Uralic perspectives on experimental evidence for evidentials: Early interpretation of the Estonian evidential morpheme*

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The article gives an overview on evidentiality in the Uralic languages. It then focuses on a behavioral experiment testing the processing of Estonian evidentials by 4- and 6-year-old children. The predominantly agglutinative Estonian, a Uralic language spoken in Europe, has an evidential morpheme on verbs (typical of various non-European languages), combining evidentiality and epistemic modality (typical in various European languages). We examine the effect of the Estonian evidential on preschoolers' exploratory play, contrasting it with the effect of unmarked indicative sentences. Initially, the novel morpheme causes increased play, but the effect disappears as the acquisition of the indirect evidential meaning progresses. Novel grammar raises expectations of communicative intent in young children and makes them try out (or generalize over) statements.

Keywords: acquisition, agglutination, behavioral experiment, child-directed speech, epistemic modality

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1. Introduction

Evidentiality is a grammatical category that expresses the source of information. Current literature on evidentiality features two main approaches to evidential meaning that are relevant for the acquisition data discussed in this article. Some approaches separate epistemic modality and evidentiality (Aikhenvald 2004: 3). Previous approaches that did not have access to the wealth of evidentials in the world's languages regard the two categories as overlapping or subsumed under a wider category of epistemic modality (Palmer 1986: 10–11; Kiefer 2000). In the analysis of de Haan (2005), there is a logical connection between the two categories, because evidentiality asserts evidence, while epistemic modality evaluates evidence, but the categories can still be separated. It seems that the combination of evidential and epistemic meanings is a phenomenon that is widely spread in the languages of the European region, while in many other languages, the categories are expressed with separate dedicated forms.

European languages, at least the ones with well-studied evidential systems, tend to belong to the same language family. Uralic languages are interesting in the sense that they are scattered over a vast discontinuous area spanning across northern Europe and Asia. Estonian is a Finnic Uralic language that can help understand the relationships between the two categories – or the links between the various aspects of the category. It has a special position among its areal neighbors, that is, the Indo-European languages of Europe, and its genealogical relatives, which are Uralic. Especially, it is interesting to study the formation of the category that shares elements of form and meaning from these two sources of influence.

The Estonian evidential (*-vat*) is Uralic-like in the sense that it has evolved on the basis of a case-marked non-finite, and it is European-like, since its use in marking the source of information is optional and dependent on various pragmatic conditions. The morpheme encodes the source of the speaker's knowledge (hearsay), but also the aspects of incompleteness of evidence and the degree of strength of evidence. In the examples in (1), the unmarked (1b) does not specify the source of information, whereas the

morphologically marked (1a) specifies a source different from the speaker as the source of the information.[1]

(1) a. *Mari* *tule-va**t**.*
M[NOM] come-EV
'Allegedly/reportedly, Mary will come.'

b. *Mari* *tule-b.*
M[NOM] come-3SG
'Mary will come.'

The unmarked sentence has an implicature of full evidence as opposed to the partial or insufficient evidence conveyed by the marked sentence (1a). In its epistemic nature, the Estonian partitive evidential is not different from the expression of evidentiality and epistemic modality in many European languages, which often combine the two meanings. As an example of combining these meanings, consider the Dutch modal verb *moeten* 'must' and the modal verb form *zou*(*den*) to be understood as 'reportedly' as in (2a-b).

(2) a. *De film moet uitstekend zijn.*
'The film is said to be excellent.'

b. *Bij de brand zouden alle bewoners zijn omgekomen.*
'All inhabitants are said to have been perished in the fire.'
(de Haan 2000: 74)

c. *Hij zei van niet*.
'He said that it is not the case'
(Verkuyl 1972, Coppen and Foolen 2012)

[1] The glossing follows the Leipzig Glossing Rules. Abbreviations: AUD - auditive, CNG - connegative, COMP - comparative, DAINF - d-stem non-finite form (the 'da-infinitive'), DEF - definite, DUB - dubitative, EV - evidential, FUT - future, GEN - genitive, IMP - imperative, INE - inessive, IND - indicative, INDIR - indirect, INTERJ - interjection, MAINF - m-stem illative non-finite form, the supine (the 'ma-infinitive'), MOD - modal, NARR - narrative, NEG - negative, NOM - nominative, PPF - participle of the perfect, PROH - prohibitive, PST - past tense, REP - reportative, SG - singular

Morphosyntactically, the Estonian partitive based origin of the form is similar to some European languages, such as the Dutch *van*-construction in (2c), where it is the preposition *van* that introduces a quoted statement (see Coppen and Foolen 2012). The Estonian evidential form is a partitive form of a participle, and the partitive case and the preposition "van" are to some extent also functional equivalents, expressing "some(thing) of the kind X". This situation is different from Uralic languages, where it is not typical that modality and evidentiality are combined (see Section 2 for evidentiality in the Uralic languages).

Accounting for the overlap of epistemic and evidential meanings is still a major challenge in the literature on evidentiality, and the acquisition of the intertwined meanings has not been studied. Moreover, it is not clear how optional and infrequent morphology is interpreted in its acquisition. Independent studies show that morphologically rich languages or at least languages that have multiple grammatical cues for categories enhance early acquisition (Culbertson et al. 2010, Xanthos 2011). Broadly speaking, we could expect children who acquire languages with rich morphology to be sensitive for bound morphemes, because successful guessing what a bound morpheme is used for leads to further successful guessing about other bound morphemes and, therefore, potentially leads to faster increase of coherent structures in language. However, we do not know well how this effect is expressed, and the methods require often laboratory settings that are usually not freely available in the areas where languages with evidentials are spoken by many young children.

The literature dealing with evidentiality in Estonian is by now quite substantial (see for example Kehayov 2008, Sepper 2005, Tamm 2009, a.o., and Tamm 2012 for further references), but the research on the rest of the Uralic rich evidential systems as well as the the acquisition of evidentiality in Estonian is in its early stages. The acquisition of this category from its beginnings is especially challenging, because children have access to a concrete unknown form *-vat* in the input, and additionally, they need to figure out the two broad and interdependent semantic categories related to the form, the evidential and the epistemic modal one. In other words, while Estonian children may have an advantage of a clear dedicated grammatical form while acquiring the

composite category in the early stages, it is not clear how they start interpreting the form and its special nature of combining modal and evidential meanings.

Studies on the acquisition of evidentiality concentrate on languages where evidentiality is obligatory, such as Turkish, and the forms occur rather frequently in the child-directed speech in the respective languages (Aksu-Koç 1988, Papafragou et al. 2007). Existing research has established that evidential markers are rather infrequent in Estonian (Tamm et al. 2013). They are not particularly frequent in conversations between caregivers and children because of their contextual restrictions. Therefore, we would not expect Estonian children to master the evidential early, before age 7. Although we might expect the epistemic meaning to be less sophisticated than the evidential meaning, which involves reasoning about other sources and others' minds, Tamm et al. (2015) show that the evidential meaning starts to be acquired at age 6 and establishes itself firmly by the age of 9, whereas the epistemic modal meaning lags somewhat behind, and even nine-year-olds do not have the full mastery of it. However, in a forced choice task, children start to guess the epistemic meaning early already.

What would be a child's reaction to an infrequent and semantically and situationally rather opaque evidential morpheme? What is the child's first guess or hypothesis, and how does it change in the course of acquisition of the correct conceptual space of the morpheme in the language? This paper presents the results of an experiment targeting the development in interpreting the evidential marker *-vat* in Estonian. The experiment was carried out with monolingual Estonian-speaking children aged 4 and 6 years in various locations in Estonia in 2013. Results were analysed in two age groups, to determine whether there are developmental differences in understanding the meaning of the Estonian *-vat* morpheme.

We detail the characteristics of this morpheme in comparison to other Uralic versus and European languages in the following two sections, 2 and 3. Section 2 gives an overview about evidentiality in the Uralic languages. The problems of teasing apart evidentiality and epistemic modality in Estonian are sketched in Section 3. The acquisition of evidentiality is introduced in Section 4, and the details of what is known about the acquisition of Estonian follow in Section 5. We turn to the methods of the experiment in Section 6. Section 7 features the results of it. The discussion of the results

in a wider perspective of the morphological expression of optional indirect evidentiality can be found in Section 8, and Section 9 is a conclusion.

2. Evidentiality in Uralic languages

As opposed to the well-known Uralic languages, Hungarian and Finnish, which lack a dedicated grammatical evidential, Estonian as well as almost all Uralic languages of the ex-Soviet Union do have grammaticalized or fairly well conventionalized evidential systems. Figure 1 presents a traditionally assumed depiction of the Uralic languages with some examples.

Uralic
- Samoyedic *[Nenets, Enets, Nganasan, Selkup]*
- Finno-Ugric
  - Ugric
    - Ob-Ugric *[Khanty, Mansi]*
    - [Hungarian]
  - Finno-Permic
    - Permic *[Udmurt, Komi, Komi Permyak*]
    - Finno-Volgaic
      - Volgaic *[Mari, Erzya]*
      - Finno-Saamic
        - Saamic *[various Saami languages]*
        - Finnic
          - Northern
          - *[Finnish, Veps, Karelian]*
          - Southern
          - *[Estonian, Livonian]*

Figure 1. The structure of the Uralic family

Four groups can be distinguished in the Uralic languages. The distribution seems to be geographically rather than genealogically determined along the East-West axis. The two outer opposites are the European Finno-Ugric languages (the ones that did not belong to the territory of Soviet Union) versus the Samoyedic languages. The Samoyedic languages have a rich system of evidentials, including direct as well as indirect evidentials. The European languages, such as Hungarian, Finnish, or the Saamic languages, do not have a grammaticalized evidential. However, they may have evidential adverbs, modal morphemes with evidential uses, or various forms that express epistemic modal as well as evidential meanings (Kugler 2014 refers to the Hungarian ones as "epistential" elements). Erzya belongs to this group as well. Although there is no dedicated grammatical form for evidentiality in Hungarian, Finnish, Saamic, and Erzya, these languages have constructions such as "I heard that" or "they say" to express evidentiality. Interestingly, these tend to be the Uralic languages that have a more elaborate marking of definiteness distinctions within the DPs/NPs, which may point to some complementarity of functions within this area of categories.

Typical Uralic languages, however, have indirect evidential strategies. In the case of Permic languages, this is probably due to contact with Turkic languages. In the case of Finnic languages, indirect evidentiality can be at least partly attributed to contacts with the Baltic (Indo-European) languages. The current knowledge about Uralic evidentials is presented in Table 1.

Table 1. Uralic evidentials

no evidentials	evidential strategies	indirect evidentials	direct and indirect evidentials
Hungarian, Erzya, Finnish, Saamic	Mari, Udmurt, Komi, Permyak, Khanty, Mansi	Estonian, South-Estonian, Livonian, Votic	Nenets, Enets, Nganasan, Selkup
Western, dispersed	Middle region, contact languages	Western, contact languages	North-Eastern, dispersed

There are thus four main types of evidentiality expression systems:

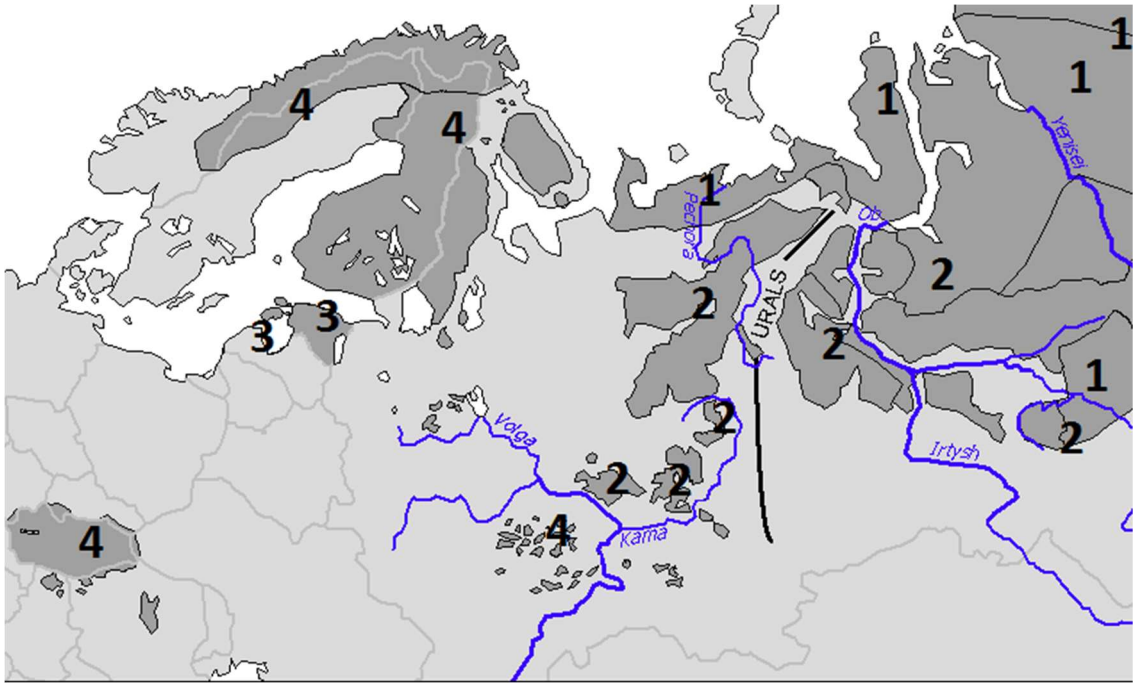
1) direct and indirect evidentials (the Samoyedic languages).

2) evidential strategies (the Permic languages, the Ob-Ugric languages)

3) indirect evidentials and evidential strategies (Southern Baltic Finnic)

4) no evidentials but adverbs, verbs, and modal morphemes (Hungarian, Erzya, Finnish, Saamic).

These types are represented in Figure 2 with Uralic languages. The basis of the map is designed by György Liszka (Miestamo et al 2015: 6).



1: direct and indirect evidentials; 2: evidential strategies; 3: dedicated indirect evidentials and evidential strategies; 4: no evidentials but lexical means of expressing evidentiality

Figure 2. The distribution of evidentials in Uralic

The following passages discuss the four main types in more detail.

1) Direct and indirect evidentials (the Samoyedic languages).
Nganasan and other Samoyedic languages have direct evidentials, including the auditive (Usenkova 2015, Gusev's studies on Nganasan, see also Iljina 2002 for Selkup), see the example in (3). Burkova (2004: 353) notes that in Nenets, evidential forms do not allow an extension to the epistemic modal meanings.

(3) Nganasan (direct evidentials such as the auditive)

munu-munu-ťü:	*"Tə-tə, maa,*	*tuu-ʔ*	*ńi-**li̯**"*
say-AUD-3SG	well what	come-CNG	NEG-DUB.3SG

'(he) says: "Well, he will probably come"'
(Gusev 2015: 128)

Another instance of a typical Samoyedic evidential is the renarrative from Nganasan.

(4) Northern Selkup, Taz dialect

tan	*iija*	*ilɛ-nnanti,*	*ašša*	*mat*
you/your	child	live-FUT.NARR.3sg	NEG	I

'Your child will live, not me.'
(Kuznecova et al. 1980: 306 in Wagner-Nagy 2015:154)

2) evidential strategies (the Permic languages, the Ob-Ugric languages)

Udmurt has an analytic construction for evidentiality. It is *pe*, something like a parenthetical or a discourse particle, and *vylem*, the participle of the perfect tense. Previous Udmurt sources do not always categorize the participle phenomenon as evidentiality, but recent sources treat the Udmurt and also Komi (Leinonen 2000, Siegl 2004) as having an evidential strategy built upon another grammatical form. The same evidentiality type can be found in other Permic languages (or dialects) and in the Ob-Ugric languages. More references and discussion on Mansi, Khanty and Permic languages can be found in Sipőcz (2014), Csepregi (2014), and Siegl (2006).

(5) Udmurt

Лыз/Горд	*нылпи*	*сад у*	*мойгес*	***вылэм,***	***не.***
Blue/Red	Daycare	center	good-COMP	is-PPF.3SG.	EV

‘(Reportedly,) the Blue/Red Daycare center is better.’
(Yulia Speshilova, p.c.)

3) morphological indirect evidentials (Southern Baltic Finnic)

The borderline between the systems described under 2 and 3 is fuzzy, since the tense-based systems in the Turkic contact area are formally and probably also semantically different from the nominalization-based forms in the area (Ob-Ugric). The Estonian evidentials are also based on nominalizations, and they have clear and dedicated indirect evidential morphemes. The origin of the Livonian reportative evidential is the form of an agent noun.

(6) Livonian

sis	*kuŗē*	*kītiz*	*algõ*	*ta*	.
then	devil.NOM	say:PST.3SG	proh:IMP	he.NOM	
rõkāndõgõ	*tämā*	*kītiz*	*ta*	*äb*	
speak:IMP.SG	he.NOM	say:PST.3SG	he.NOM	NEG	
rõkāndi-ji					
speak-REP.IND.SG					

‘The devil then said that he should not speak. He said that he is reported not to speak.’
(Kehayov, Metslang and Pajusalu 2012: 43)

4) No evidentials but adverbs, verbs, and modal morphemes (Hungarian, Erzya, Finnish, Saamic)

Saamic (Jussi Ylikoski p.c.) and Finnish (Seppo Kittilä, p.c, Kittilä 2013) have modal adverbs, and so does Hungarian. In addition, Hungarian has modal morphology that can express source (Kiefer 2000, Kugler 2014). These means can be compared to the expression of evidentiality in European languages such as Dutch in example (2). Note

that the expression is morphological, as in Estonian or other Uralic languages that have evidentials. A constructed example (7) illustrates the modal morpheme expressing evidentiality in Hungarian.

(7) *Es-het* *az* *eső* *(, mert látom hogy vizes a kabátja)*
fall-MOD DEF rain because I see that his coat is wet
'Supposedly it is raining (because I see that his coat is wet).'

In sum, the Uralic languages have typically means to express indirect evidentiality, but the expression of this category is optional. Samoyedic languages have grammaticalized evidentials that form the largest systems. Dedicated morphological evidentials are missing in Uralic languages outside of the former Soviet Union, and the European part of Russia has various evidential strategies based on non-finites and other morphological markers of TAM. Differently from European languages, dedicated morphological evidentials do not typically express epistemic modal meanings. This makes most of them semantically different from typical European evidential expressions.

3. The evidential -*vat* and other ways of expressing evidentiality in Estonian

Across the Uralic family, we find languages with evidential and epistemic modal adverbs and verbs (separate words), evidential modal words, evidential strategies, epistemic modal morphology with evidential aspects, evidential morphology with epistemic modal aspects, and pure evidentials of various types. Estonian shows a wealth of those means of expressing source-related meanings.

Many previous studies concentrate on the morpheme -*vat* as an instance of indirect evidential in Estonian (Erelt, Metslang, Pajusalu 2006; Erelt 2002; Metslang and Pajusalu 2002; Aikhenvald 2004; Sepper 2005; Kehayov 2008). Estonian is one of the few European languages with a grammaticalized evidential. The evidential is indirect, and there are no direct evidentials in the system. This is also the most frequent way of expressing indirect evidentiality in the written standard language (Sepper 2005: 85), and

in traditional Estonian grammars it is referred to as “quotative mood”. There are other grammatical and lexical means for expressing evidentiality in Estonian as well (Erelt 2013: 121, Kehayov 2004: 829). For instance, there is a special infinitive form that can be used in the evidential function (8) (*Ta olla kodus*) and the combination of the modal verb *pidama* ‘must’ and another infinitive, the *ma*-infinitive (9) (*Ta pidi kodus olema*) (cf Erelt 2013: 122).

(8) *Ta* ***olla*** *kodu-s.*
3S.[NOM] be.DAINF home-INE
‘S/he is supposedly at home.’

(9) *Ta* ***pidi*** *kodu-s* ***ole-ma***
3S.[NOM] must.3S.PST home-INE be-MAINF
‘S/he is supposedly at home.’

As in many languages, the complementizer *et* ‘that’ is used in expressing the fact that the message is assumed from other sources that are reported (see Keevallik 2000), cf. (10).

(10) *(ah)* ***et*** *ta* *on* *kodu-s.*
INTERJ that 3s.[NOM] be.3s home-INE
‘I see, s/he is at home.’

It has thus been generally accepted in the Estonian grammatical writings that the morpheme *-vat* is an evidential, but the connections of the morpheme to modality are nonetheless strong. It is also an optional evidential, which is not particularly frequent in written registers. If we say that *The Moon orbits the Earth* (11), then it is not based on our personal observations rather than on something that we have heard or studied at school.

(11) *Kuu* *tiirle-b* *ümber* *Maa*
moon[NOM] spin-3S around Earth.GEN
‘The Moon orbits the Earth’

Despite the mediation of information, the user of the Estonian language would not express the sentence by using *-vat* and stating that *It is said that the Moon orbits the Earth,* (12).

(12) *Kuu tiirle-vat ümber Maa*
Moon[NOM] spin-EV around Earth.GEN
'The Moon orbits the Earth' (mediated)

Although a sentence using the Estonian *-vat* is not grammatically incorrect, a native speaker of the Estonian language would still get the impression that the speaker actually doubts the fact of the Moon orbiting the Earth. Almost all the information we possess about the world around us is based on mediated statements. Nonetheless, in Estonian it is mostly being expressed in the indicative mood and without the *-vat* morpheme.

The morpheme *-vat* can often be found in statements that are of low probability from the speaker's point of view. We analyse a few evidentials found in the corpus. The *-vat* found in Example (13) (*statements that are said to prove)* is not meant to inform the reader that the theories about the catastrophe of MS Estonia have been heard from someone else rather than communicate the fact that according to the journalist the theories about the disaster hold no specific reliability.

(13) *Ametlikest raportitest erinevad teooriad Estonia huku kohta ja väited, mis tõesta**vat**, et valitsused varjavad tõde, elavad rahvasuus oma elu ning on äärmiselt visad kaduma isegi siis, kui leidub fakte, mis need ümber lükkavad.*
'Different theories from official reports about the sinking of MS Estonia that are said to prove that governments are hiding the truth are set in people's minds and die hard even if there are facts that refute them.' www1

Such examples provide us with a reason to doubt whether *-vat* has been used to denote the fact that information has been mediated. Taking a look at sentence (14) in a context that describes information that has been received indirectly, it can be seen that *-vat* occurs

in a sentence that a) includes information from an indirect source (FSB public relations centre), but b) it also includes an evaluation of the probability of the statement.

(14) *Reede õhtul väitis Venemaa Föderaalse Julgeolekuteenistuse (FSB) avalike suhete keskus, et Eesti kaitsepolitsei ametnik peeti kinni Pihkva oblastis, kus ta ole**vat** viinud läbi salajast operatsiooni*

'On Friday the public relations centre of Federal Security Service of the Russian Federation (FSB) claimed that an official of Estonian Security Police had been detained in Pihkva oblast, where he was said to have conducted secret operations.' www2

Examples (13) and (14) also present an interesting contrast. It can be noted that the use of the *vat*-morpheme is not determined by the indirect nature of the information, because indirectness doesn't automatically elicit its use in other verb forms of the sentence, but, rather, an emphatically low probability of the reported action. Indirect information that "an official of Estonian Security Police was detained" (14) or that "theories [---] are set in people's minds" (13), are not marked by an evidential.

If information is marked as being indirect in communication, it is not surprising that the listener also makes an inference about the lower probability or reliability of the information, because the source of the knowledge is not the speaker herself. Therefore, indirect markers (e.g. Estonian *da*-infinitive, *-vat*) imply an element of epistemic modality. But is epistemic modality always part of the meaning of an Estonian evidential? Let us examine the combining of meanings in other examples of evidentiality, for example (15).

(15) *Putin **olla** Porošenkole **öelnud**: „Kui ma tahaksin, siis võiksid Vene väed olla kahe päeva jooksul mitte ainult Kiievis, vaid ka Riias, Vilniuses, Tallinnas, Varssavis või Bukarestis.*

'Putin is said to have told Poroshenko: "If I wanted, I could take Russian forces not only to Kiev, but also Riga, Vilnius, Tallinn, Warsaw, or Bucarest in two days." ' www3

Example (15) (*Putin* ***olla*** *Porošenkole* ***öel-nud*** 'Putin:NOM be.DAINF Porošenko-ALL say-PPF = *Putin is said to have told Poroshenko'*) is important in this discussion, because it indicates that the grammatical means of expressing evidentiality also convey other types of evaluations. Evidentiality that has been expressed by the Estonian *da*-infinitive in (15) is related to a negative attitude towards the mediated information, or something the reported speaker did or said. It is dominated by a hidden judgment or even irony, and therefore, the evaluation is merely moral and unlike in the case of the *vat*-morpheme the epistemic evaluation is only based on the context. Indirect evidentials within one language can combine different types of evaluation, not only epistemic modality.

4. The Acquisition of Evidentiality

Language acquisition and cognitive development are closely related. Although arguably children base the acquired linguistic categories on the cognitive ones (Clark 2004: 472), there is also influence in the other direction, linguistic development also fosters cognitive development (Papafragou et al. 2007: 254). The basis of the late acquisition of evidentiality is the cognitive complexity of the category (Öztürk & Papafragou 2007). It is believed that evidentiality is acquired later because in order to acquire this category other particular cognitive abilities must have developed first (e.g. Theory of Mind). In order to understand where a particular piece of information comes from, the child must be able to define the source of information and to associate two temporally different events. In case of indirect evidentials, the child cannot conclude on the basis of a speech situation that earlier there must have been another situation of information exchange, during which the person speaking with the child had received information from some other source. Therefore, the marker of evidentiality is cognitively complicated for the child.

In addition to cognitive complexity there are also pragmatic factors that influence the rather late acquisition of the indirect evidential. The use of the indirect evidential is not frequent in child-directed speech, because it is not common to use information that has been mediated or that is of low probability while talking to young children. Neither

does the material of spontaneous speech of Estonian children offer ample linguistic data to study the acquisition of the evidential (see Section 5).

Although in some languages the markers of evidentiality are obligatory and children are able to use them as early as two or three years of age, e.g. in Turkish and in Korean, (Aksu-Koç 1988, Papafragou et al. 2007), it has nonetheless been stated about these languages that children are able to get full understanding of the evidentials much later (Öztürk & Papafragou 2007: 2) and, therefore, the understanding of these markers can cause problems even to six-year-olds (Zufferey 2010: 88).

There have been contradictory results found in studies on how children understand the information coming from different sources and how they detect the source of the information. For example, it has been found that 3-years-old children associate seeing and knowing: children are sure that the person who has seen some kind of object has established knowledge about this object (Pillow 1989). At the same time children have been found to have difficulties in identifying the source of information. Gopnik and Graf (1988) have found that diverging types of evidence carry different weight in the group of three- and five-year old children. Three-year old children seem to trust more what they have seen and less what they have been told (O'Neill & Gopnik 1991).

Children start expressing evidential meaning early also in languages that lack morphological evidentials (e.g. about English see Rett et al. 2013: 11). Nonetheless, the acquisition of evidentials seems to depend on whether the particular marker in the language is obligatory and frequent or not. Such markers are acquired early on in languages in which direct as well as indirect evidentials are morphologically marked (Choi 1995, Aksu-Koç 1988).

Children also seem to acquire different types of evidentials at different times: direct evidentials are acquired earlier (in case of such a marker in a language) than indirect evidentials (Öztürk& Papafragou 2007, de Villiers et al. 2009, Rett et al. 2013). The Turkish inferential evidential is acquired early in life, at the age of 1;6-2;0, and the approximate equivalent of the Estonian indirect evidential at the age of 2;0-3;0 or even later, around the age of four (Slobin & Aksu 1982; Aksu-Koç & Slobin 1986, Fitneva 2001). Turkish evidentials are part of a larger set of functional categories that pertain to sources and generalizability. Aksu-Koç et al. (2014) have shown that evidentials thwart

generalization in Turkish as opposed to the generic morpheme that increases generalization in a behavioral experiment.

On the basis of that research we could expect evidentials not only to be about epistemic modality and source marking, but also to be part of a marking system that has to do with the generalizability of the knowledge. In order to find out if a piece of new information has to be written off as an odd outlier or attributed the status of a generalizable fact that is worthwhile to learn is a highly important task for children. Young children have to figure it out as fast as possible in their early years in order to thrive in their cultural surroundings (Csibra and Gergely 2011). Information about generalizability interacts with probability and reasoning about sources in children's minds and, possibly, propositions are judged to be generalizable or not based on their source and probability.

5. The acquisition of Estonian evidentials

Indirect evidentials are extremely rare in the corpora of Estonian child language.[2] There are only a couple of examples of *-vat* forms used when addressing children:

(16) *MOT: *päris maitsev jogurt paistab OLE-VAT.*
'it seems to be a pretty tasty kind of yoghurt'
(CHILDES, subcorpora Vija, child's age 2;1.7)

(17) *EMA*: ta miskipärast rääkis, et sa OLE-VAT lubanud.*
'he told me for some reason that you had promised it'
(CHILDES, subcorpora Vija; child's age 3;0.25)

[2] The CHILDES Estonian corpora consist of approximately 170 hours of recordings of spontaneous speech (http://childes.psy.cmu.edu/browser/index.php?url=Other/Estonian/).

There are no instances of the *vat*-evidential in children's speech in the corpora. The first evidential construction is expressed by means of the verb *pidama* 'must', and it can be found in an utterance of a child whose age is eleven.

(18) *CHI: *Vova ütles et tema paralleelile on ta klassijuhataja see PIDI OLEMA ull* [: hull].
'Vova told that his parallel class teacher is told to be crazy'
(CHILDES, subcorpora Kõrgesaar; child's age 11;9.7).

Constructions with the verb *pidama* can be found only in the speech of parents with older children (note that the adult spoken language may diverge from the written Standard Estonian):

(19) *OBS: *aga min ma kuulsin et teil PIDI lasteaias OLEMA täitsa selliseid lapsi ka kes ei pooli tähti ei tunne*.
'I have heard that you have children in your kindergarten who do not know half of the letters.'
(CHILDES, subcorpora Kõrgesaar; child's age 6;6.19)

As the Estonian evidential system includes only one grammaticalized evidential, the optional indirect evidential *-vat* that is rarely used in child-directed speech, the late acquisition of the Estonian evidential would be more than logical to expect. Indeed, the initial acquisition data also confirm that.

The first studies about the acquisition of the Estonian evidential (Argus et al. 2014, Tamm et al. 2014) conclude that children do not interpret the meaning of the evidential morpheme in the same way as adults. They start to comprehend the meaning of the morpheme *-vat* only at age 6, and they can fully comprehend the meaning of the *-vat* at age 9. Evidentials are also a way to render the transmitted information more specific, relating the knowledge to a source instead of allowing it to be interpreted as generally shared or accepted knowledge at least at the level of an implicature (Tamm 2012).

In case of the Estonian *vat*-morpheme, the categories of evidentiality and epistemic modality are clearly distinguishable in the acquisition of Estonian as a first

language (Tamm et al. 2015). The meaning of evidentiality is acquired before the meaning of epistemic modality. Still, both categories are quite late in acquisition, and children do not seem to start acquiring their combination before age 6.

6. Method

6.1. Procedure

The method used in this research involved a behavioral experiment inspired by Butler and Markman (2012). Four and six-year-old children were presented with one single instance of a new object ("a blicket"). A property was demonstrated ("being a magnet") with other objects.

The novel objects presented to the children were small wooden blocks (5 cm long and 2,5 cm wide) covered with black and green electric tape (see Figure 3). The active block was covered with black magnetic tape on one end, while the other 7 inert blocks were covered with non-magnetic black electric tape instead. The active block and the inert blocks looked identical and were indistinguishable. Furthermore, a box with paperclips, a box with five different kinds of magnets and two boxes containing four distractor objects and an extra blicket were used.

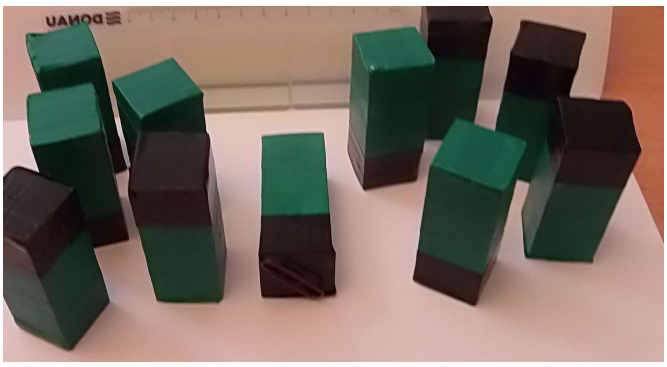


Figure 3. Blickets

All children were tested individually. The testing took place in a private room of the children's kindergarten. Children were first shown the active block and were taught a novel label for it, 'blicket'. In order to see whether children had learned the novel label, they had to select the blicket from four distractor objects on two trials. Then the participants were asked whether they knew what a magnet is and how it works. Regardless of their answer, the magnetic property was shown with a pile of paperclips and five different magnets. As the magnets were being put back into their box, the active block was taken out of the box and the test sentence was uttered in one of the following forms, depending on the condition that was being tested:

Zero Condition:	*Plikit on magnet* ['Blicket is magnetic.']
Evidential Condition:	*Plikit ole-vat magnet*. [Blicket is magnetic-evid.']

Children were randomly assigned to two conditions. The test sentence was repeated twice in order to make sure that the children would not miss it. Then, the blicket was put back into the box with other magnets. The experimenter left after placing seven inert blocks on the table, saying "You can play with these blickets while I go look for something." The child was given 60 seconds to explore and play with the blickets. After 60 seconds, the experimenter returned to the table, and the child was asked what kind of a thing this blicket is, and what it does. Next, the child was told that the experimenter had still not found the missing object. The children's play was videotaped, and the number of attempts that the children made at testing the magnetic properties of the blickets were measured on the basis of the videotaped material.

6.2. Participants

Forty-three four-year-olds and thirty-nine six-year-olds participated in this study. Seven additional children had to be excluded from the initial dataset because they were slightly older or younger than the targeted group at the point of testing. Children were recruited from ten different kindergartens (from Tallinn and its surroundings, and Southern Estonia). All children came from upper-middle class families.

6.3. Coding

Two independent coders coded the two 60 second video recordings of the children's explorations. Within the exploration of the 60-second period, the number of attempts that children made to elicit the magnetic property from the inert blicket was coded. The results of two coders were compared later. The agreement on the coded measures was high in all cases, and differences were checked and a joint decision was made by both coders.

Only those attempts were counted as trying the magnetic property of the blicket, where the child tried to attract the paperclips to the blicket or to join two blickets horizontally, or if the child placed the paperclips on the surface of the blicket to see if there was any effect. Instances when the child used blickets only for building something, for example, a tower or a house, were not coded. In some instances, where it was difficult to decide if the child was just playing with blickets and not trying their magnetic properties, the question about what kind of a thing this blicket is, and what it does helped to decide during the coding process. The experiment was considered valid if the scenario was followed correctly and the time for trying magnetic properties of the blickets was exactly 60 seconds.

7. Results

We examined if the marker *-vat* leads to a difference in exploratory play across two age groups, measuring the effect with a set of inert wooden blocks, "blickets". After demonstrating the property of "magnetism" with a real magnet and introducing the new label "blicket", we attributed the property to a single blicket. The property was attributed to the new object by uttering a sentence with *-vat* in the evidential condition and an unmarked sentence (zero condition). We wanted to know if new grammar, more specifically *-vat* in the evidential condition, led to a difference in exploratory play compared to the zero condition. We hypothesized that the reaction of younger and older children is different.

Six-year-old children played more intensively than the four-year-old ones. In both

age groups, four and six-year-olds, the number of attempts made to elicit the magnetic property from the blickets was higher in the evidential than in the zero condition (see Tables 2 and 3).

Table 2. The number of attempts to try the properties of blickets, four-year-old children

Condition	Average number of attempts	Number of children
Zero condition	2,47	32
Evidential	6,62	21

Table 3. The number of attempts to try the properties of blickets, six-year-old children

Condition	Average number of attempts	Number of children
Zero condition	5,00	15
Evidential	7,71	24

Comparing the baseline and evidential conditions, we found that the age groups behaved differently. More specifically, the two conditions differed from each other significantly in the group of four-year olds (p= .021) but not with six-year-olds (p= .743). Figure 2 presents the number of attempts to try the property in the zero versus evidential conditions.

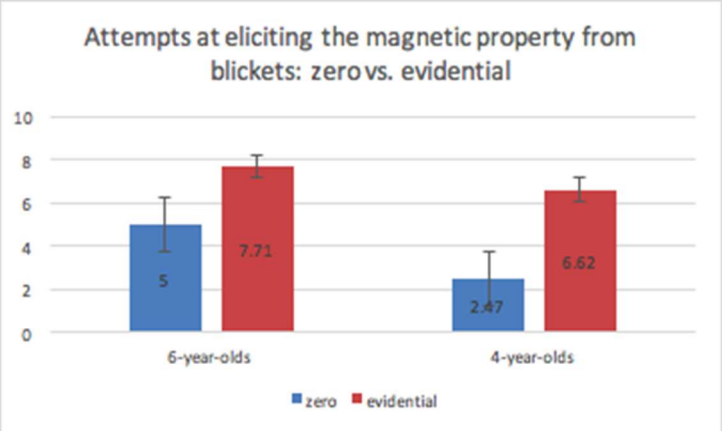


Figure 2. The number of attempts to try the property: zero *vs*. evidential

8. Discussion

Not much is known about Uralic evidentiality, and even less is known about the acquisition of evidentiality in this language family. The well-studied Hungarian and Finnish lack evidentials and, in general, only the ex-Soviet Uralic languages have them. The Uralic languages, given their special geographical and genealogical positioning, may provide some relevant missing pieces in the evidential puzzles of form and meaning mapping. The language family exemplifies systems that have developed evidential adverbs (Finnish, Saamic), evidential-modal verbs and verbal complexes (Estonian), evidential strategies based on past tenses (Permic languages), epistemic modal bound morphemes with evidential aspects (Hungarian), evidential morphology with epistemic modal aspects (Estonian), and pure direct evidential bound morphemes of various types (the Samoyedic languages).

Estonian seems to be uniquely positioned to enable us to gain insights in the development and acquisition of various Uralic and European form-meaning relationships. It has an evidential *-vat* morpheme that is European-like in the sense that the evidential is optional and related to epistemic modality. Estonian is also similar to its Uralic relatives, since its evidential is a grammaticalized indirect evidential that is part of verbal morphology. However, some other Estonian evidential expressions do not behave as epistemic modals in addition to the evidential aspects they display. From among the "evidential Uralic languages", only Estonian has currently sufficient resources to explore the acquisition of the category.

A factor that seems to have an indirect impact on the acquisition of the evidential *-vat* is its optionality, which is likely to result in a low frequency of the form in the input. The CHILDES corpus data confirmed the lower frequency of the form. In addition, Argus et al. (2014) show that the acquisition of the infrequent and optional Estonian evidential proceeds at a slow pace compared to Asian (Turkish and Korean) evidential morphemes, which are obligatory and belong to a richer evidential system. We could thus indeed

conclude that the optional nature of the morpheme has an impact on the acquisition of evidentials.

The infrequent occurrence of -*vat* in the input brings about another relevant aspect that renders the study of the acquisition of the morpheme an exciting venture, namely the level of cognitive development. The cognitive development level that matches the age of acquisition of the Estonian evidential is higher compared to the developmental stage matching the acquisition of Turkish and Korean morphemes, because the Estonian optional evidential is acquired at a relatively late age. One of the practical consequences of a higher developmental level for our research is that simpler experimental methods can be applied to investigate the effect of a new morpheme as it makes its way into the grammatical system of a language.

The cognitive developmental aspect leads us to the next question: what to expect of the interpretation of the same grammatical element, such as an evidential, in children at different stages of social cognitive development? Can children make epistemic modal inferences based on sources easier at a more advanced age? There are in any case reasons to assume that the use of evidentials is tightly intertwined with social biases and cultural norms in adults. Previous experimental studies have shown that Estonian adults use evidentials strategically to hide the source of valuable information in competitive situations (Argus et al. 2013, Kütt et al. 2014). Adults nudge their competitors towards the interpretation of low or reduced reliability of information by using an evidential morpheme. In this way they hide themselves as the source of valuable information, if sharing the information is personally costly.

It has not been studied yet when children start to strategically hide the source of information in competitive situations. Children start to be enculturated towards generosity and benevolence in their pre-teen age only. House et al. (2013), who studied the prosocial behavior of 3-14-year-old children across six culturally and geographically different societies, found that when delivering benefits to others was personally costly, rates of prosocial behavior dropped across all six societies in middle childhood. However, from then on the rates of prosociality diverged—children tracked toward the behavior of adults in their own societies. Probably this is the age where children from prosocial cultures start looking for linguistic "tools" to manage the cognitive dissonance

that emerges from generously delivering valuable information to others even if doing so is personally costly. This kind of linguistic "tool" can be an indirect evidential, which, if used strategically, renders the information less reliable for the addressee of the message. The speaker retains some advantage vis-à-vis the addressee in this case. Prior to using evidentials strategically in conflict situations, children should have the ability to grasp the modal meaning of the indirect evidential or at least be able to make inferences about the lower reliability of the information provided with an evidential. We can expect the modal meaning to emerge before the strategic uses.

Previous research shows that children who belong to the age groups that we studied should be able to understand mediated information as far as their cognitive development is concerned, viz. Theory of Mind (de Villiers et al. 2010). Indeed, Estonian four-year-olds start understanding that an evidential conveys information from another source, and at 6, even more children are able to understand that the information presented with an evidential is mediated. Only at age 6, children start inferring the relationship between another source and lower reliability of the information that is conveyed by means of an evidential (Argus et al. 2014, Tamm et al. 2015). How do the results of the present paper relate to these insights?

When the group of 6-year-olds were given information by means of an evidential and the zero condition (the present indicative), the results turned out to be nearly identical. Why should this be so? Two possibilities present themselves, one is pragmatic and the other is developmental. On the one hand, it is possible that the experimental setting or situation does not felicitously allow for the inference from the indirectness of the information to its unreliability. On the other hand, it is possible that 6-year-olds still do not understand evidentials in the way grown-ups would understand them. Although the experiments in Tamm et al. (2015) showed that children of ages 4 and 6 may already attribute an epistemic modal interpretation to the evidential morpheme in a forced choice task, they clearly do not assume any lower reliability of information in the kind of situation that was modeled in our experiments. It is thus plausible that children can make a correct guess about the meaning if forced to choose between three options on the modal scale of reliability ("true", "false", "maybe true or false"), but in free play, they do not attribute the same interpretation (i.e., "maybe true or false") to the morpheme and its use.

Rather, the observation is that the morpheme does not add anything to the interpretation in the present experiment, where the different groups received the information either with a neutral "zero" sentence or with an evidential sentence prior to a period of free play. This result resembles similar experiments with Turkish 4 and 6 year-olds—who had mastered the meaning of the indirect evidential earlier—where the evidential and zero conditions did not show any significant difference in the intensity of play (Aksu-Koç et al. 2014).

There may be combined reasons for the nearly identical outcome of the results of testing the evidential and the zero condition in children who have mastered the meaning of the indirect evidential. Although there is no significant difference between the two conditions in the group of six-year-olds, the present paper establishes that the zero and the evidential conditions differ from each other significantly in the group of Estonian four-year-olds. Four-year-olds play more intensively in the evidential condition. Since the content of the proposition was identical in the two conditions, the increased activity could only be attributed to the effect of the grammatical element. The paper thus provides evidence that the new verbal morphology *-vat* elicits increased exploratory play in children of age four, and that this effect disappears as children mature, as they have had more exposure to the evidential, and they have acquired it to some extent already. The fact that the results did not differ in the zero and the evidential condition in the different age groups of Turkish provides an argument for a particular interpretation of the developmental-linguistic behavior of the Estonian four-year-old children.

Can we conclude anything about the acquisition of communicative grammar on the basis of these Estonian acquisition data? If children are confronted with new verbal morphology in an agglutinative language, with no access to the function or meaning, we would predict that they are biased towards certain interpretations according to the type of the language. More specifically, we could predict that children would either disqualify the new element as white noise or interpret it as something potentially meaningful. Estonian, like Turkish and Hungarian, is a suffixing, predominantly agglutinative language, and it is possible that a new suffix emerges as a more prominent candidate for a potentially meaningful (or structure-building) element than many other types of novel occurrence. In suffixing languages, a suffix would trigger specific interpretational

processes, as opposed to some other possible candidates for forms bearing meaning such as tone, prefixes, or infixes. We could assume that guessing about the grammatical meaning of a morpheme happens in a different way in a highly polysynthetic or a highly isolating language, where the order of morphemes and prosodic patterns provide diverging cues for processing new sound combinations. The fact that the Estonian evidential is acquired so late offered us in any case unique opportunities to use simpler experimental methods.

What are the pieces of evidence that we have now about processing new suffixes in suffixing languages? Here we are considering some data from Turkish as a comparison. The information conveyed with an evidential morpheme but not with an unmarked sentence created increased exploratory activity in the group of Estonian but not Turkish younger children. Turkish four-year-olds, who already master the meaning of the evidential at age 4, do not play significantly more in the evidential condition compared to the zero condition. This fact provides evidence that the introduction of new verb morphology elicits a clear effect on children's behavior only if it is really new and recognized as a new and potentially relevant meaningful form. Estonian four-year-olds clearly increased testing blickets for magnetic properties. We considered two explanations, one that could be referred to as an "assume that language provides tools for learning" explanation, and another, somewhat less bold account, dubbed here as "explore the effect of the new grammar" explanation.

On the one hand, since only the new morphology versus zero distinguish the two conditions tested, and the experiment was modeled after an experiment that studied generalization, an "assume that language provides tools for learning" explanation could be a plausible one for the interpretation of new morphology. Under this explanation, children try how the new "tool" fits in their toolkit of learning new things in their cultural surroundings under the guidance of adults. But then, what kind of an interpretation is known to have a similar effect?

If children assume that language is a tool for learning about the surrounding world, and that bound morphemes are taken to provide instructions for how to interpret the propositions made, we could additionally hypothesize that the first guess of a child with a morphologically rich language is to interpret a new item as a generic marker that

elicits generalization over particulars. In case of a child-centered situation, a smaller child could interpret an utterance with special grammar as pedagogical demonstration, which elicits generalization (cf. Butler and Markman 2012, Gelman 2010, Csibra and Gergely 2011). We could argue for this interpretation of the results, since in the experiment, we attributed a property to a single novel exemplar and measured the children's exploratory play with other exemplars that actually lacked the property. Increased exploratory play could be evidence that children have made a generalization, since when their expectations about the properties of new exemplars were not met, they tried harder to elicit the expected effect. An older child, however, understands the meaning of the morpheme already and does not attribute to it an interpretation related to generalization over particulars.

In order to either support or exclude this explanation, we lack comparable behavioral and linguistic evidence about the interpretation of new morphology. Instead of pursuing this avenue, we examined the option of "explore the effect of the new grammar" explanation. In other words, there is a possibility that the new grammatical element makes children explore what it means. We knew from previous work that the epistemic and evidential aspects of the Estonian evidential category are learned at a slow pace and at different times. At age 4, the category is not acquired. At 6, its acquisition has started already, and approximately two thirds of the tested children demonstrated the correct understanding of the indirect evidential meaning of the *-vat* evidential. Previous longitudinal research has established that, contrary to intuitive expectations, children learn complex morphology earlier in languages with rich morphology than in languages where morphology is poorer. In languages with less complex morphology, new morphology is acquired relatively slow and late (Xantos et al. 2011). Morphologically rich languages seem to provide young children with increased attention towards morphology—but it has not been shown yet how children from such languages react to the introduction of new morphology. It can be assumed that 4-year-old children perceive an unfamiliar piece of verbal morphology as something unfamiliar, new, and salient, and that makes them test it out (Tamm et al. 2013).

This special situation allows us to hypothesize that the acquisition of the category of evidentiality in Estonian will open further perspectives as a contrast or test in the

research of languages that, on the one hand, have evidential-epistemic expressions that are not part of verbal morphology and, on the other hand, languages where the category is expressed by verbal morphology but does not show this European-specific mix of epistemic and evidential meanings. These data are also likely to provide a background to the study of evidentials in Uralic languages, which diverge greatly in terms of their expression of evidentiality. Hungarian could be the next step if we want to see how the interpretation of a bound morpheme of an epistemic modal morpheme with evidential aspects develops. Finnish, with its evidential adverbs, could provide evidence about dedicated evidential adverbs that do not belong to verb morphology.

9. Conclusion

From among the Uralic languages, only Estonian has currently sufficient resources to explore the acquisition of the grammaticalized evidential category.

Since there are, at this point, no overviews about the Uralic evidential systems yet, the article has provided an overview of the evidential category in the Uralic languages. It has sketched the "part Asian, part European" characteristics of the category in Estonian.

Firstly, some parallels with Dutch have been drawn to exemplify the various properties of the Estonian evidential forms. The Estonian evidential category (*-vat*) is similar to many typical European expressions of evidentiality, since the expression of evidential and epistemic meanings is combined. Morphosyntactically, the Adposition Phrase or Case Phrase type of origin of the form resembles the forms in some European languages (the Dutch *van*-construction e.g. *Hij zei/dacht/etc van p* as in *Hij zei van niet* 'He said that it is not the case') but also Uralic ones, where some evidential strategies evolve from non-finites and their case forms. The Estonian evidential is optional, which makes it similar to the European expressions of evidentiality. Optionality leads to lower frequency in the input and, subsequently, to a later age of acquisition.

So even if Estonian is a Uralic language, many characteristics bring it close to European languages. The interesting variable that makes an acquisition study exciting is

the morphological realization of the Estonian evidentiality—the predominantly agglutinative Estonian realizes the evidential morphology on its main verb. We have shown previously that the acquisition of an infrequent and optional evidential proceeds at a slow rate compared to Asian (Turkish) evidential morphemes, which are obligatory and belong to a richer evidential system. We have concluded that the obligatory status has an impact on the acquisition of evidentials.

We have also concluded that the introduction of new verb morphology in a morphologically rich language elicits a clear effect on children's behavior. We reached this conclusion upon the analysis of the results of a behavioral experiment with Estonian four and six-year-old preschoolers. In the experiment, a neutral sentence was contrasted with an evidential one. The information conveyed with an evidential morpheme but not with an unmarked sentence created increased exploratory activity only in the group of younger children. We have therefore concluded that the new verbal evidential morphology *-vat* elicits increased exploratory play in children of age four, and that this effect disappears as children mature, that is, they have had more exposure to the evidential and they have acquired it to some extent.

Since the content of the proposition was identical in the two conditions, the increased activity could only be attributed to the effect of the grammatical element. We have considered two explanations, one that could be referred to as an "assume that language provides tools for learning" explanation, and another, dubbed as "explore the effect of the new grammar" one.

On the one hand, if children assume that language is a tool for learning about the surrounding world, and that bound morphemes provide instructions for how to interpret the propositions made, we could hypothesize that a new morpheme could be interpreted as a generic marker that elicits generalization over particulars. We also examined the possibility that the new grammatical element makes children explore what it means and found that it is plausible that in morphologically rich languages, the introduction of a new item in verbal morphology in any case increases exploratory activity triggered by the new item.

Getting information with a clear new evidential morpheme thus leads to extra exploration, an effect that disappears as the form becomes more familiar and the meaning

of it is acquired. There are various avenues that can be explored from now on. Are novel forms interpreted as markers that guide generalization, or are they tested for their meaning? How are forms that express both evidential and epistemic modal aspects acquired? How is any morphology that is properly acquired only at a relatively late age acquired in typologically diverging systems? Would children have similar guesses about the meaning of a bound morpheme had they been exposed to it earlier (or later)? Do the morphosyntactic properties matter, and does the composition of the semantic category matter? For instance, in Dutch, the *zou/moeten* 'supposedly/it must be that' forms are separate words, which are familiar to children in their other meanings or functions. Is the learning of the combined category crucially enhanced or exactly hindered by the novelty of the form? Does the correct acquisition of the evidential-epistemic composite meaning of such free forms happen faster or slower than that of the bounded morphemes? Does the status of an evidential strategy versus an evidential proper matter?

Since we have currently data on the acquisition of languages from two geographical areas (such as Dutch and German as well as Turkish and Korean), even if the precise analysis of them is out of the scope of this article, we have provided a basis for addressing some of these fundamental questions about the acquisition of new form-meaning relationships against the background of cognitive development. This pertains to new morphology as well as the development of epistemic or evidential meanings by children.

In sum, the Uralic languages, given their special geographical, typological, and genealogical properties, provide important missing pieces of the evidential puzzle and, possibly, more broad issues of grammar learning. The language family exemplifies systems that have developed adverbs (separate words), evidential modal words, evidential strategies, epistemic modal morphology with evidential aspects, evidential morphology with epistemic modal aspects, and pure evidentials of various types. Especially Estonian seems to be uniquely positioned to enable us to gain insights in the acquisition of various form-meaning relationships, since it is a suffixing language with a grammaticalized evidential-epistemic morpheme that is acquired late.

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