

# Are Deontic Modals Acquired Before Epistemic Ones?

Ana-Maria Andreea Gaidargi

University of Bucharest

## Abstract

*Most studies which addressed the issue of the acquisition of the English modal verbs put forth the idea that the deontic modals are acquired before the epistemic ones (Brown, Wells, Papafragou, a.m.o.). On the other hand, Hirst and Weil show that the epistemic values of modal verbs are understood before the deontic ones by young children. The present paper aims to evaluate these two main claims, with a view to answering the question whether it is true that epistemic modals are acquired later than deontic ones. In order to answer this question I investigate two longitudinal corpora of monolingual English (from the Manchester corpus, Chiles Database).*

## Keywords:

*acquisition, modal verbs, deontic, epistemic, longitudinal study*

## 1. Introduction

### 1.1 Modal verbs and their meanings

Modal verbs are used to express a judgement or interpretation with respect to an action or a state (Kratzer 338-39, Papafragou 3, Modyanova et al. 301). There are two main clusters of modal meanings widely acknowledged in the literature: deontic and epistemic modal meanings (Coates 18-22, Palmer 96-97, Papafragou *The Acquisition of Modality* 372, Leech 67, Sweetser 51-68, Shatz and Wilcox 318-19): deontic/ root meanings encode notions such as necessity and possibility of acts imposed by social laws and obligations, while epistemic meanings are related to speaker knowledge or the evidence that he/she has to evaluate the truth of the proposition which forms the complement of the modal.

There is ambiguity across languages between epistemic and deontic meanings of modal verbs (Sweetser 49-51, Modyanova et al. 301).

### 1.2 The acquisition of modal verbs in English

There are two main approaches to the semantics of modal verbs. According to the first approach modal verbs are analysed as polysemous (Palmer 121-125). The second approach assumes that modal verbs are monosemous, they have one basic meaning which gets contextually extended. This approach separates ‘the contribution made by linguistically encoded information and inferential processes in the derivation of contextually attested interpretations of lexical items’ (Papafragou 8)

The acquisition of modal verbs in English has been approached mostly from a semantic perspective. There are two main hypotheses in this sense: one hypothesis according to which deontic meanings of modal verbs are acquired before epistemic ones by young children (Brown, Wells, Papafragou, a.m.o.) and a second one according to which epistemic meanings are understood before deontic ones by young children (Hirst and Weil, Noveck et al.).

## 2. Aim and organization

The aim of this paper is to evaluate the two main hypotheses with respect to the acquisition of modal verbs, with a view to answering the question whether it is true that epistemic modals are acquired later than deontic ones.

The paper is organized as follows: Section 3 of the paper deals with a brief presentation of some previous studies on the acquisition of modal verbs in English; Section 4 presents the method I used to evaluate the two main hypotheses on the acquisition of modal verbs, i.e. I investigated two longitudinal corpora of monolingual English from the Manchester corpus, Childes Database; and it also presents the results I obtained; Section 5 sketches an analysis of the results and the conclusions are summarized in Section 6.

## 3. Previous studies on the acquisition of modal verbs in English

### 3.1 Deontic/root values are acquired first - previous studies

Brown in a complex study of the acquisition of English on the basis of three longitudinal corpora Adam, Sarah and Eve, points out that modals develop in a gradual order between the ages 1; 10 and 2; 6, in a limited number of syntactic contexts, mainly declaratives. As far as the semantics of these modal expressions is concerned, the three children in the study used them with deontic values, i.e. to express notions such as ability, desire and intention and also what Brown calls “imminence”, referring to an action which was about to take place, or making a statement of the child’s wish or intention (318).

Another study that provides evidence in favour of the early occurrence of deontic meanings of modals belongs to Wells (250-269). He points out that by the age of 2; 6 more than 50% of his subjects used *can* to express ability and permission, *will* to express intention and *may* for permission, but less frequently than *can*. Wells’s general result was that deontic values are acquired earlier. Wells claims that if an item is not present in child’s speech, then he does not have knowledge about it (261). According to Wells two factors can account for the frequency distribution in children’s speech: (i) the order of acquisition and (ii) and the differential importance of the meanings realised by auxiliary verbs in the interactions that take place between children and their parents (262).

### 3.2 Epistemic meanings are understood early – previous studies

A famous experimental study which provides evidence in favour of the hypothesis under discussion in this section belongs to Hirst and Weil (659-665). They aimed to test children’s appreciation of the meaning of modals. They tested 54 children divided into seven groups according to age, from 3; 00 to 6; 06. In terms of procedure, each child passed the deontic and epistemic task in one session. Half of the subjects received the deontic task and the other half received the epistemic task. During the epistemic task, children were asked to indicate whether a peanut was hidden in a cup or in a box following indications of two puppets which produced sentences like the ones in (17). Children were advised to choose the most likely situation.

- (1) a. The peanut **must** be under the cup
- b. The peanut **should** be under the box. (is>must>should>may)

According to Hirst and Weil each modal contrast, i.e. *must/may*, *must/should*, *should/may* and each modal factual contrast, i.e. *is/must*, *is/should*, *is/may* was administered twice, once with the stronger proposition uttered first and once second. In both the epistemic and the deontic tasks the sentences were uttered in a randomized order (662).

During the deontic task children were required to indicate the room where a doll named Andy would go when hearing the indications given by two puppets which were Andy's teachers who were uttering modalized sentences as in (2). As in the previous task each modal pair was presented twice.

- (2)a. You **should** go to the green room.
- b. You **must** go to the red room.

The results of Hirst and Weil show that children are able to distinguish between modal verbs and factives before they can make distinctions inside the modal system. Also Hirst and Weil found that children appreciate the strength of epistemic modals a year earlier than the strength of deontic modals, i.e. 5; 00 opposed to 6; 00 years of age (665). According to them, the general rule seems to be: 'the greater the difference in the strength of the two types of modal propositions the earlier this difference will be appreciated' (Hirst and Weil 665). The relative modals strength is acquired in the same order in both tasks. But the authors are cautious not to draw risky conclusions, even if their data might seem to provide evidence against the studies presented in the section 3.1.

A study which replicated Hirst and Weil belongs to Noveck et al. (621-642). Their aim was to determine the extent to which relative force can account for epistemic modal semantic development. They designed 2 experiments. For the first experiment they had 32 subjects, 5 year-old children. Hirst and Weil's paradigm was adopted with five modifications: (i) they used *has to* and *might* instead of *must* and *may*; (ii) the sentence formulation was changed in the sense that it began with *There is/has to be a peanut*; (iii) children were assigned with feedback and no-feedback conditions, i.e. in the feedback condition they had the possibility to check whether their choice was correct or not; (iv) children were presented with three contrasts and given 4 trials with each; (v) only five-year-olds were included.

The results of this first experiment are on the same line with those of Hirst and Weil with respect to relative strength between contrasts of *is* > *has to* > *might*. On the basis of their results, Noveck et al. (1996) assume that modals like *have to* and *might* with an epistemic meaning do not just indicate relative force; they also encode possible and necessary inferences.

Noveck et al. designed a second experiment meant to determine children's appreciation of logically correct aspects of modals. For the second experiment they tested the following groups of subjects: 32 five-year-olds, 20 seven-year-olds, 16 nine-year-olds and 20 adults. In terms of procedure, two open boxes and one closed box were presented to the subjects. One open box contained a parrot and the other a parrot and a bear. Subjects were told that the closed box had the same contents as one of the open boxes. Then, they were presented one true modal statement and one false modal statement and asked to determine which was correct. Examples of these modal statements are in (3), (4) and (5):

- (3) There might be a bear/ there has to be a bear.
- (4) There might be a bear. / There cannot be a bear.

(5) There does not have to be a bear. / There cannot be a bear.

The results of this experiment show that subjects do not evaluate a modal statement which implies evidence on the basis of relative modal force. Five-year-olds accepted a true statement even if it was weaker-sounding over a false stronger-sounding statement in some of the cases. They performed better with necessary conclusions than with possible conclusions. Seven-year-old children accepted the true statements irrespective of the weaker/stronger distinction in five of the six contrasts. The nine-year-olds performed equally to adults in the sense that they accepted the true statements in all the six contrasts.

### 3.3 Accounting for the previous findings

A possible accounting for the earlier acquisition of deontic meanings of modal expressions builds on the relationship between acquisition and cognitive development. Papafragou (*The Acquisition of Modality* 373, 386) suggests that the reason for which deontic meanings are acquired before epistemic ones might be young children's lack of ability to represent/understand alternative versions of the world. In addition, she tries to develop an account which links the acquisition of modality with the Theory of Mind. Epistemic meanings deal with the speaker's attitude towards the truth of the complement of the modal verb (*The Acquisition of Modality* 382-84).

Papafragou (*The Acquisition of Modality* 382-84) proposes that successful use of epistemic values demands deductions on abstract propositions in order to arrive at a conclusion. The 'theory of mind' implies metacognitive abilities which are required by epistemic uses; therefore the use of epistemic values is expected to depend on development of the ability of the child to deal with mental representations. Deontic meanings are easier to understand since they deal with social laws and regulations. According to Papafragou there is some understanding of mental life by the age of 2, but children slightly older than 3 have more complex knowledge about the mind (*The Acquisition of Modality* 382).

In contrast to the theory of mind approach Heizmann puts forth the hypothesis according to which children have the same problems with the acquisition of both deontic and epistemic modals when they find them in syntactically difficult environments. Therefore syntax might offer us another type of constraint to the acquisition of modal verbs. Jackendoff and Brennan qtd. in Modyanova et al. claim that the deontic interpretation is mediated by control syntax and the epistemic interpretation is mediated by raising syntax (302). According to Hirsch and Wexler children acquire raising structures after 7 years of age. Therefore, as Modyanova et al. hypothesizes young children lack the ability to interpret epistemic meanings of modals because they have not acquired yet the raising syntax which mediates these meanings (310).

Another constraint with respect to the acquisition of modal verbs might be related to input, in the sense that children may acquire those modal values that are frequent in the input which they receive. Wells reports that *can* and *will* are the two modals that all mothers in his sample use and that appear frequently in children's speech (261). But input cannot always explain the developmental pattern (Shatz and Wilcox 340).

### 3.4 Summing up

Since there are studies which demonstrate that epistemic meanings are understood before deontic ones, the comprehension data challenge the view that deontic values are always acquired before epistemic ones.

#### 4. Evaluating the two main hypotheses on the acquisition of modal verbs

##### 4.1 Method

I investigated two longitudinal corpora of monolingual English children from the Manchester corpus, Childes Database, John and Liz. Each corpus contains 68 files. Both John and Liz were recorded between the ages 1; 11 - 2; 10. Each file was examined with a view to identifying the utterances containing modal verbs and to verifying whether there are early occurrences of epistemic uses. The meaning of each modal verb was analyzed with special attention to the context in which it was attested.

##### 4.2 Results

###### 4.2.1 John

The results I obtained for John show that he rarely uses modal verbs. I found a total of 71 utterances containing modal verbs, 12 occurrences with epistemic values (26%) and 59 occurrences with deontic values (74%). The modals attested in the corpus are *can*, *will*, *might*, *shall*, *must*. The first modal attested in the corpus is deontic *can*, in the negative form and it occurs at the age of 1; 11. Example (6) illustrates this first use.

- (6)[John 1; 11] \*MOT: is it stuck?(...)  
\*CHI: <I can't do shoes> [?].  
\*MOT: put on her shoe.

In Snyder's terms in order to get confidence in a child's performance with respect to the acquisition of a grammatical issue, among other methods of investigation of longitudinal studies, one may apply the criterion that he calls 'First of Repeated Uses', i.e. when the first use of the item under research appears, the investigator looks through the next part of the corpus to find additional uses, eliminating uses in isolation or imitations of adult speech (77-78). Following this criterion, I investigated the corpus in order to see if the modal use in example (6) above is used accidentally with deontic value or only in the negative form but this is not the case because John uses the modal *can* with this value quite often, more specifically within the subject-oriented reading. If we take into account the three types of modality proposed by Palmer qtd. in Papafragou, dynamic, deontic and epistemic, these subject-oriented uses of *can* are rather dynamic meanings of the modal (371).

The first epistemic value is attested in the corpus at the age 2; 07, with the modal verb *might*. Example (7) below illustrates this use. I applied for this first use as well Snyder's (2007) 'First of Repeated Uses' criterion, and as we can see in (7) the use of epistemic *might* is not the immediate imitation of an adult structure. I also looked through the next part of the corpus after this first use and I found that John uses the same modal with epistemic value four more times by the end of the recordings, once at the age of 2; 08 and three times at 2; 09. Moreover, after this first use of epistemic *might*, he also uses *will* and *must* with epistemic values.

(7)[John 2; 07] \*INV: well I think it's best on the floor.

\*CHI: think.

\*INV: mhm.

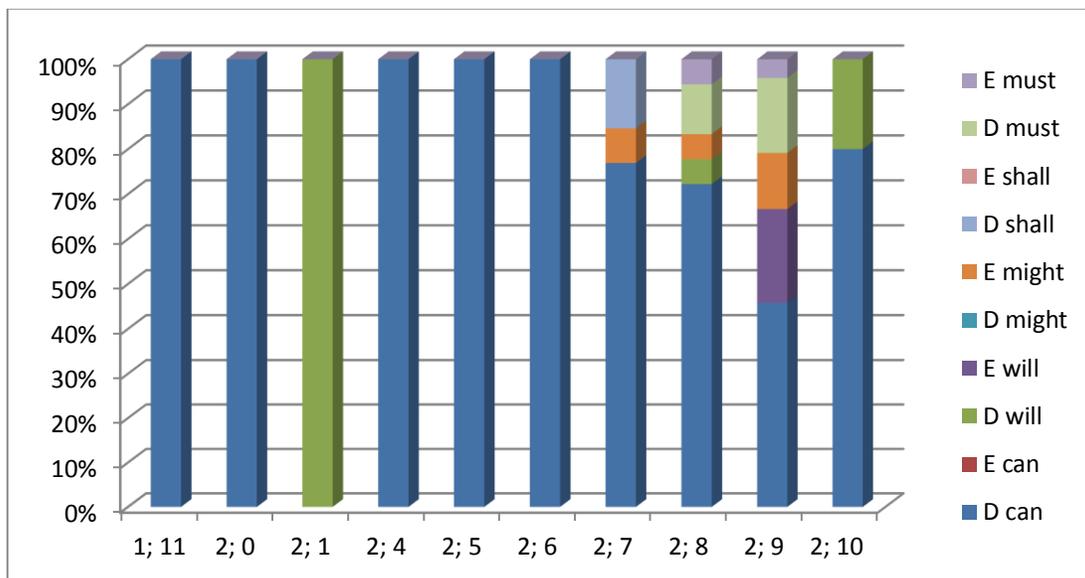
\*CHI: **might be.**

\*INV: might be yeah.

The number of occurrences for each modal is illustrated in Table 1 where it can be seen that the modal *can* has the greatest frequency in the root subject-oriented readings. The use of modal verbs, by verb, as well as the frequency of deontic and epistemic values at each age are illustrated in Figure 1 and Figure 2 below.

**Table 1:** The use of deontic and epistemic modals in child English. *John corpus.*

Can			Will			Might			Shall			Must		
Root S-O	Root D-O	Ep												
44	4	0	3	0	5	0	0	5	0	2	0	0	6	2



**Figure 1.** The use of modal verbs (by verb): John

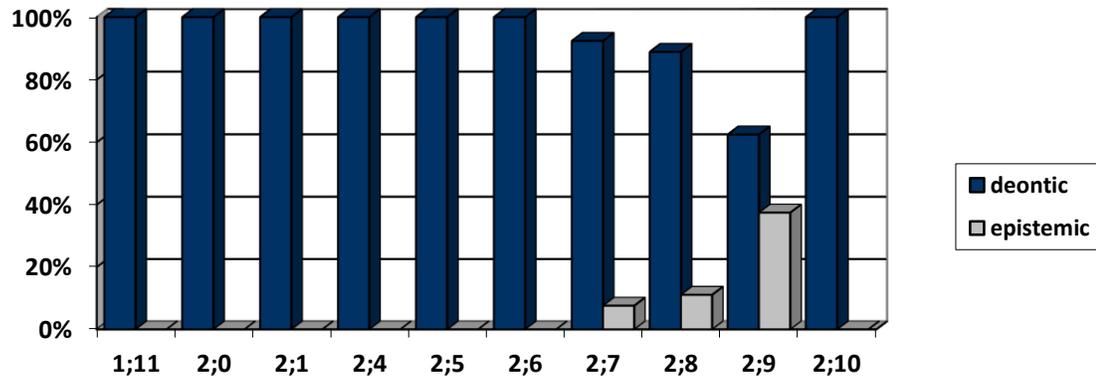


Figure 2. Deontic vs. epistemic values (%): John

#### 4.2.2 Liz

The results I obtained for Liz show quite a frequent use of modals. I found a total of 420 utterances containing modal verbs, 33 occurrences with epistemic values (8%) and 397 occurrences with deontic values (92%). The modals attested in the corpus are *can*, *will*, *might*, *shall*, *could*, *would*, *should*. It appears that Liz uses a wider range of modals than John.

The first modal attested in the corpus is epistemic *might* and it occurs at the age of 2; 0. 14. This finding illustrated in (8) is somehow opposed to the one for John. But in order to verify its availability I applied one more time Snyder's 'First of Repeated Uses' criterion and I searched in the next immediate part of the corpus. I found that Liz uses at least once a month the modal verb *might* with epistemic value, according to the transcripts. After this first epistemic use she also uses other modals like *can*, *will*, *would* and *should*.

- (8) [Liz 2; 0.14]\*MOT: I tell you where it might fit.  
 \*MOT: there.  
 \*CHI: **might there.**  
 \*MOT: did it?  
 \*MOT: oh yeah.

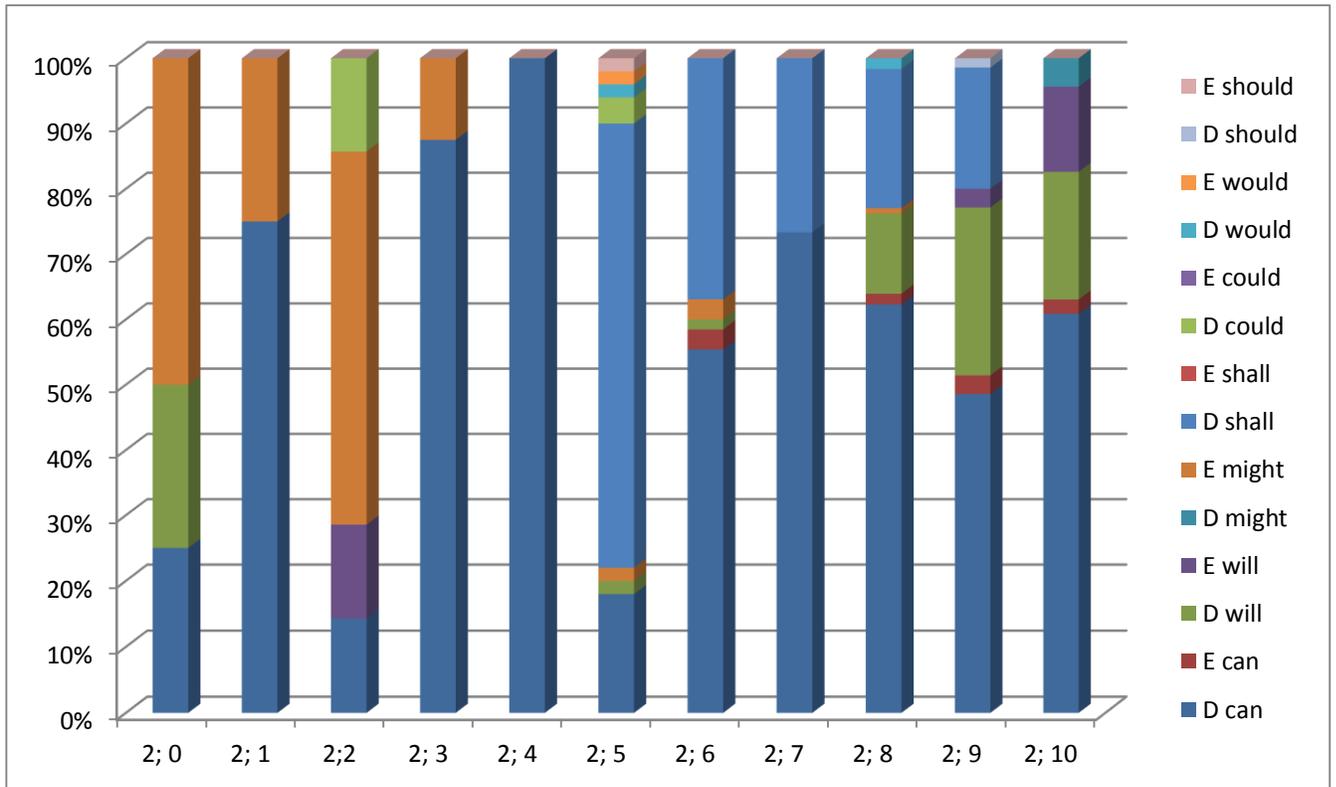
The first deontic value is attested at the age of 2; 0.21. Consider the context in (9). As for the above use I applied the same criterion and found that this deontic use was not in isolation or the result of imitation. Liz uses modal verbs with deontic readings quite frequently

- (9) [Liz 2; 0.21] \*CHI: fish.  
 \*CHI: **Liz can't fix.**  
 \*MOT: all right.  
 \*MOT: okay.

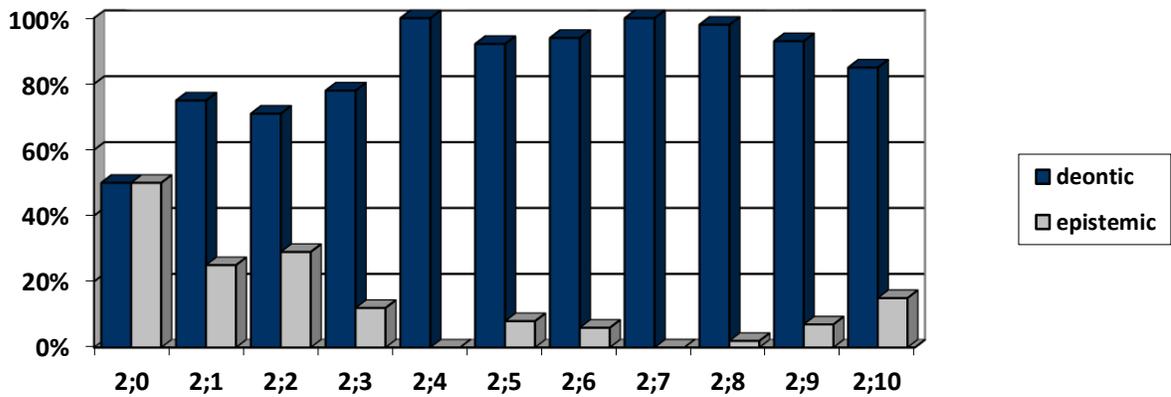
The occurrences for each modal are illustrated in Table 2. The use of modal verbs, by verb, as well as the frequency of deontic and epistemic values at each age are illustrated in Figure 3 and Figure 4 below.

**Table 2:** The use of deontic and epistemic modals in child English. *Liz corpus*.

Can			Will			Might			Shall			Could			Would			Should		
Root S-O	Root D-O	Ep																		
186	40	7	42	4	9	0	0	14	107	0	0	2	1	0	1	2	1	1	0	2



**Figure 3.** The use of modal verbs (by verb): Liz



**Figure 4.** Deontic vs. epistemic values (%): Liz

## 5. Analysis

This analysis starts from the hypothesis according to which modal verbs are monosemous<sup>1</sup> i.e. they have one basic meaning which gets extended contextually. “One should separate the contribution made by linguistically encoded information and inferential processes in the derivation of contextually attested interpretations of lexical items” (Papafragou 8). Kratzer claims that there is something which remains invariable in the meaning of a modal across contextual occurrences. She names that the common kernel of meaning which is felt to be present in all the occurrences of the modal (340).

The prediction that I put forth is that children learn the basic meaning which allows them to use the modal contextually.

Both corpora for John and for Liz had the same number of files and the recording period in terms of the age interval was the same, but the two children do not use modal verbs with the same frequency; modal verbs do not appear in the same order; modal verbs are used correctly which allows us to claim that children know the meaning of the modal in that context, i.e. *can* expresses possibility, *must* necessity etc.

(10)[John 2; 09] \*MOT: what's that now?

\*CHI: bus.

\*CHI: bus.

\*MOT: oh I see.

\*CHI: **people can sit down.**

(11)[John 2; 09] \*MOT: Daddy's car must have a wash as well.

\*MOT: very dirty, isn't it?

\*CHI: yeah.

\*CHI: it's <got a> [/] got a bird poo.

\*MOT: yes.

\*MOT: it has.

\*CHI: **must go in carwash.**

\*CHI: **must go in carwash.**

One might say that in both corpora analyzed for this paper deontic values have a higher frequency of occurrence, especially *can* and *will*<sup>2</sup> but we can notice that the first epistemic value attested for Liz is around the age of 2 which might be taken as a counterargument to Brown's (1973) finding that around the same age children use only deontic values. Also the first epistemic value attested for John is around the age of 2; 07 which might be a counterargument to Wells's (1979) finding that at the age of 2; 06 children use only deontic values. In addition at the age of 2; 06 Liz uses modal *can* with epistemic value

---

<sup>1</sup> There are two main approaches to the semantics of modal verbs: **a.** the monosemous approach (Kratzer 1977, Papafragou 2000) and **b.** the polysemous approach (Palmer qtd in Avram, Coates 1983 qtd in Avram)

<sup>2</sup> There has always been a controversy in the literature whether *will* is to be analysed as a future tense auxiliary (Hornstein 9-41, Leech 51-65) or as a modal verb (McGinnis 25-43, Huddleston 399-439). I choose to analyze *will* as a modal verb and I will adopt the arguments that McGinnis (25-43) and Huddleston (399-439) bring in favour of this hypothesis, i.e. the properties that *will* shares with modal verbs, they have only tensed forms, no agreement marker, they select bare infinitives as their complements, to name just a few arguments.

The fact that a child uses a modal verb with an epistemic value for the first time at a certain age doesn't necessarily imply that he/she didn't know that value before. In order to express epistemic contextual values the modal verb has to take as a complement a structure that should have independent temporal interpretation, i.e. to denote an independent situation that the modal evaluates. Epistemic values are possibly more frequently attested when the structures are complex enough to allow an evaluation of an independent situation. Consider the following examples taken from Liz corpus which are attested in the early files:

- (12) [Liz 2; 08] \*CHI: a tower.  
\*MOT: yeah.  
\*CHI: **what can it be?**  
\*CHI: what [\* 0is] it going to be?
- (13) [Liz 2; 05] \*CHI: want it all right.  
\*CHI: **should it be all right now.**  
\*MOT: it'll be all right now?  
\*MOT: is that what you're saying?  
\*CHI: **should be all right.**

If children do not use epistemic modal verbs frequently it doesn't mean that they don't know them. It might be the case that we should not take into consideration an extension of the semantics of the modal when it comes to acquisition, but a "progress" at the morpho-syntactic level.

## 6. Conclusions

The aim of the paper was to evaluate the two main hypotheses with respect to the acquisition of modal verbs, with a view to answering the question whether it is true that epistemic modals are acquired later than deontic ones. In the two corpora investigated for this paper, i.e. John and Liz from the Manchester corpus, Childes Database, I found that both deontic and epistemic values are attested early and I also noticed that there is no clear time lag between the acquisitions of these modal values.

Another factor which should be taken into consideration is individual variation, the two children do not use modal verbs with the same frequency and they do not have the same pattern of occurrence of modal verbs.

I also noticed that young children use modal verbs correctly which demonstrates that they know the meaning of the modal in that context, i.e. *can* expresses possibility, *must* necessity etc. The fact that a child uses a modal verb with an epistemic value for the first time at a certain age doesn't necessarily imply that he/she didn't know that value before.

## References

- Avram, L. *The Acquisition of the English Modals*. Unpublished lecture, department of English, University of Bucharest, 2007.
- Brown R. *A First Language: The Early Stages*. Cambridge, MA: Harvard University Press, 1973.
- Coates, J. *The Semantics of the Modal Auxiliaries*, Croom Helm/Routledge, 1983
- Heizmann, T. The acquisition of deontic and epistemic readings of must and müssen. In: Heizmann, T. (Ed.), *Occasional Papers in Linguistics*, vol. 34: *Papers in Acquisition*. University of Massachusetts, 2006.
- Hirsch, C., and K. Wexler. *The Late Development of Raising: What Children Seem to Think About Seem*. In S. Dubinsky and B. Davies (eds.) *New horizons in the analysis of control and raising*. New York: Springer, 2007.
- Hirst, W. & Weil, J. 'Acquisition of Epistemic and Deontic Meaning of Modals', *Journal of Child Language* 9: 1982. 659-66
- Hornstein, N. *As Time Goes By*, Cambridge, Massachusetts: MIT Press, 1990.
- Huddleston, Rodney. 'The Case against A Future Tense in English', *Studies in Language* 19:2. (1995). 399-446.
- Kratzer, A. 'What 'Must' and 'Can' Must and Can Mean', *Linguistics and Philosophy*, 1. (1977). 337-55.
- Leech, G. *Meaning and the English Verb*, London: Longman, 1971/1986.
- McGinnis, M. *The Deontic/Epistemic Distinction in English Modals*. MA Dissertation, University of Toronto, 1993.
- Modyanova, N., Agoos, C., Kenney, A., Echelbarger, M., Holt, A., Wexler, K. 'Young Children's Interpretations of Modal Verbs'. In J. Costa, A. Castro, M. Lobo & F. Pratas (Eds.) *Language Acquisition and Development: Proceedings of the Generative Approaches to Language Acquisition 2009*. Cambridge Scholars Press, 2010. 301-312
- Noveck, I. A., Ho, S., Sera, M. 'Children's Understanding of Epistemic Modals. *Journal of Child Language* 23: (1996). 621-643
- Palmer, Frank R. *Mood and Modality* (2nd edition), Cambridge, Cambridge University Press, 2001.
- Papafragou, Anna. *The Acquisition of Modality: Implications for Theories of Semantic Representation*. *Mind & Language*, 13 (3): (1998). 370-399.
- Papafragou, Anna. *Modality: Issues in the Semantics –Pragmatics Interface*. Amsterdam: Elsevier, 2000.
- Shatz, M., S. Wilcox. *Constraints on the Acquisition of English Modals*. In S. Gelman, J. Byrnes (eds.) *Perspectives on Language and Thought*. Cambridge University Press, 1991. 319-353.
- Snyder, W. *Child Language: The Parametric Approach*. Oxford, UK: Oxford University Press, 2007.
- Sweetser, E. *From Etymology to Pragmatics: Metaphorical and cultural aspects of Semantic Structure*. Cambridge University Press, 1990.
- Wells, C. G. *Learning and Using the Auxiliary Verb in English*. In V. Lee (ed.), *Cognitive development: language and thinking from birth to adolescence*. London: Croom Helm, 1979.