1

Knowing How We Know: Evidentiality and Cognitive Development

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Abstract

Evidentials are grammatical elements such as affixes and particles indicating the source of knowledge. We provide an overview of this grammatical category and consider three research domains to which developmental studies on evidentiality contribute: the acquisition of linguistic means to characterize knowledge, the conceptual understanding of knowledge sources, and the evaluation of others' testimony. We also consider the study of evidentiality in relation to the Sapir-Whorf hypothesis about the influence of language on thought. © Wiley Periodicals, Inc.

The source can be decisive for the credibility of information. Courts disallow hearsay, academics sprinkle articles with citations, and everyday conversations often veer into, "How do you know this?" or "Were you there?" Some languages even have grammatical elements such as affixes and particles that identify the source of the information being communicated, for example, whether it is obtained by perception, inference, or hearsay. The category to which these markers belong is called *evidentiality* (Aikhenvald, 2004).

Evidentiality is a feature of about one-quarter of languages in the world, (Aikhenvald, 2004). The set includes languages from all continents and most language families, for example, the Indo-European, Turkic, Sino-Tibetan, Arawakan, and Quechuan families. Despite its prevalence, developmental psychologists have limited awareness of evidentiality, perhaps due to the absence of evidentials in Western European languages. This is now beginning to change, as indicated by the growing number of developmental studies on evidentiality in the mainstream press (Aksu-Koç, 1988; Fitneva, 2008; Matsui, Yamamoto, & McCagg, 2006; Papafragou, Li, Choi, & Han, 2007). Such studies have both practical and theoretical importance for research on source monitoring, theory of mind, narrative skills, and children's trust and knowledge development. This volume introduces readers to the diversity of evidential systems around the globe and reveals some of those linkages.

In this introductory chapter, we provide an overview of evidentiality. We also consider three key research domains to which the developmental study of evidentiality has been most fruitful contributions: acquisition of linguistic means to characterize knowledge, conceptual understanding of knowledge sources, and the evaluation of others' testimony. Finally, we consider the research on evidentials in relation to the Sapir-Whorf hypothesis about the influence of language on thought.

What Is Evidentiality?

Every known language has means to indicate various sources of knowledge. In some languages, for example, English and German, the source of knowledge can only be encoded lexically with expressions such as "I saw" (as in examples 1 to 3). In other languages, such as Turkish and Quechua, the source of knowledge can also be expressed by grammaticalized morphology, including verbal affixes and particles (as in examples 4 to 6):

English
1. *Apparently* John wrote a letter.
2. *Reportedly* John wrote a letter.
3. *I saw* John write a letter.

Turkish
4. John mektup yaz-*DI*.
   John wrote a letter; I saw that.

5. John mektup yaz-*MIŞ*
   John wrote a letter; I have indirect evidence.
6. John mektup yaz-mis-*TIR*.
   John wrote a letter; I've concluded this on the basis of all my knowledge.

Three features of evidentiality should be highlighted. First, evidentials encode more abstract source information than lexical expressions such as "I saw," and in contrast to the optional use of lexical alternatives, the use of evidentials is required in certain grammatical or discourse contexts. Second, there is substantial variability in the evidential systems of different languages. Finally, evidentiality is an autonomous semantic category.

Source Marking: Pervasive and Abstract. Pervasiveness and abstractness are two important features of evidentials. In English, spontaneous and direct marking of the source of the reported information, for example, with expressions such as *I saw* and *reportedly*, is somewhat rare. However, in languages with evidentials, the use of evidentials and thereby the indication of the source of knowledge, is just as pervasive and natural as the grammatical marking of number (singular versus plural) and time (past versus future tense) is for English speakers. In languages such as Bulgarian and Turkish, evidentials are obligatory in the sense that a subset of sentences in the language *has* to contain an evidential. For example, every third-person sentence about a past event in Bulgarian contains an evidential that Bulgarian speakers consciously or unconsciously have to select. In other languages, the use of evidentials is restricted to certain linguistic genres. In Japanese, for instance, evidential sentence-ending particles, such as the hearsay particle *tte,* are used only in conversational discourse. Nevertheless, Japanese evidential particles are de facto part of most spoken sentences. Thus, not every sentence in a language with an evidential system contains an evidential but evidentials are found in a substantial number of the sentences in these languages.

Evidentials also represent source information abstractly, within a closed system of contrasts. According to Aikhenvald (2004), existing evidential systems typically distinguish one or more of the following six types of information sources: vision, nonvisual sense (for example, for information acquired through hearing, smell, or touch), inference, assumption (for example, for information based on general knowledge), hearsay, and quotation (which, unlike hearsay, makes an overt reference to a source). Note that inferences, for example, could be inductive or deductive, and evidentials rarely make this important distinction. In addition, in leaner evidential systems, sensory sources may not be distinguished. Thus, in acquiring evidentials, children may have to acquire more general (superordinate) concepts than in acquiring lexical source expressions. Note also that evidentials include a small subset of the conceivable and culturally salient information sources, a restriction not applicable to lexical source expressions (Speas, 2004). For example, existing evidential categories do not refer to divine

revelation, advice of the elderly, or gut feeling. Clearly all of these and many other sources can be expressed lexically.

Diversity. Evidential systems vary in the number and type of source distinctions they make. The simplest evidential systems consist of only two categories, while the richest ones distinguish five or more. Examples of the former are Japanese and Sissala, which distinguish hearsay from everything else. Languages that have richer evidential contrasts include Tariana, spoken in a part of northwest Amazonia, in which explicit distinction is made among direct (or visual), nonvisual sensory, inferred, assumed, and hearsay. Turkish, Bulgarian, and Tibetan, the three languages discussed in this volume besides Japanese, fall in between these extremes. This diversity of evidential systems is important to note in view of potential questions about universal and language-specific aspects of the course of acquisition of evidentials and the relation of evidentiality to cognitive development.

Autonomy. Evidentials are just one of the linguistic tools speakers have to characterize the knowledge expressed in their utterances. Other tools include lexical or grammatical expressions whose primary meaning is the expression of speaker certainty and of the novelty of the information in relation to the speaker's other knowledge. The grammatical systems corresponding to these notions are epistemic modality and mirativity (De Haan, 1999; DeLancey, 2001). Examples of epistemic modals include English auxiliary verbs such as *must* and *may* and adverbs such as *certainly* and *maybe*. Miratives are found in Hare, Tibetan, and Western Apache. They are used, for example, in the equivalents of the English exclamatory sentence, for example, "Your daughter plays the piano well!" to express the speaker's surprise or that the reported information is novel to him or her.

Evidentiality, epistemic modality, and mirativity are closely related. We often infer the speaker's degree of certainty from his or her evidence, and vice versa. For example, if you hear someone claim that something *must be* the case, you may infer that he has strong evidence to support the claim. Conversely, if someone says that she witnessed an event directly, you may infer that she is certain about the truthfulness of the report. As a further illustration, someone who is unsure about a piece of information may have just come across it. Conversely, someone who is reporting something novel is likely not committed to its truth. These relations are important to consider in studies examining linguistic and cognitive development (see Chapter Three).

Nevertheless, the differences between the categories are important (De Haan, 1999; DeLancey, 2001). The difference between evidentiality and epistemic modality is in particular worth emphasizing because some earlier treatments classified evidentiality as a type of epistemic modality rather than a category of its own (Palmer, 1986). There are some formal differences between these categories: for example, negating a statement with an evidential negates the assertion but not its evidential basis, while negating

a statement with an epistemic modal can negate either the assertion or the modal (see Chapter Three). However, equally important are the pragmatic implications of the semantic differences (Fitneva, 2001). The speaker's certainty represents basically the speaker's *judgment* about the probability or necessity of the reported event. This judgment may be based on the type of evidence she has for her assertion but also on other considerations. In contrast, evidentials denote solely the type of evidence the speaker has. This information may justify a judgment by the speaker as well as the hearer about the probability of the assertion being true but it has no direct link to its truth or validity (see also Aikhenvald, 2004). Chapters Three and Five discuss how the two categories are different, how they serve utterance interpretation, and how they may be related developmentally.

The Interface Between Evidentiality and Language and Cognitive Development

This volume illustrates how children's understanding of evidentiality relates to a variety of concepts that have fascinated developmental researchers. Specifically, how and when children start producing, comprehending, and using knowledge-qualifying expressions such as evidentials is related to understanding theory-of-mind development. Here, we provide a brief overview of the directions in which the new research on evidentiality is poised to make valuable contribution: the acquisition of tools to characterize knowledge, the conceptual understanding of the sources of knowledge and source monitoring, and the assessment of communicated information.

Acquisition of Linguistic Expressions for Characterizing Knowledge. Research on English-speaking children's acquisition of expressions of speaker certainty provides a useful comparative ground to research on the acquisition of evidential expressions. Besides epistemic modals, expressions of certainty in English include mental verbs such as *I think* and *I know* and adverbials such as *probably* and *maybe*. The expression of speaker certainty is present relatively early in language development. Shatz, Wellman, and Silber (1983) observed that English-speaking children start using *think* and *know* to modulate assertion as early as age two years, eight months. There seems to be a consensus that children begin to use *think* to express uncertainty before they reach the age of three. Modal adverbs also appear in the speech of English-speaking children early, at around age two (O'Neill & Atance, 2000).

Bartsch and Wellman's (1995) examination of English child-language corpora revealed some, but rare, examples of children marking the source of knowledge between the ages of three and four. As mentioned earlier, lexical source expressions are relatively rare in English. As evidentials are common, examining evidential languages allows us to assess whether the rarity of source expressions in English child language is due to their frequency in

the input or has conceptual bases. The existing research shows that evidentials emerge quite early in children's speech and thus supports the former possibility. For example, Choi (1995) investigated the acquisition of Korean sentence-final suffixes. Of particular interest here are the evidential suffixes –*ta* (direct evidence/new information) and –*tay* (indirect evidence/hearsay). Choi found that –*ta* was acquired before age two and –*tay* between two and two and a half. She suggested that the meanings of these evidentials are easy for children to grasp because they are deeply situated in conversation; occur in the sentence-final position, which is perceptually salient; and constitute an obligatory category. Similarly early production of evidentials has been observed also in Turkish (Aksu-Koç, 1988) and Japanese (Matsui et al., 2006). In both Korean and Japanese, strong correlations have been observed between children's production of evidentials and their frequency in child-directed speech.

It is important to ask how deep children's understanding of the markers is. The answer provided by experimental investigations is that naturalistic production data have to be interpreted with caution. In one comprehension task, Turkish-speaking children aged three to six years, four months had to identify the likely speaker for each of several utterances (Aksu-Koç, 1988). In the procedure, two speakers are introduced to the children: one who had witnessed the event in question and one who had just come in and could only comment on what had happened by making an inference from the observable situation. Half of the utterances were inflected with –*mIş* (past/indirect experience) and the other half with –*dI* (past/direct experience). The results revealed that children correctly identified the speaker for –*dI*-inflected utterances by age three. However, they did so for –*mlş*-inflected utterances only at around age five, much later than when they start producing this marker at around age two. A more recent study on Korean also confirms the lag between the production and comprehension of evidentials (Papafragou et al., 2007).

In sum, studies of evidentiality so far contribute to research on children's production of knowledge-qualifying expressions by suggesting that source, just like certainty expressions, can appear early in children's speech and by strengthening the case for input frequency as a determining factor of the time line on which such expressions appear in children's speech. Furthermore, current findings indicate that children's comprehension of evidentials lags a couple of years after the onset of their production. In addition, explicit, or metalinguistic, awareness of evidentials for indirect evidence and hearsay develops later (not until about five years of age) than awareness of evidentials for direct evidence. Chapters Two, Four, and Five extend this research in an attempt to explain why secure understanding of evidentials is achieved later in childhood. The chapters raise the possibility that grammaticalized source information is inherently more abstract than source information in lexical and nonlinguistic counterparts, and therefore the acquisition and evaluation of evidentials involves more complex reasoning. It is suggested that

such reasoning is likely to require sophisticated metarepresentational ability, as well as robust metalinguistic awareness, both of which develop and consolidate during the early school years.

Children's Conceptual Understanding of Knowledge Sources. Perception, communication, and inference provide the foundation of our knowledge. Research on theory of mind and memory has focused on whether children understand the circumstances under which these sources give rise to knowledge and on whether children encode the sources of their knowledge.

Children appear to understand seeing as a source of knowledge between three and four years of age (Pillow, 1989; Pratt & Bryant, 1990). Specifically, they begin to understand the difference between an informative and uninformative visual access—for example, that one cannot identify an object from seeing a part that allows multiple interpretations. Understanding of the modality-specific aspect of knowledge, for example, that knowledge of color is obtained through vision and of temperature through feeling (Perner, 1991), is generally demonstrated only at age four (O'Neill & Chong, 2001). It takes a couple of years more for children to understand that inference is also a legitimate source of knowledge (Sodian & Wimmer, 1987). Further understanding about inference develops during middle childhood: at around age nine, children come to grasp that deduction is more reliable than guessing (Pillow, Hill, Boyce, & Stein, 2000).

Three and four year olds also have difficulty correctly indicating how they have come to know what they report (Gopnik & Graf, 1988; O'Neill & Chong 2001). O'Neill and Gopnik (1991), for example, tested whether preschoolers could identify an object that was hidden in a tunnel by touching it, seeing it, or being told what the object was. When later asked how they came to know what was inside the tunnel, three year olds generally failed to explain how they knew, despite being able to identify the object itself.

Research into these issues could be extended by looking into evidentiality, although the questions have to be recast. Instead of asking whether children understand how different sources give rise to knowledge, here we can ask how children represent the origins of information encoded in language. Instead of asking whether children encode the sources of their knowledge, we can ask whether they encode and recognize the source information present in sentences. Do they engage in linguistic source monitoring in addition to nonlinguistic source monitoring? Chapters Two and Four present some initial insights into the development of children's beliefs about and memory of source information in language. These beliefs can be seen as constituting their theory of evidentiality.

Assessing the Reliability of Information. While much of our knowledge is constructed on the basis of the testimony of others, information provided by others is not always truthful. Thus, the ability to accurately assess the reliability of testimony is one of the most significant aspects of our social

intelligence. An important enterprise in this domain is to catalogue and map the changes in the set of cues children use to assess the reliability of testimony.

The cues revealed so far that influence children's learning include the speaker's certainty, past reliability, and age, as well as nonverbal source-of-knowledge information. For example, Moore, Bryant, and Furrow (1989) tested three- to eight-year-old children using a task, now widely known as the hidden object task, to tap children's comprehension of certainty expressions. An object was hidden in one of two boxes, and children received verbal clues from two different puppets about where the object was hidden. The descriptions of the location were prefixed by *I know* or by *I think* as in, "I know it's in the red box" or "I think it's in the blue box." By age four, children were capable of differentiating the degree of speaker certainty associated with the two verbs. Three and four year olds are also likely to mistrust error-prone informants, for example, those who label familiar objects inaccurately (Koenig, Clement, & Harris, 2004). Furthermore, preschoolers understand that knowledge increases with age and so typically trust adult informants more than they do peers, but they also have the flexibility to choose to trust a child more than an adult when the child has been a previously reliable informant and the adult an unreliable informant (Jaswal & Neeley, 2006). Around age four, children also attend to the source of an informant's knowledge: whether he has looked at or touched the object he is talking about, in deciding whether to trust the information he provides (Robinson & Whitcombe, 2003).

Recent research adds evidentials to the set of cues children use in deciding what to believe (Fitneva, 2008; Matsui, Miura, & McCagg, 2006; Papafragou et al., 2007). Interestingly, the findings indicate that children's ability to use evidentials to assess the reliability of communicated information develops later, during the early school years. For example, both four- and six-year-old Japanese children were better at assessing the reliability of testimony on the basis of nonlinguistic source information rather than of linguistic equivalents (Matsui, Miura, et al., 2006). Furthermore, contextual flexibility in children's evaluation of testimony, demonstrated, for example, by Jaswal and Neely (2006) with regard to age, may also be found in children's assessment of testimony based on evidentials. Chapter Four of this volume argues that context plays a crucial role in determining the hearer's trust in testimony marked with evidentials.

Children's formation of beliefs based on others' testimony has particular importance in forensic contexts (Roberts, 2002). In court, however, children are expected to report firsthand knowledge, and forensically motivated research uses the term *suggestibility* rather than *learning* to describe the formation of beliefs based on testimony. Central to this research is how the language and behavior of speakers influence children's suggestibility, and in Chapter Six, Aydin and Ceci take the step of examining the relation between evidentiality and suggestibility.

In sum, research on evidentiality can substantially contribute to our understanding of the development of the linguistic marking and conceptual understanding of sources of knowledge, as well as children's trust in testimony. These streams of research are clearly related, but much further research is needed to elucidate the links among them. For example, conceptual understanding of the representation of source information in language is arguably related to children's reliability assessments of sentences with evidentials. It is intriguing, though, that children are able to use evidentials to assess the reliability of information before developing conceptual understanding of the particles. It is possible that in the former, children engage in an online, implicit processing of evidentials, while the latter requires more explicit processing (Matsui, Miura, et al., 2006). The relation between implicit and explicit processing, on the one hand, and between linguistic and nonlinguistic source information, on the other, may provide a fertile ground for further investigations of children's source monitoring and the relation between the acquisition of linguistic and nonlinguistic concepts.

Implications for the Sapir-Whorf Hypothesis?

The Sapir-Whorf hypothesis fascinates scholars and laics alike: Does the language we speak influence how we think? Evidentiality provides a new and exciting arena for examining this hypothesis. Existing research suggests that the understanding of nonlinguistic information sources develops earlier than the comprehension of evidentials, which indicates the possibility that the comprehension of evidentials maps onto an existing conceptual framework, not vice versa (Papafragou et al., 2007). Yet research begins to suggest strong correlations between the semantic and pragmatic understanding of evidentials and several aspects of cognition, such as source memory and inferential reasoning (see Chapters Two, Three, and Six). For example, in Chapter Two, Aksu-Koç, Ögel-Balaban, and Alp demonstrate that Turkish-speaking children are better able to retain nonlinguistic source information than are same-age English-speaking children. In Chapter Six, Aydın and Ceci indicate that Turkish-speaking children may also be less susceptible to the influence of conflicting testimony in court. Drawing on these correlational data, one can envisage the possibility that the thinking of a person who habitually uses and hears evidentials differs in some important ways from the thinking of a person who rarely uses or hears source information in language.

It is early to draw broad conclusions about the relationship between language and thought in respect to evidentiality. First, there is no direct evidence that children who grow up hearing and using evidentials daily remember, use more reliably, or in some other way show earlier or higher sensitivity to source information than children whose mother tongue does not contain evidentials. Noncorrelational research designs are necessary to obtain such evidence (Fitneva & Aydın, in press). Second, as we pointed out, the differences between evidential systems can be substantial. Thus,

careful investigation of the replicability of findings across languages will be needed to uncover if there are universally valid effects of evidentiality. Despite these cautionary notes, we hope that the emerging evidence for a connection between the acquisition of evidentiality and aspects of cognition in children will stimulate further research that advances our understanding of the relation between language and thought.

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