentiality generally—both in the theoretical and acquisition literature—and then we'll discuss English PVSs in more detail.

2. EVIDENTIALITY GENERALLY

2.1. Evidential Strategies across Languages

Languages differ in their evidential strategies. Typologists like Aikhenvald (2004) have placed emphasis on the difference between languages that mark evidentiality obligatorily and optionally.

[1]In Quechua, the evidential markers do not encode tense or aspect, but some of them encode a specific level of speaker certainty in addition to evidence source (Nuckolls 1993; Faller 2002; Aikhenvald 2004). Courtney (2008) claims that the earliest uses of the evidential markers by Quechua-speaking children (up to roughly age 3) express certainty or conviction rather than evidentiality or they are used in "conventional" contexts (i.e.,with *wh*-question words, in response to questions, with the verb *–ni* used in reporting direct speech, and in equative sentences wihout the copula *ka-*). See note 5.

We choose to focus instead on the types of strategies (and the relevance of this for acquisition): whether an evidential marker is semantically simplex or complex (i.e., whether it encodes only evidentiality or evidentiality in addition to some other semantic property).

Tariana is an obligatory evidential language that uses only simplex evidential strategies: Its evidential markers are sentence particles. The sentences in (2) illustrate its direct and indirect evidential markers; Tariana also has hearsay and inferential evidentials (Aikhenvald 2004:2–3).

(2) a. Juse irida di-manika**-ka**.
José football 3sgnf-play-REC.P.VIS
'José has played football (I saw it).' *direct*
b. Juse irida di-manika**-nihka**.
José football 3sgnf-play-REC.P.INFR
'José has played football (I infer it from visual evidence).' *indirect (visual)*

An utterance of (2a) is acceptable only in situations in which the speaker has direct or firsthand evidence of José playing football; for instance, as was the case for (1a), if the speaker directly perceives José playing football. In contrast, an utterance of (2b) is acceptable only if the speaker has indirect visual evidence of José playing football, i.e., visual evidence for something that allows him to infer that José has played football (for instance, if the speaker sees his muddy cleats in the hallway).

Turkish is an optional evidential language that uses a complex evidential strategy. In Turkish, evidentiality is encoded in a present perfect marker *–mIş* (the "evidential perfect"), as shown in (3), from Aksu-Koç 1988. (See also Slobin & Aksu-Koç 1982; Aksu-Koç & Slobin 1986; Izvorksi 1997.) Other evidential perfect languages include Bulgarian, Georgian, and Norwegian.

(3) a. Ahmed gel**-dI**.
Ahmed come-PST
'Ahmed came (I saw it).' *direct*
b. Ahmet gel**-mIş**.
Ahmet come-PPERF
'Ahmet came (I infer it or heard it).' *indirect*

(3a) is formed with the past tense marker *–dI*. In addition to asserting that Ahmed came (in the past tense), it commits the speaker to having direct visual evidence of Ahmed's arrival. (3b) is formed with the present perfect marker *–mIş*. In this context it too receives a past-tense interpretation. And it commits the speaker to having indirect (in this case, either indirect visual or hearsay) evidence of Ahmed's arrival.

That *–mIş* is a present perfect marker (and not a past tense marker) is clear from its semantic contribution in, for instance, nonfinite clauses (as shown in [4], from Izvorski 1997). In this context (and other contexts in which *–mIş* receives a present perfect interpretation), *–mIş* is not an evidential, i.e., it contributes no information about the source of knowledge.

(4) Kitap yaz –mIş ol –mak büyük bir başarı.
book write MIS be INF big a achievement
'To have written a book is a big achievement.'
NOT 'To have apparently written a book is a big achievement.'

The prevalence of this "evidential perfect" strategy across unrelated languages suggests that (3) is not an instance of accidental homophony. As a result, semantic accounts of Turkish *-miş* generally attempt to characterize it as marking both evidentiality and tense/aspect.

It is still a matter of controversy what type of semantic contribution evidentials make. One prominent school of thought characterizes (some) evidentials as epistemic modals (e.g., Izvorski 1997); many others characterize evidentiality as a nonpresuppositional not-at-issue content (Simons et al. 2010), meaning it projects and is backgrounded (e.g., Faller 2002; Murray 2010; Koev 2011). This is because the semantic behavior of evidentiality is relatively consistent across languages: The evidential component of a sentence always scopes outside of negation, and it is generally not deniable (Faller 2006; Murray 2012). We will illustrate these points for evidentiality in English after presenting the PVS data in more detail.

2.2. Evidentiality and English PVSs

The canonical raising construction, first discussed in Postal (1974), involves a raising verb and comes in two forms: a raised and an expletive version, shown in (5).

(5) a. John seems to have won the race. *raised*
b. It seems that John has won the race. *expletive*

Perception verb similatives (a.k.a. copy-raising constructions), which are the focus of our study, differ in subtle but important ways from canonical raising constructions. PVSs can be formed with *seems* but also with perception verbs like *sounds, looks,* and *feels*.[2]

(6) a. John seems/looks/feels/sounds like he won the race. *raised*
b. It seems/looks/feel/sounds like John won the race. *unraised*

In both (6a) and (6b) the embedded clause is finite and is introduced by a PP instead of a complementizer (*like* or *as though*/*as if*). The raised version in (6a) has a full-DP matrix subject and a pronominal embedded subject. These subjects often corefer, as they do in (6a), which has inspired syntactic theories in which the embedded subject is a copy of the matrix subject (hence the label "copy raising"). But they need not corefer, as (7) demonstrates.

(7) Mary looks like Sue won the race.

These non-coreferring raised PVSs are rare and can only be felicitously uttered in certain contexts. For example, (7) is felicitous when it's been established that we can reliably infer from Mary's appearance whether Sue has won the race, etc. Also, noncoreferring PVSs are decidedly worse with *seem*, as Asudeh & Toivonen (2012) note.[3]

[2]We did not include the verb *feel* in these studies because of its low incidence in corpuses relative to *looks, seems,* and *sounds*; Asudeh & Toivonen (2012:325) additionally report that PVSs formed with *feel* and *taste* are generally less acceptable to speakers. As a reviewer points out, *feels* is additionally problematic because it has a propositional attitude interpretation (i.e., in which *John feels like he's swimming* reports on John's, rather than the speaker's, impression).

[3]And they are completely out in the case of canonical raising: *Mary seems Sue to have won the race.

(8) #Mary seems like Sue won the race.

PSVs also encode evidentiality.[4] As discussed in Section 1, raised PVSs commit the speaker to having direct evidence of the asserted proposition, while unraised PVSs make no such commitment. Another example of this distinction is in (9) (from Asudeh & Toivonen 2012).

(9). a. John seems/looks/sounds like he is cooking. *raised*
asserted proposition: There is visual/audio evidence that John is cooking.
evidential component: I have seen/heard John.
b. It seems/looks/sounds like John is cooking. *unraised*
asserted proposition: There is visual/audio evidence that John is cooking.
evidential component: Ø

Both (9a) and (9b) are acceptable in a situation in which the speaker has seen John chopping vegetables and boiling water on the stove, but only (9b) is compatible with a situation in which the speaker has witnessed John's kitchen—in John's absence—with chopped vegetables on the countertop and water boiling on the stovetop.

In contrast with the raised PVS construction, the raised version of canonical raising construction in (5a) does not mark direct evidentiality (but see note 4). The sentence in (5a), *John seems to be have won the race,* can be felicitously uttered in a situation in which John is directly perceived as having won the race—breaking through the ribbon on the finish line, for example—or a situation in which we infer his victory—for example, by seeing the first place medal on his shelf—or even a hearsay situation. As we will see later, the distinction between canonical raising and PVSs with respect to the encoding of evidentiality is also respected by very young children.

For ease of exposition, the evidential properties of the PVS sentences in (9) are schematized in Table 1.

TABLE 1
PVSs and Evidentiality

Evidential source	*Raised (8a)*	*Unraised (8b)*
Direct	Okay	Okay
Indirect	*	Okay

[4]Grimm (2010) argues that canonical raising constructions also mark evidentiality but in the opposite way that PVSs do. He claims that the raised version is unmarked for evidentiality, but the expletive version marks *indirect* evidentiality.

(i) Julius Caesar appears to be honest.
(ii) It appears that Julius Caesar is honest.

He also observes that there are a number of other asymmetries between canonical raised and unraised constructions, having to do with topic/comment structure and specificity, for example. In our study we focus on PVSs, in particular on the difference between raised and unraised PVSs in terms of their evidential status. Because the raised version of the canonical raising construction is unmarked with respect to evidentiality, it provides a useful control for our analysis of children's PVSs, and thus we also briefly examine children's production of canonical raising constructions. See Section 5.2.

We follow Rogers (1973) in characterizing the evidential component of raised PVSs as non-truth-conditional (i.e., not-at-issue), just like other evidentials. For the present purposes, this means that the evidential requirement of constructions like (9a) projects outside of truth-functional operators and is backgrounded. Tests for projection include the inability of the evidential component to be negated, as (10a) shows. Tests for whether or not a meaning is backgrounded include the inability of the evidential component to be denied in discourse, as (10b) shows.

(10) a. Tom doesn't look like he is cooking.
is not equivalent to Tom appears to be cooking (but I didn't see him).
b. Mary: Tom looks like he is cooking.
John: #Nuh-uh, you haven't seen Tom!

Asudeh & Toivonen (2012) argue that the evidential component of raised PVSs isn't presuppositional; they conclude from this that it is part of the asserted content. Their evidence, we believe, is more naturally interpreted as indicating that the evidential component is not-at-issue.

2.3. An Analysis

Following Asudeh & Toivonen (2012) (henceforth A&T), we assume that perception verbs mark their subjects not as thematic arguments but as PSOURCES, sources of the speaker's perception. This nonthematic semantic role is an adjunct introduced by a preposition in Swedish and syntactically in the case of English.

The result for evidentiality is relatively clear for raised PVSs: The matrix subject *John*, by virtue of its position in the syntax, is the recipient of a semantic role that identifies it as the source of the perception. According to this analysis, (9a) can be paraphrased as, "John looks like he is cooking; I know this from looking at John," and so forth for other raised PVS constructions.

Extending this analysis to unraised PVSs like (9b) requires only a robust concept of eventualities as semantic objects (Bach 1981; Parsons 1990). Rather than analyzing *it* in (9b) as a semantically vacuous expletive, we take it to be a pronoun ranging over eventualities, a cover term for events (like cooking) and states (like being sick). Given this assumption, consistent with the syntactic proposal in A&T, (9b) attributes the source of perception to an eventuality whose reference is determined by context.

There are two types of events relevant for the perceptual source of a proposition like *John is cooking* in (9b). The first is an event of John cooking. In such an event, John is the agent, and as a result the prediction is that (9b) is compatible with the speaker having as his source of evidence an event of John cooking. This amounts to a direct evidence interpretation: If the speaker sees John cooking, then he has direct evidence of John cooking (just as seeing John gave him direct evidence of John cooking in [9a]).

The second type of event is one that entails that John is cooking. An example of such an eventuality is the state discussed previously, in which the speaker's source of perception is instead a scene of John's kitchen in which pots are boiling and sauces are simmering. This amounts to an

indirect evidence interpretation: If a speaker sees John's busy kitchen (but not John), and cites that state as a source of perception, then (assuming a context in which John doesn't have a roommate or a houseguest) the speaker has indirect evidence that John is cooking.

So, in sum, we follow A&T in assuming PVS mark their subjects as the source of perception. In raised PVS cases, in which the matrix subject denotes an individual, the speaker is committed to the (not-at-issue) claim that the denoted individual is his or her perceptual source. In unraised PVS constructions, we assume, the subject is a pronoun ranging over events or states, and so the sentence is compatible with either a direct evidence scenario (in which the event is one in which the embedded subject is a participant) or an indirect evidence scenario (in which the event entails the asserted proposition).

3. THE ACQUISITION OF EVIDENTIALITY

Virtually all of the previous research on acquisition of evidentiality has examined languages in which evidentiality is grammaticized in the morphological system (but see Koring & De Mulder 2011 for a study of Dutch evidential verbs). A central focus of many of these studies is the child's mastery of direct and indirect evidential markers in relation to his development in other cognitive areas presumably involved in use and understanding of evidentials. These include inferential reasoning, the ability to monitor and identify information source in nonlinguistic tasks, judgment of speaker certainty, and understanding of informational perspective of the speaker more generally. Much of this is taken to be part and parcel of theory of mind (TOM) development, namely, "the ability to attribute to oneself and others mental states and to reason in terms of mental states in order to explain and predict behavior" (Papafragou et al. 2007:255).

Among the "evidential" languages studied, including Turkish, Korean, Quechua, and Tibetan, the acquisition findings are fairly consistent. The first noteworthy result is that children spontaneously produce evidential markers by age 2 to 3, but their performance in experimental tasks lags behind their naturalistic production by about a year or so (e.g., Aksu-Koç 1988; Papafragou et al. 2007; Choi 1995). This delay is true both for elicited production and comprehension tasks but is especially pronounced in comprehension.

Aksu-Koç, Ögel-Balaban & Alp (2009) have argued that the lag is a function of the experimental tasks, which often place additional demands on the child's working memory and perspective-shifting abilities and require a set of computations that also have to be accessible to consciousness. Additionally, as Papafragou et al. (2007) note, many of these tasks seem to tap metalinguistic abilities in a way that normal language comprehension does not.

Another possible factor contributing to the production/comprehension discrepancy is that children are correctly producing evidential morphemes early on but may be doing so with a somewhat different underlying semantics than adults. This hypothesis is made more plausible by the fact noted earlier that the morphemes at issue are often polysemous, also encoding tense, aspect, or modality, among other functions. For example, the Korean direct evidential marker *–e*, which is regularly produced by age 3, is also the default declarative marker that also marks old information (Choi 1995). Indeed, Villiers et al. (2009) argue that the early use of the direct evidential (and possibly also speaker-certainty) marker *–dug* by Tibetan children indicates their certainty with

respect to the knowledge expressed and not the source of the knowledge.[5] We refer to this as the "polysemy problem."

A second consistent result across evidential languages is that children produce direct evidentials earlier than indirect evidentials (Choi 1995; Ozturk & Papafragou 2008; Villiers et al. 2009; Courtney 2008). This is sometimes attributed to the increased cognitive difficulty associated with indirect evidentials which—at least in production—involves ''the further complexity of making an inference . . . as compared to simply accessing an experienced event from memory'' (Aksu-Koç & Slobin 1986:166). This developmental advantage of direct evidentials over indirect evidentials appears in both spontaneous production and experimental tests of production and comprehension (Aksu-Koç, Ögel-Balaban & Alp 2009). Within the indirect category, markers of inferential evidence are typically acquired before markers of hearsay evidence in languages that distinguish those two categories, such as Quechua and Turkish (Courtney 2008; Aksu-Koç, Ögel-Balaban & Alp 2009; Aksu-Koç & Slobin 1986)

A final issue concerns the neo-Whorfian position that the acquisition of linguistic evidentiality facilitates the child's *nonlinguistic* source monitoring ability. Aksu-Koç, Ögel-Balaban & Alp (2009) explain the reasoning as follows: "For children acquiring evidential languages the ability to track different types of knowledge representations that evidential markers map onto is likelier to be an earlier development because the linguistic encoding of experience in memory will be in terms of these obligatory source categorizations that will also leave a trace" (p. 20). It follows from this hypothesis that for children acquiring a language like English in which evidentiality is neither grammaticized nor obligatory, reasoning about evidential source—and hence the semantics of evidentiality—should be delayed, as compared to children acquiring "true" evidential languages like Korean and Turkish.[6]

Our acquisition study attempts to circumvent a number of problems associated with the studies just described. First, by investigating English PVSs we directly test knowledge of evidentiality and avoid the polysemy problem.[7] Moreover, because evidentiality is optional in English, our

[5]Across languages, direct evidentials tend to be acceptable in contexts in which the speaker's level of certainty is high. This is generally a pragmatic effect, so it's defeasible and changes in contexts if the speaker is drunk, etc. In a few languages, however (Cheyenne and Cuzco Quechua), the reportative has a speaker uncertainty effect that seems strong and semantic. It remains unclear whether or not raised PVSs, by virtue of the fact that they encode direct evidentiality, indicate speaker certainty. It's possible that any such effect is secondary, a pragmatic issue rather than a semantic one (Davis, Potts & Spears 2007).

Matsui, Yamamoto & McCagg (2006) find that Japanese-speaking children ages 3 to 6 do better with markers of speaker certainty than with evidential markers *(-tte* and *–yo*) in experimental tasks. Jeschull & Roeper (2009) investigated the production and comprehension of the perceptual verb *look* as compared to *probably*, which marks speaker certainty, in children ages 4 to 6. They conclude that English-speaking children distinguish evidentials from certainty markers by that age, though they are not yet fully adultlike. However, in discussing the evidential aspect of *look,* they do not differentiate between raised and unraised PVSs or between direct and indirect evidence source.

[6]Aksu-Koç, Ögel-Balaban & Alp (2009) did a meta-analysis (comparing children from two different studies) and found that at 4 years old, Turkish-speaking children outperformed English-speaking children on nonlinguistic source memory tasks. In contrast, Papafragou et al. (2007) found no difference between Korean and English-speaking children's source monitoring performance (see also Ozturk & Papafragou 2008) and argue on this basis that the development of source monitoring is independent of language, apart from performance on nonlinguistic tasks, which typically involves metalinguistic skills and much else.

[7]For example, evidential morphemes are acquired somewhat earlier in Korean than in Turkish despite the fact that they are obligatory in both languages and therefore rather frequent in the input (Choi 1995; Aksu-Koç 1988). This is possibly due to differences in their other semantic features: The Korean markers *–e* and *–ta* encode old versus new

results speak to the issue of whether indirect evidentials are cognitively/linguistically more complex for the purpose of acquisition, and also to the neo-Whorfian idea that learning a language that grammatically marks evidential categories could enhance early knowledge about sources of information.

4. ADULT ONLINE "FELICITY JUDGMENT" STUDY

Before discussing our acquisition study we describe an adult experiment in which we test the empirical claims made in A&T concerning the relationship between evidentiality and the syntax of PVSs, as schematized in Table 1.

4.1. Procedure

This experiment was designed to target the acceptability of raised versus unraised PVSs in contexts in which the speaker has direct and indirect evidence for the asserted proposition. The experiment was carried out online using IBEX (Drummond 2010). Ninety-three subjects participated online; data from three subjects were discarded because they characterized themselves as nonnative speakers. The total number of participants reported here is 90.

Subjects were asked to help an English-language learner, Fola, perfect her use of English. They are told that Fola is near fluent but needs help with the more subtle aspects of the language. In the experiment, subjects were presented with various scenarios and Fola's commentary of each scenario. The subjects were then asked to determine whether her comment is *okay, kind of weird,* or *weird*. These judgments were converted to numerical scores for the purposes of analysis. The exact instructions were:

> Fola is visiting the U.S. in order to improve her English. She's taken several English-language classes and is pretty fluent, but she still needs practice with some of the more subtle aspects of the language. She's asked you to help her by giving her feedback on her use of English. What follows will be descriptions of various scenarios, followed by a comment of Fola's. After reading both, please indicate whether her comment, given the scenario, is okay, weird, or kind of weird. You will not be timed, so take time to fully understand the scenarios and comments.

The scenarios provided background information on the type of evidence Fola has for the proposition she asserts. They were differentiated based on four different criteria:

(i) Sensory source: whether Fola's evidence for the proposition is visual, auditory, or hearsay;
(ii) Evidence type: whether Fola's evidence is direct (involves her directly perceiving the subject) or indirect (applicable to the visual and auditory but not the hearsay scenarios);
(iii) Predicate: whether the sentence contains *seems, looks,* or *sounds;*
(iv) Syntax: whether the sentence is a raised or unraised PVS.

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information—directly correlated with evidence source (Davis, Potts & Spears 2007)—while Turkish *–mIş/–dI,* (see examples in [3]) encode perfect/past, arguably a more complex semantic opposition.

This example has a scenario that is (i) auditory, (ii) indirect, (iii) uses the predicate *sounds*, and (iv) unraised.

> Fola and her son Milo live near a pig farm. Milo loves to play with the pigs when he has time, and the pigs always squeal with joy when Milo visits them. One day Milo leaves the house after finishing his homework.
>
> Soon after, Fola hears the pigs making a lot of noise, and she says: "It sounds like Milo visited the pig farm."

It is auditory because Fola heard the evidence she has for suspecting that Milo visited the pig farm (the pigs' squealing). It's indirect because Milo is not the source of the noise, but instead Fola had to infer from the noise of the pigs to the likelihood of Milo visiting them. Examples of each type of scenario can be found in the Appendix.

The combinations of these scenario parameters form 30 test questions. We had three tokens of each question type for a total of 90 test items. In addition, we included 10 fillers containing a modal (like *can*) or an attitude verb (like *believe*). The test items were divided into blocks, and each subject received 15 test questions, 10 fillers, and 1 practice question. The practice scenario went as follows:

> Fola went to watch John and Sue run in a race. She arrived late, however, and saw John looking upset and Sue running a victory lap with a trophy in her hand. Fola says: "Sue must have won the race."

4.2. Results

The responses were coded numerically, with *okay* corresponding to +1, *kind of weird* corresponding to 0, and *weird* corresponding to –1. Average scores thus divide into *acceptable* (a positive score) and *unacceptable* (a negative score).

The results of a 2 × 2 mixed-design ANOVA showed main effects of both syntax (raised vs. unraised) and evidence type (direct vs. indirect) ($p < .001$). There was a strong main effect of syntax: Subjects strongly preferred unraised constructions over raised ones across dependent variables. There was also a strong effect of evidentiality: Subjects were more likely to accept a sentence in a direct scenario than an indirect.

Importantly, there was also a significant interaction of syntax and evidence ($p < .001$); while raised PVSs are acceptable (to some degree) in direct scenarios, they are absolutely unacceptable in indirect scenarios. These results are presented in Figure 1.

A further result follows from the semantics of the different PVS verbs, which differ in the extent to which they are acceptable across different sensory sources, as shown in Figures 2–4. In the unraised PVS construction, *seem* and *look* are completely unspecified with respect to sensory source; i.e., our subjects accepted an unraised PVS with *seem* or *look* in contexts of visual, auditory, and hearsay contexts (Figures 2 and 3).

Yet, the two verbs differ in the restrictions they place on the sensory source in raised PVS constructions: *Seem* can be used when the evidence is visual or auditory, while *look* can only be used when the evidence is visual. (Neither verb is acceptable in raised PVSs when the source is hearsay because in that case the evidence is indirect.)

Figure 4 shows that *sound* is the most restrictive PVS verb; it is only acceptable with auditory evidence, suggesting that English differentiates between direct auditory evidence (hearing John

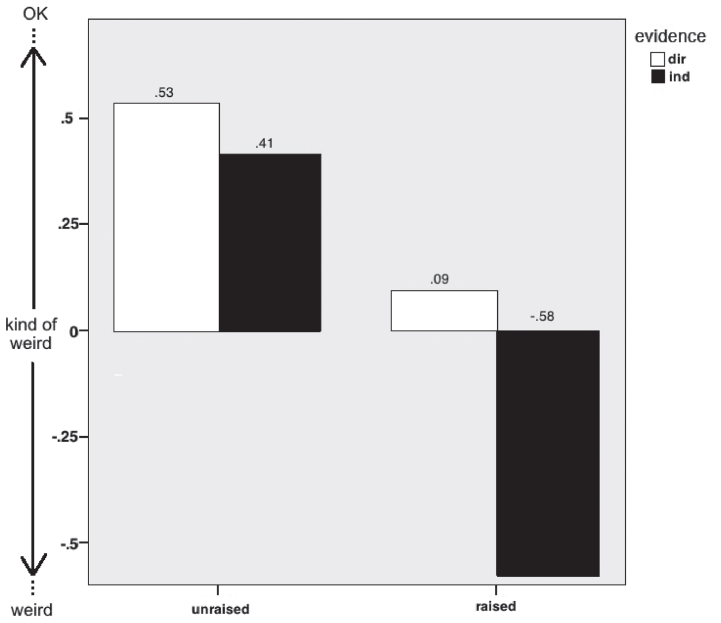

FIGURE 1 Mean acceptance rates by evidence type and syntax.

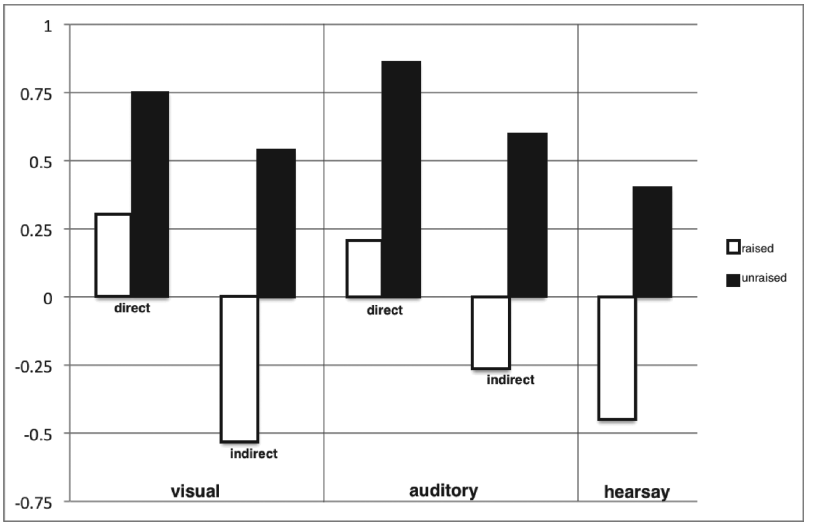

FIGURE 2 Mean acceptance rates for *seem* with different sensory sources.

come in, for instance) and indirect auditory evidence (hearing that John came in, from a third party). This would make English a trivalent evidential language, distinguishing between direct visual, direct nonvisual, and inferred or reported evidence sources (Aikhenvald 2004).

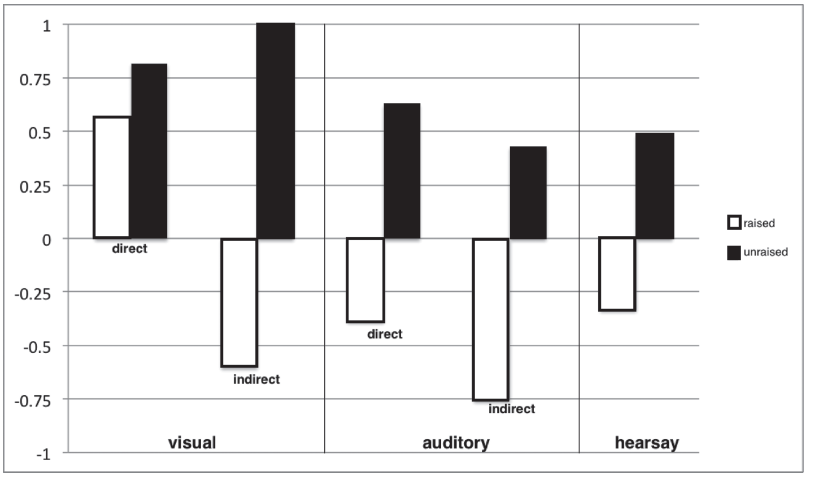

FIGURE 3 Mean acceptance rates for *look* with different sensory sources.

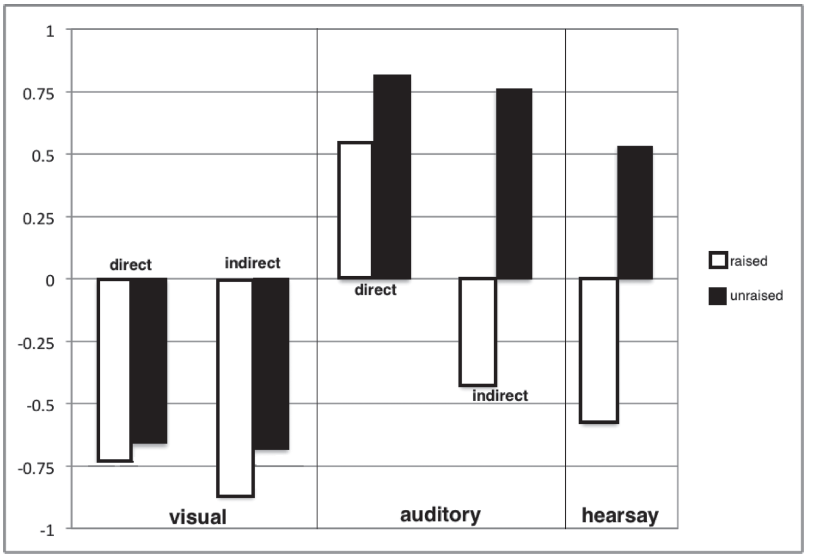

FIGURE 4 Mean acceptance rates for *sound* with different sensory sources.

We would like to note in passing a surprising difference between *look* and *sound. Look* only restricts the source of evidence when it appears in raised PVSs; this is evident from the fact that its unraised versions (the black bars) are acceptable even in contexts of auditory or hearsay evidence. In contrast, *sound* seems to restrict the evidence source in raised *and* unraised PVSs, evidenced by the unacceptability of the unraised versions in the visual condition. It is not clear to us how this asymmetry can be accounted for in terms of the assignment of P-SOURCE, as proposed in A&T 2012.

4.3. Discussion

The predictions of A&T's theory are largely borne out in our data. In particular, our experiment demonstrates that unraised PVSs are acceptable in scenarios in which the speaker has direct or indirect evidence for the asserted proposition, but raised PVSs are acceptable only in scenarios in which the speaker has direct evidence for the asserted proposition. This is reflected in the significant interaction effect between syntax and evidence type and holds across PVS verbs (*seem, look,* and *sound*) and across sensory sources (visual, auditory, and hearsay).

Another main effect observed is that unraised PVSs are in every case more acceptable than their raised counterparts, regardless of evidence (this is reflected in the significant effect of syntax). We believe this is a new observation. There are a few tempting explanations for this preference, although we cannot argue for any of them definitively. On the one hand, unraised PVSs could be syntactically unmarked relative to raised PVSs. This explanation seems more natural in a syntactic theory in which the unraised PVSs involve expletives instead of event pronominals (as in the proposal in A&T).

On the other hand, the raised and unraised versions of PVSs correspond to a specific and general semantic marking respectively. So it seems plausible that this is instead a construction for which the semantically specific form is marked. This is, arguably, a general phenomenon; Levinson (2000: 330) refers to it as the "M-Principle": the inclination of a speaker to, based on Gricean maxims, "indicate an abnormal, non-stereotypical situation by using marked expressions that contrast with those you would use to describe the corresponding normal, stereotypical situation."

Finally, the verbs that participate in PVS constructions seem to differ in the extent to which they restrict their sensory source: *Seems* is the least restrictive, while *looks* and *sounds* prefer visual and audio sensory sources respectively. But these verbs also differ in how these restrictions are manifested. For example, *look* constrains the sensory source of only raised PVSs, while *sound* constrains the sensory source in both raised and unraised PVS constructions. While these findings were robust in our study, we have no explanation for the difference. We return to this issue shortly when we discuss the acquisition of the individual verbs.

5. CHILDREN'S PRODUCTION OF PVSs

5.1. Subjects

We turn now to our acquisition study, which is based on 45 American English-speaking children in the CHILDES database (McWhinney & Snow 1985). Our preliminary work showed that children younger than 2 did not produce the constructions of interest. We therefore limited our search to corpora that included children between the ages of 2 and 7, including the following: Bates, Bernstein-Ratner, Bliss, Bloom 1970, Bloom 1973, Bohannon, Brent, Brown, Clark, Cornell, Demetras Trevor, Demetras Working, Evans, Feldman, Garvey, Gathercole, Gleason, Haggerty, Hall, Higginson, HSLLD, Kuczaj, MacWhinney, McCune, Morisset, Nelson, New England, Peter Wilson, Post, Providence, Sachs, Snow, Soderstrom, Suppes, Tardif, Valian, Van Houten, Van Kleek, Warren-Leubecker, and Weist.

We found a total of 70 declarative PVSs containing the verbs *look, seem,* and *sound*. Interrogative sentences were not included because their evidential status is unclear.

5.2. Coding Procedures

Each relevant utterance was coded for two factors: Syntax (raised or unraised) and Evidence (direct or indirect). The syntax coding was relatively straightforward: PVSs with full DP matrix subjects were coded as raised and sentences with expletive (or event-pronominal) subjects counted as unraised. There were 13 cases in which the syntactic status was ambiguous. These consisted of null subject sentences, as in (11a), where it was unclear whether the omitted subject is expletive or referential; and "double *it*" sentences, as in (11b), where it is uncertain whether the higher *it* is expletive or referential (or in the case of [11c] weather *it*).

(11) a. Sounds like she's making up her stories. (unnamed, 6;00)
b. It sure does look like it's old. (Nat, 3;01)
c. He says it seems like it's Christmasy weather. . . . (Ross, 7;00)

Such utterances were excluded from our analyses.

Two coders worked independently to determine, for each PVS utterance, the evidential type of that utterance. Any utterance the coders disagreed on was excluded from further analysis; those will be discussed shortly.

In order to determine whether the speaker has direct or indirect evidence for a proposition, one must establish which entity the construction assigns the PSOURCE role to. In some cases, especially the unraised PVSs (in which the subject is often *it*), this requires looking at context to determine the referent of the pronoun.

To determine evidence type, coders relied on several contextual and grammatical cues, including the use of demonstratives in describing the topic, the proximity of the topic to the speaker, and the discussion before and after the PVS utterance. In (12) and (13) we provide an example of direct and indirect evidence-situations.

(12) Direct-evidence scenario (Nat, 3;00)
ANG: give me the kitty cat.
ANG: thanks.
ANG: kitty+cat looks tired .
ANG: have you been a good kitty+cat? . . . .
CHI: look it .
CHI: he +. . .
CHI: **he looks like he's sleeping** .
CHI: **he looks like he's sleeping** .
ANG: all curled up .

In (12) the relevant utterance is the CRC *He looks like he's sleeping*. This was coded as a direct-evidence scenario for several reasons. Prior discourse, including the use of the second-person pronoun *you*, suggests that the cat is so close that the interlocutors are addressing it directly. And the comment that the cat is all curled up suggests that the interlocutors are looking at the cat.

(13) Indirect-evidence scenario (Mrktp 3;10)

CHI: nope <there's> [//] <they're> [/] they're closed mommy .
MOT: they're always closed and every time we get there they're closing huh?
CHI: I know (.) .
CHI: **it looks like they're open to me.**
MOT: they might be.
MOT: as long is it's not Tuesday they'll be open.
MOT: is it Tuesday?
CHI: yep.
MOT: well then they're closed (.).

In (13) the relevant sentence is *It looks like they're open to me*. The question is whether the speaker has direct or indirect evidence for the store appearing open, i.e., whether the child's evidence comes from looking at the store or from indirect perception of some eventuality that entails that the store is open. The discourse following the relevant utterance—including a weak epistemic modal and a clear pattern of inference regarding the asserted proposition—shows that the speaker and his mother are inferring about the status of the store, rather than perceiving its apparent openness directly.

(14) is a clear example of a PVS whose evidence type is completely unclear. The coders were unable to establish either the meaning of the sentence in this context or the child's evidence for it. Even the mother seems bewildered.

(14) Unclear evidence source (Sarah, 4;01)

MOT: who's mindin(g) you today ?
ANN: Nana.
MOT: Nana?
MOT: does she know you're over here?
ANN: yeah. . . .
CHI: what Nana?
MOT: Nana Fitzgerald.
ANN: xxx for a long time.
CHI: <the one> [/] (.) the one that died?
CHI: Uncle_Eddie died (.) the one?
MOT: yeah.
ANN: I forgot that Uncle Eddie died (be)cause **it seemed like he was cryin(g) when she was talkin(g)**.[8]
MOT: well.

Coders were able to determine the evidence type for the vast majority of cases from context and other linguistic cues. Several more examples of the children's direct and indirect evidentials are given in (15) and (16).

[8]This utterance, which appears in Sarah file 092, is produced by Ann, a child described as a playmate of Sarah's.

(15) Direct
a. Dat clay doesn't look like it's sticky, but it is. (Adam 4;09)
b. Now it's a Pooh truck, he looks like he's driving. (Ethan 2;09)
c. Well it looks like I got all the rabbits. (collecting rabbits) (Abe 3;02)

(16) Indirect
a. Look like the howl's been in your room. (unnamed 4;06)
b. Looks like there's another piece. (noticing empty spot in puzzle) (HV1/TP 3;07)
c. But it seems like he's never coming. (Joe 5;04)

5.3. Results

In Table 2 we provide the frequency of each of the PVS verbs and age of first occurrence. We see that *look* far outnumbered the other two verbs and appears at a much younger age.

A priori we might expect that *seem*, which is neutral with respect to evidential type, would be acquired earlier than the semantically more restrictive *look* and *sound* (which require visual and auditory evidence respectively; see Section 4). But this is not what we find. A possible explanation for the earlier appearance of the perceptual verbs despite their more restrictive conditions of use is suggested by examples such as (7) and (8) (repeated here).

(7) Mary looks like Sue won the race.
(8) #Mary seems like Sue won the race.

As noted earlier, PVSs with perception verbs like *look* and *sound* do not require coreference between their embedded and matrix subjects, in contrast to PVSs with raising verbs like *seem* and *appear*. This would follow if the perception verb PVSs do not involve syntactic raising (i.e., A-movement; contra A&T, who analyze both [7] and [10] as involving raising), while the raising verb PVSs do (similar to canonical raising, as in [5a]). This would also explain the low incidence of *seem* PVSs in our data, given the considerable independent evidence that prior to age 6 or so children's grammars do not license A-movement in canonical raising sentences with *seem* (Hirsch, Orfitelli & Wexler 2007, 2008; Orfitelli 2012, but see also Becker 2006).[9] However, it must also be noted that the adults in our production study (to be discussed in Section 5.3) also

TABLE 2
Number and First Occurrence of PVS Verbs

	Look	*Sound*	*Seem*
Number (child)	55	3	12
Age of first occurrence	1;10	2;06	4;01

[9]Orfitelli (2012) proposes that children do not have difficulty with A-movement per se (in contrast to Hirsch, Orfitelli & Wexler 2007, 2008) but are delayed in acquiring structures that require A-movement across an (implicit or explicit) intervening argument, such as the experiencer phrase selected by *seem*. This analysis would also extend to PVS *seem* (e.g., *John seems [to Mary] like he won the race*).

TABLE 3
Number and Percentage of Direct vs. Indirect-Evidence Situations by Age

Age (years)	*Direct* N *(%)*	*Indirect* N	*Total*
1–2	8 (88%)	1	9
3	15 (79%)	3	18
4	12 (70%)	5	17
5	13 (76%)	4	17
6–7	4 (67%)	2	6
Total	52 (78%)	15	67

showed the same preference for perceptual verbs over *seem*. We found 123 tokens of *look*, 15 of *sound,* and 4 of *seem* (Providence corpus, Demuth, Culbertson & Alter 2006), which may suggest a frequency effect as opposed to a syntactic one.

Table 3 shows the frequency of each Evidence type by age. We see that PVSs are roughly three times more likely to be uttered by a child in a direct evidence scenario than an indirect one, although the difference decreases with age. There were three cases in which it was not possible to determine the evidence source (so $n = 67$).

Within the indirect evidence situations, all except one are based on inference (usually visual), as in (13). There was one indirect PVS with *sound* uttered in a hearsay context.[10]

Table 4 shows the incidence of syntax (raised and unraised) relative to evidence type (direct and indirect). Of the 70 utterances in our child corpora, 54 were unambiguous with respect to their syntax and evidence source.

In a situation of direct evidence children are roughly equally likely to utter a raised or unraised PVS (21 and 20 instances respectively). In stark contrast, PVSs uttered in indirect evidence scenarios were exclusively unraised (14 instances). That is, we found zero instances of a raised PVS used in an indirect evidence-scenario, which is what we would predict if children have the adult

TABLE 4
PVSs and Evidence Source in English-Speaking Children

	Syntax		
Evidence	*Raised*	*Unraised*	*Total*
Direct	21 (52%)	20 (49%)	41
Indirect	0	14 (100%)	14
Total	21	34	55

[10]Morriset 740m30, age 2;11–3;06 (context: mother and child eating crackers):
*MOT: I'm all done.
. . .
*CHI: <it sound like ya> [/] <it sound like ya> [/] <it sounds like ya> [/] it sounds like ya need more.
*MOT: mhm .
*MOT: it sounds like I need more ?
*CHI: yeah .

system, as schematized in Table 1. A chi-square test with Yates's correction revealed that the syntax of PVSs is distributed differently across direct and indirect scenarios: X^2 (1) = 9.531, $p = .002$.

There were 15 utterances that could not be fully coded because either the evidence source could not be determined (3 cases) or because the syntax was unclear. Of the 12 syntactically unclear cases, 11 were direct-evidence situations and hence would be acceptable with either raised or unraised syntax. Examples with null subjects such as *Sounds like she's making up her stories* could be either *She sounds like she's making up her stories* or *It sounds like she's making up her stories.* Other ambiguous cases involve *it* pronouns in both the matrix and embedded subject positions: for example, *It looks like it's deep*. Such examples could be analyzed as raised PVS (in which case both instances of *it* refer to an individual) or an unraised PVS (in which case the matrix *it* ranges over an event or state while the embedded *it* ranges over an individual). Only one of the ambiguous examples was uttered in an indirect-evidence situation: *He says* ***it seems like it's Christmasy weather***. Here again both the higher and lower subjects are *it*, but because this sentence was uttered in an indirect evidence scenario, it would constitute a counterexample to the previous pattern if it were an raised PVS.[11]

In Table 5 we report the breakdown by age of direct evidentials into the two syntactic constructions, raised and unraised PVSs. What is noteworthy is that children use the semantically marked raised construction beginning at age 2, that is, as soon as they start using PVSs generally.

5.4. Adult CHILDES Study

We also looked at adult spontaneous production data in order to see what kind of input children receive with respect to PVSs. For this we coded a single corpus—the Providence corpus (Demuth, Culbertson & Alter 2006)—and found 142 instances of adult PVSs. These data are given in Table 6.

TABLE 5
Number (Percentage) of Direct Raised and Unraised PVSs by Age

	Direct		
Age (years)	*Raised*	*Unraised*	*Total*
2	3 (38%)	5 (62%)	8
3	7 (64%)	3 (30%)	11
4	7 (70%)	3 (30%)	10
5	4 (40%)	6 (60%)	10
6–7	0	3 (100%)	3
Total	21	20	41

[11] Following the suggestion of an anonymous reviewer, we redid the chi-square test on the data in Table 4, including the 13 ambiguous syntax as "unraised direct" evidentials. In this way we stack the deck against the hypothesis by making the distribution across direct and indirect more similar. Even with this manipulation the results remain significant: X^2 (1) = 6.34, $p = .01$. Thus, it is not the exclusion of the ambiguous cases that is driving the significant results in Table 4.

TABLE 6
PVSs and Evidence Source in Adult Input (Providence Corpus; Demuth, Culbertson & Alter 2006)

	Syntax		
Evidence	*Raised*	*Unraised*	*Total*
Direct	45 (46%)	52 (54%)	97
Indirect	0	15 (100%)	15
Total	45	67	112

Of the unambiguous adult utterances, raised and unraised PVSs are roughly evenly distributed across direct evidence scenarios. Importantly, every PVS uttered in an indirect evidence scenario was an unraised PVS. A chi-square test with Yates's correction shows that the syntax of PVSs is distributed differently across direct and indirect scenarios: X^2 (1) = 9.782, $p = .0017$. In short, the adult production data align with the felicity judgment results of our online study (both sets of data support A&T's claims) and are mirrored by the child production data in Table 4.

5.5. Canonical Raising Constructions

Earlier we noted that the raised version of the canonical raising construction, in contrast to the raised version of PVSs, is not sensitive to evidence source. Thus, the utterances in (17) are equally acceptable in situations of direct or indirect evidence.

(17) a. John seems to have won the race.
b. Bill seems to be sick.

Canonical raising therefore provides a natural control for our PVS study.[12] We've seen that children clearly distinguish raised and unraised PVSs in terms of their evidential requirements, as adults do. These findings will be strengthened to the extent that children—like adults—do not show a syntactic effect of evidence source in cases like (17).

Canonical raising is less frequent than PVS constructions in early language. We found 19 relevant examples in our corpora. (There were 8 cases in which it was not possible to determine the evidence source.) These utterances were coded using the same procedures we adopted for PVSs (described in Section 5.2). We coded for syntax—whether raised or unraised—and evidence source (direct vs. indirect). Examples are provided in (18) and (19). The canonical raising construction in (18) is uttered in an indirect evidence situation, one in which the child seems to be inferring about the mother's whereabouts. The example in (19) is an expletive version of a canonical raising construction, uttered in a direct evidence situation.

(18) *CHI: **mom doesn't seem to be going to hills [= store]** .
*FAT: well why not ?
*FAT: are you sure she [//] maybe it's just because it's too far away and she hasn't had time (.) Ross .

[12]Our thanks to Jeff Lidz for suggesting this to us.

TABLE 7
Canonical Raising and Evidence Source in English-Speaking Children

	Syntax		
Evidence	*Raised*	*Unraised*	*Total*
Direct	12 (75%)	1 (33%)	13
Indirect	4 (25%)	2 (66%)	6
Total	16	3	19

(19) *MOT: &hmm ?

*MOT: don't put that in your mouth gahb [: Gabriella]
*CHI: I'm not doing daet [: that] I just .
*MOT: Sorry .
*MOT: I'll take it away
*CHI: I'm not put (i)n my mouth I just do [//]
*CHI: **it seems that they go**
*MOT: I know, but that
*MOT: no, you can't put marbles in your mouth .

We compared the syntactic patterns (raised and unraised) of the different evidence types (direct and indirect) in the 19 unambiguous canonical raising cases. Table 7 provides these results.

As was the case with PVSs (Table 4) we find overall fewer indirect evidence scenarios than direct (13 vs. 6). However, the children seem to be adultlike in their ability to differentiate between raised PVS constructions (which are marked for direct evidence) and raised canonical raising constructions (which are not so marked). The latter are uttered in both direct and indirect evidence scenarios, roughly proportional to the distribution of direct and indirect evidence scenarios in the corpus. A chi-square test to determine if raising is distributed differently across direct and indirect scenarios failed to indicate a significant difference, in contrast to the PVS data in Table 4.[13] However, this failure may be due to the very low number of canonical raising cases observed in the data.

Perception verb constructions with small clause complements also show an evidentiality effect, one that's parallel to what we find in PVSs (Moulton 2011). The sentence in (20a) can be felicitously uttered only if the speaker has direct evidence of John's happiness, that is, if John is the PSOURCE (in contrast to canonical raising constructions like [20b]).

(20) a. John seems happy. *direct*
b. John seem to be happy. *direct or indirect*

[13]We also observe that children are more likely to raise the subject in canonical raising structures than in PVSs, in which there is slightly higher proportion of unraised utterances. This makes sense under the assumption that unraised canonical raising constructions are marked for indirect evidence, while raised canonical raising construction are unmarked, as Grimm (2010) argues, although the data in this corpus do not entirely bear out that hypothesis (see [19]).

We can report, informally, that our corpus study reflected this pattern; the children also use these small clause constructions to differentiate between evidential sources. The data are slim, however. We found five small clause constructions with *seems* (like [20a]) in our corpora, and all five were uttered in direct-evidence scenarios. This shows a parallel with the distribution of raised PVSs, in contrast to the evidentiality-neutral canonical raising constructions reported in Table 7.

5.6. Discussion

What conclusions do we draw from these results? First, and most importantly, as far as production goes, children are able to correlate the syntax of PVSs with the type of evidence they have, as shown in Table 4. Moreover, because the polysemy issue does not arise in English as it does in evidential languages, we can be more confident that we are examining acquisition of the semantics of evidentials rather than tense, aspect, or some other feature of the language.

Table 4 also shows that unraised PVSs are somewhat more frequent overall than raised PVSs. This is also true of the adult input, as shown in Table 6. For both children and adults, roughly 60% of PVSs are unraised. This result may be unsurprising, given that unraised PVSs are semantically unmarked with respect to evidentiality and so are acceptable in both direct- and indirect-evidence situations. However, if we focus on the direct evidentials in Table 4, we see that children use raised PVSs (52%) somewhat more often than unraised ones (48%), and that even the 2-year-olds use the raised construction nearly 40% of the time, as shown in Table 5. The fact that even the youngest children use the semantically marked PVS supports our claim that they have acquired the syntax of evidentiality and are not just relying on a default strategy of some sort. Nor are they simply matching input frequency. As Table 6 shows, in the input data direct evidentials occur slightly more often in the nonraised construction than in the raised one.

Another important finding is that, despite the nonobligatory, nongrammaticized nature of evidentiality in English, the children in our study show no production delay relative to children acquiring evidential languages. They use the raised construction—which is marked for (direct) evidentiality—from age 2 (Table 5). In as much as the linguistic encoding of evidentiality itself entails an understanding of the semantics of evidentiality, and hence the ability to monitor the source of evidence, this finding argues against the neo-Whorfian view that language-specific properties influence the age at which children acquire the conceptual understanding of evidence source (and hence the semantics of evidentiality). In other words, early attention to evidence source does not depend on having a language with obligatory, morphologically encoded evidentiality. Indeed, our results are in line with claims by Papafragou et al. (2007), Gleitman & Papafragou (2005), and Koring & De Mulder (2011), who argue that the conceptual framework for marking linguistic evidentiality is in place at a relatively young age and not subject to much language-specific variation.[14]

[14]In this article we report on production data, which does not speak directly to whether the children have knowledge of other minds in the way that comprehension data do. However, if the linguistic marking of evidentiality—whether syntactic or morphological—is acquired on the basis of input, as seems reasonable, then children must understand the perspective of the people providing the input. In this sense, then, production data do provide indirect evidence bearing on theory of mind issues.

Our data also show that children are sensitive to the distinction between PVSs (and small clause complements), in which the raised version is marked for direct evidentiality, and canonical raising structures, which are neutral with respect to evidentiality. The children have not simply made an across-the-board association between the higher subject position and direct evidence.

A final result concerns what we call "the cognitive primacy of direct evidentiality," which is the idea that children acquire direct evidentials earlier because reporting on direct perception is "simpler" in some intuitive sense than reports based on either inference or hearsay (Ozturk & Papafragou 2008; Villiers et al. 2009; Courtney 2008). Table 3 shows that the children in our study do indeed produce PVSs in direct-evidence situations before using them in indirect situations. This is similar to what we find in children acquiring morphologically encoded evidentials in languages like Korean and Turkish. In these languages, children use the morphological marker for direct evidence earlier than the marker for indirect evidence. In our data, with only one possible exception (from a child whose age is not clearly specified), PVSs occur in the context of direct evidence at around 2;00 and first appear in contexts of indirect evidence at age 3;00.

Thus, the time line of development in English-speaking children is roughly parallel to that of children acquiring evidential languages.

Similarly, we found only one instance of a PVS used in a situation of hearsay evidence. This is consistent with findings reported for Quechua (Courtney 2008) and Turkish (Aksu-Koç, Ögel-Balaban & Alp 2009; Aksu-Koç & Slobin 1986). Courtney reports that the Quechua children acquired the direct evidential marker *–m*i and the inferential marker *–cha* by age 3, while the reportative maker *–si* was produced very infrequently and only by children aged 4;02 and older. Similarly, for Turkish, Aksu-Koç, Ögel-Balaban & Alp (2009) observe that in elicited production the inferential use of the indirect-evidence morpheme *–mIş* increased from 66% at age 3 to 95% at age 6, while the reportative use of *-(I)mIş* went from 40% at ages 3–4 to 75–80% at ages 5–6.[15]

Thus, our results are consistent with the idea that direct evidentials are cognitively simpler in some sense, but it must also be noted that in terms of overall frequency, in the English data direct-evidence situations vastly outnumber indirect-evidence situations for both children and adults (Tables 4 and 6). So the earlier appearance of direct evidentials could be an effect of input frequency. One thing seems certain, however, which is that direct evidentials in English are not acquired earlier because they are syntactically simpler, involving (as they often do) raising and/or copying operations.

6. CONCLUDING REMARKS

In this study we investigated the acquisition of evidentiality in English "perception verb similatives" (PVSs). Much of the previous work on the acquisition of evidentiality has focused

[15]Koring & De Mulder (2011) and Koring (2012) report that Dutch children acquire the reportative evidential verb *schijnen* ('seem/is said') before the inferential evidential verb *ljkt me* ('seems to me/I infer'), in contrast to the order observed in Quechua and Turkish. A possible explanation for this difference is that the Dutch experiment required inferences based on mental reasoning (e.g., The cookie is missing. Ernie likes cookies. Ernie must have eaten the cookie), while the Turkish and Quechua uses of the inferential evidential were based on perceptual evidence (e.g., The cookie is missing. There are cookie crumbs in Ernie's bed. Ernie ate the cookie). In our study, as in the Turkish and Quechua studies, the indirect-evidence situations were based on perceptual evidence (where we could clearly determine the evidential source).

on evidential languages, that is, languages with obligatory, morphologically marked evidentiality, such as Turkish and Korean. Our goal in looking at English PVSs was to explore the development of syntactically encoded evidentiality and to compare this to the target language, as well as development in evidential languages. In particular we were interested in addressing what we dubbed the "polysemy" problem, namely, the fact that in most evidential languages the evidential morpheme also marks tense, aspect, or some other semantic feature. By comparing English to canonical evidential languages, we were able to address this issue, and also explore the extent to which language-specific grammatical properties influence the course of development of particular semantic features. Does the polysemous nature of evidential markers in evidential languages significantly affect their rate of development? Apparently not, at least as far as our production data suggest. Is evidentiality easier to acquire when it's morphologically encoded rather than syntactically derived? Our findings thus far say that it is not.

Overall, the results of our study show that as far as production is concerned, English-speaking children acquire the ability to correlate the syntax of PVSs with the type of evidence they have at a strikingly early age. This suggests that young children are able to (implicitly) monitor evidential source and that this cognitive ability does not depend on having a language with obligatory, morphologically encoded evidentiality. Another important finding is that the specific time line of development in English is not notably different from children acquiring languages with morphologically encoded evidentiality. This is true both with respect to the ordering of direct and indirect evidence sources, but also of the different kinds of indirect evidence, (perception-based) inference versus hearsay. The commonalities across typologically distinct languages argue against a relativistic Neo-Whorfian view that language-specific morphological or syntactic features determine the course of conceptual or semantic development.

Perhaps some final methodological points are in order. Our results are based on spontaneous production data, and although the patterns we find are robust and quite similar to the production data from children acquiring evidential languages, the actual number of PVSs is small. Additionally, it has been observed that in evidential languages such as Korean and Turkish, children's performance in experimental tasks lags behind their naturalistic production by about a year or so (e.g., Aksu-Koç 1988; Papafragou et al. 2007) in both elicited production and comprehension, but is especially pronounced in comprehension. Thus, in order to better inform the studies reported here, we are currently testing English-speaking 4- to 6-year-olds on their understanding of the evidential constraints of PVSs in a felicity judgment task. Having said that, we think it is important to distinguish children's ability to make explicit judgments about evidential sources in nonlinguistic or meta-linguistic tasks from the implicit knowledge of source that they (evidently) deploy in (naturalistic) language production, just as we draw a distinction between children's (or adults') ability to provide grammatical judgments from the implicit grammatical knowledge accessed in normal language use.

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APPENDIX

Examples of stimuli by scenario type (Online study)

1. Direct Visual

Fola is babysitting little Timmy when she notices spots on his skin. When Timmy's mom picks up him up, Fola says:

{It/Timmy} {seems/looks/sounds} like {Timmy/he} has a rash.

2. Indirect Visual

Fola's son Milo is grounded and not allowed to leave his room. When Fola goes upstairs to check on him, she finds his room empty and the window wide open, so she says:

{It/Milo} {seems/looks/sounds} like {Milo/he} snuck out of the house.

3. Direct Auditory

Fola tried out for a role in Macbeth and is now jealous because she is only the understudy for Carol. From behind the curtain, Fola hears Carol coughing and sneezing. Excited, Fola says:

{It/Carol}{seems/looks/sounds} like {Carol/she} is sick.

4. Indirect Auditory

Fola has a next door neighbor, Mrs. Noisy, who often travels on the weekend without turning off her loud alarm clock. This Saturday, Fola wakes up to Mrs. Noisy's alarm ring for 10 minutes straight, and she says:

{It/Mrs. Noisy} {seems/looks/sounds} {like} {Mrs. Noisy/she} is on vacation.

5. Hearsay

Fola is attending the graduation of her English class. She hears a rumor that the mayor is going to attend, and so she says:

{It/The mayor} {seems/looks/sounds} like {The mayor/he} may come to the reunion.