

The expression of certainty and uncertainty in Italian speaking children

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Abstract

Epistemic modality expresses the speaker's attitude of certainty/uncertainty toward the fact/event mentioned in the proposition. In conversation, the use of epistemic modality informs the listener on how much s/he should rely on the piece of information offered. Languages express epistemic modality in many ways. In the Italian language epistemic modality is expressed by the modal verbs *dovere* "must" and *potere* "may", "can", but also by other grammatical devices: nouns e.g. *possibilità* "possibility", adjectives e.g. *possibile* "possible", adverbs e.g. *possibilmente* "possibly", *forse* "perhaps". Though children's use of modal verbs has been the most extensively investigated issue in the study of modality acquisition, modal verbs may not be the most frequently used linguistic means. This study investigates the elicited production of expressions of certainty/uncertainty in typically developing Italian children.

Keywords: language development, pragmatic development, modality acquisition, epistemic modality

Introduction

Theory of Mind is the ability to attribute mental states to oneself and others (Premack, D. G. and Woodruff, G., 1978). In the last 30 years it has been a very popular subject of study and it has strongly contributed to our awareness of the causal impact that representations have on actions (Wimmer, H. and Perner, J., 1983). Representations can be acquired not only through direct perception, but also through language (Pillow, B.H., 1993). When we tell other people something, and change their representations, we affect their course of action in an indirect

Maria Silvia Barbieri – *The expression of certainty and uncertainty in Italian speaking children*

way. This is why language can be considered as a particular form of action on the world (Ford, D.H. and Lerner, R.M., 1992). In this framework, it is very important to master that type of language which allows us to know how much we can rely on a given representation when it is communicated as certain, or uncertain at different degrees, i.e. the language of epistemic modality.

Epistemic modality expresses the speaker's attitude of certainty, predictability or uncertainty toward the fact/event mentioned in the proposition (Lyons, 1977).

- E.g. a) *It may rain tomorrow.*
b) *I am sure that tomorrow it will rain.*

In conversational exchanges a speaker's use of epistemic modality informs the listener on how much s/he should rely on the piece of information offered. In this line of thought, the acquisition of the epistemic modality, and the language that expresses it, is a very important step in children's pragmatic development.

Children's use of modal verbs has been for a long time the main focus in the study of modality acquisition.

Experimental studies usually probe the understanding of epistemic modals with different experimental paradigms. Experimental methods allow for the control of the conditions of occurrence of the behaviour under study (in this case, the understanding of modalized sentences). In the study of language development, the advantages of experimental methods are twofold: a) the experimenter can choose the expressions to be studied therefore s/he may focus on a range of expressions wider than those usually produced by children; b) s/he is able to probe children understanding of the expressions under focus even when the supporting function of the context is lacking. Though some experimental studies show some understanding of the epistemic modals by four or five years of age (Hirst and Weil, 1982; Byrnes & Duff, 1989; Moore, Pure and Furrow, 1990; Noveck, Ho & Sera, 1996; Papafragou, 1998; 2001) many other studies (Major, 1974; Perkins, 1983; Stephany, 1986; Coates, 1988; Bassano, 1982; Day, 1994; Bascelli and Barbieri 2002) claim that epistemic modal verbs are not fully understood until the age of 10 years and that a proper organization of the epistemic modal system is a late developmental achievement.

On the contrary, observational studies, based on spontaneous speech production (Kuczaj e Maratsos, 1975; Wells, 1979; Shepherd, 1982; Shatz, Wellman and Silber, 1983; Bliss, 1988; Shatz and Wilcox 1991; Bernini, 1995, Calleri, 1995; Bassano, 1996), report the production of epistemic expression as early as three years of age. Similar results have been found for other languages such as German (Stephany, 1993), French (Bassano, 1996), modern Greek (Stephany, 1986), Polish

(Smoczynska, 1993), Creole of Antigua (Shepherd, 1982), Korean (Choi, 1995). However, with observational studies it is difficult to decide whether this early use corresponds to a full understanding, or is only conversational.

Despite these contradictory results, both lines of research agree in pointing out an earlier use of the modal verbs in the deontic meaning as compared to the epistemic.

However, modal verbs may not be the most extensively linguistic means used by children to express the epistemic modality. In fact, languages can express the epistemic modality in many ways. For example, in the Italian language, epistemic modality is expressed by the auxiliary modal verbs *dovere* “must” and *potere* “may”, “can”, but also by other grammatical and lexical devices: nouns (e.g. *possibilità* “possibility”), adjectives (e.g. *possibile* “possible”), adverbs (e.g. *possibilmente* “possibly”, *forse* “maybe” “perhaps”), verbal tenses and moods such as indicative simple future to indicate uncertainty (e.g. *Sarà come dici* “It might be as you say”), indicative past imperfect to indicate unreality (e.g. *io ero il re e tu la regina* “I was the king and you were the queen...”), present conditional or subjunctive to indicate uncertainty (e.g. *verrei con te, ma non so se posso* “I would come with you, but I do not know if I can”; *Che voglia andarsene?* “might it be that he wants to leave?”).

Therefore, a study investigating the spontaneous expression of epistemic modality in children could be very useful for our knowledge of modality acquisition. In fact, it is very likely that children prefer to express epistemic meanings with linguistic devices other than modal verbs, given young children’s avoidance of polysemy (Markman, 1991) and the early attribution of deontic meanings to the modal verbs *dovere* “must” and *potere* “may”, “can” (e.g. *You must come for dinner, You may go for a walk*).

The aim of the present study is mainly descriptive; it will investigate the linguistic means used to express certainty and uncertainty by typically developing children, Italian native speakers. The present study has three main features:

- a) It uses an elicited production method. Elicited production is a good compromise between experimental and observational methods because the stimuli are the same for all children who will respond to them using their own words. Therefore, we shall be able to observe spontaneous productions, but, in addition, we will be allowed some comparisons.
- b) It codes production not only for the presence of modal verbs, but for all the possible linguistic means used to express certainty and uncertainty.
- c) It uses a very simple and easy perceptual task, therefore avoiding the difficult problem of the relationship between language and thought. In fact, if children are presented with difficult reasoning tasks, we are not in a condition to

know whether a poor production is the effect of a lack of language or the effect of the inability to solve the problem.

Subjects

One hundred and fifty children, divided into six age groups of 25 subjects each (mean age 3,4; 4,3; 5,4; 6,3; 8,4; and 10,4 years) participated to this study. Children were recruited in nursery and elementary schools in a small municipality in the province of Udine, Italy. Because development at pre-school age proceeds faster than during school years, age groups were selected with one year difference from three to six years of age, and with two years difference from six to ten years of age.

Procedure, task and material

Children were interviewed individually in a quiet room of the school by a young female experimenter. Participation to the experiment was free and children were told that they could interrupt the session at any time, but all of them participated till the end. The task was presented as a game. Children had to act as assistants of a detective who was not very skilful at using his magnifying lens. They had to help him by identifying the visible objects through the lens. At the end of the game, the children were told that their help had been very useful and thanked.

The task material consisted of six series of pictures (flower, soccer ball, ice cream cone, ring, sprinkler, teddy bear), one for each inquiry introduced by a short story. The pictures of each series, shown in the magnifying lens, were computer modified so that they were very blurred at the beginning and became progressively clearer up to full visibility.

Pictures 1-5 show the series “Flower”:



Figure 1

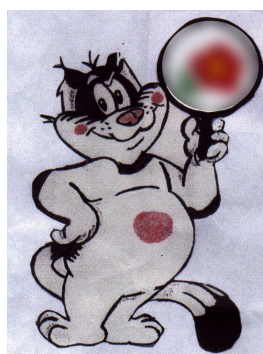


Figure 2



Figure 3



Figure 4



Figure 5

The children had to identify each picture in the series. They had to say what was the object represented in each picture (*What is this?*).

Certainty and uncertainty are mental states. In order to know how children became progressively aware of the quality of their representations, participants were also asked whether they were certain or not about the object identity (*Are you sure that it's a...?*).

Finally, they were requested to justify their identification (*Why do you say that it's a...?*), and their state of mind (*Why are you sure/unsure that it's a...?*).

So as not to make the interview too long, following the first identification the questions were repeated only when the object identification was changed.

All the interviews were recorded, transcribed and coded according to certainty/uncertainty of the identification; linguistic forms with which certainty and uncertainty were expressed; and types of justifications, in the following coding system.

Type of Identification

The answers to the questions (*What is this? Are you sure that it's a..?*), were coded as follows:

No Answer: The child stays silent or produces uninformative answers e.g. colors.

Certain Identification: Identifications were divided into Positive and Negative Identifications. In Positive Identifications the child produces a simple declarative sentence or a noun (e.g. *It's a flower, a ball*); in Negative Identifications the child states clearly that s/he cannot identify the object (*I do not know*).

Uncertain Identification: The answer of the child includes a verbal form that might be interpreted as a modal expression of uncertainty (e.g. *A flower maybe, It could be a flower, etc.*). Long pauses or a hesitant tone of voice were not considered.

Expression of Identification

All epistemic expressions produced by children were coded as follows:

Mental Verbs. These verbs have a modal semantic content and express the speaker's understanding of his/her state of mind (e.g. *Pensare* "to think", *credere* "to believe", *sospettare* "to suspect", *dubitare* "to doubt" ...etc.).

Adverbs, adverbial locutions and modal particles. Adverbs express the degree of certainty/uncertainty of the speaker about what s/he is claiming (*Certamente* "certainly", *ovviamente* "obviously", *forse* "perhaps", etc...).

Modal adjectives. These adjectives are often used in sentences containing the verb *essere* "to be" (*sicuro* "sure", *certo* "certain", *impossibile* "impossible", *incerto* "uncertain") and express the degree of the speaker's commitment to what s/he says.

Modal nouns. These nouns can be used alone or in a sentence and express the degree of the speaker's commitment to what s/he says. (e.g. *certezza* "certainty", *possibilità* "possibility", *dubbio* "doubt", etc.).

Modal verbs Modal verbs express the degree of the speaker's commitment to what s/he says. *Potere* "may", "can" expresses possibility and is a marker of uncertainty. *Dovere* "must" indicates that the speaker has enough information to be committed to what s/he says.

Verbal tenses and verbal moods. As for verbal moods, conditional and subjunctive are used, among other things, to express an epistemic modality of doubt or hypothesis (e.g. *potrebbe essere un ..* “It might be a...”; *penso che sia un* “I think that it might be a ...”), as for tenses, in Italian, indicative imperfect is often used by children to mark unreality, while simple future is increasingly acquiring in Italian a meaning of uncertainty for both present and future events (e.g. *sarà un ...* “it might be a..”).

Interjections. Interjections are used only for certain negative identifications or for uncertain identifications (e.g. *boh!*, meaning “I do not know”; *mah!* meaning “I strongly doubt it”).

Justifications

The answers to the questions concerning the justification of the identification (*Why do you say that it's a...?*), and the justification of the mental state of certainty/uncertainty (*Why are you sure/unsure that it's a...?*) were coded in the following categories:

No Justification. The child stays silent. In this category are also included answers such as *I do not know*, *Because*, etc.

Tautology. The child repeats the identification or produces generic answers not mentioning any of the object's features (*It's a flower just because; It's a flower because it's a flower*).

Evidence. The child refers to the features of the objects that made possible the object identification (*This seems to be an elephant's head because here...this could be the head and this could be the proboscis*).

Mental State. The child makes reference to mental states (*...a footprint because I think that I understand so*).

Other. Justifications that does not fall in any of the previous categories (narratives, references to the functions of the object, references to personal experiences, etc).

Analyses and results

Quantitative analyses were run on the type of answer (Certainty/Uncertainty). Then, some descriptive analyses were run on the linguistic means used to express Certainty/Uncertainty, and on children's justifications.

As for the types of answer, the corresponding pictures of all series were considered and the frequencies of each type of answer were summed up. Therefore, the maximum frequency of each type of answer could equal six if all the other types were equal to zero. The four distributions are not independent; therefore the four types of answer (No Answer, Negative Certainty, Positive Certainty, and Uncertainty) were analysed separately. Each type of answer was submitted to a repeated measures design ANOVA AGE (6) x PICTURE (5) with Age as a between subjects factor with and Picture as a within subjects factor.

First, the absence of answers was analysed. Not answering (No answers) is a very infrequent behaviour at all ages. The raw frequency of No Answers amounts to 44 at three years and to 17 at ten. For this type of answer, Mauchly's Test of Sphericity indicated that the assumption of sphericity had been violated, $\chi^2(9) = 230.6$, $p < 0.001$; therefore, the degrees of freedom were corrected using the Greenhouse-Geisser estimates of sphericity ($\epsilon = 0.68$). The results show that the absence of Answers is affected only by figure $F(2,72, 576) = 23.9$, $p < 0,001$, all the other effects being not significant. The mean of No Answers is highest for figure 1 and totally absent for figure 5. Table 1 shows the means for the raw frequencies of No Answers to the five figures.

Table 1. *Means of No Answers per figure*

	Fig. 1	Fig. 2	Fig. 3	Fig. 4	Fig. 5
Means	0,566	0,400	0,293	0,100	–

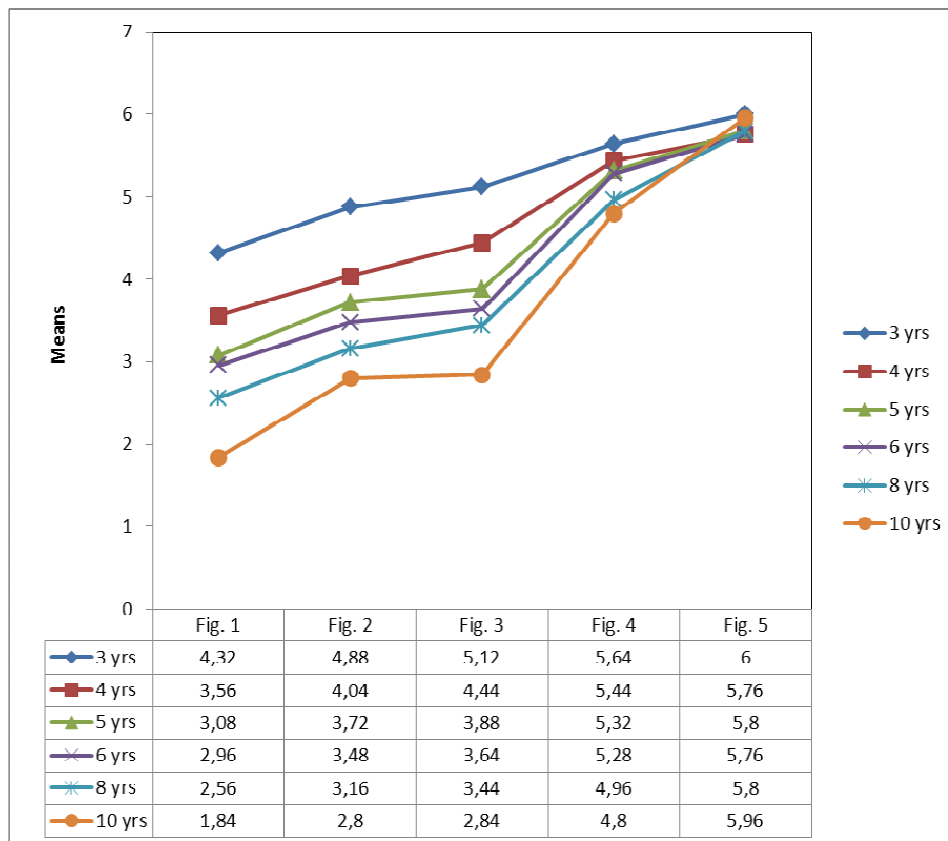
Similar results can be observed for the answers of Negative Certainty (*I do not know*). Also for this type of answer, Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been met, $\chi^2(9) = 163.5$, $p < 0.001$; therefore, the degrees of freedom were corrected using the Greenhouse-Geisser estimates of sphericity ($\epsilon = 0.72$). The results indicate that the Negative Certainty answers are affected only by figure $F(2,87, 576) = 23.36$, $p < 0,001$, all the other effects being not significant. These answers are also very infrequent, and decrease from the first to the fifth figure. Table 2 shows the means of the raw frequencies of Negative Certainty per figure.

Table 2. *Means of Negative Certainty Answers per figure*

	Fig. 1	Fig. 2	Fig. 3	Fig. 4	Fig. 5
Means	0,746	0,533	0,446	0,160	0,033

Altogether, the results concerning the distributions of No Answers and Negative Certainty Answers indicate some sensitivity to the haziness of the picture as these answers decrease from figure 1 to figure 5. Moreover, the scarce frequency of these answers, and the absence of age differences indicate that the task can be submitted even to very young children.

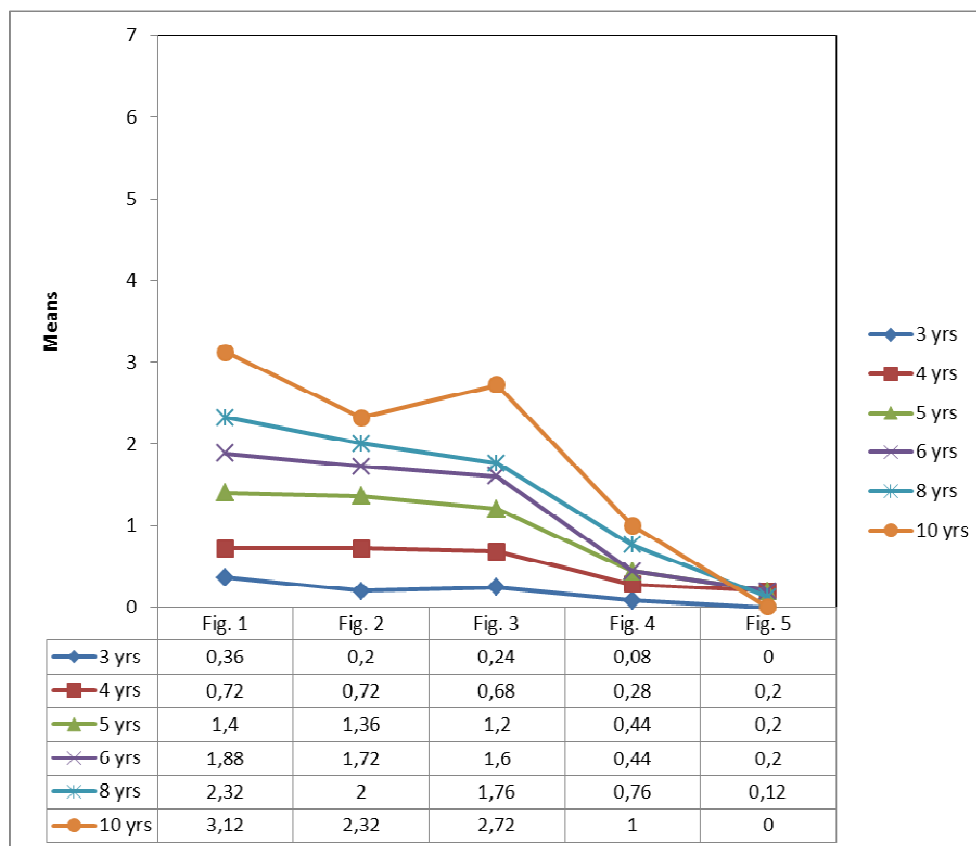
Very different results are observed when Positive Certainty and Uncertainty are concerned. For Positive Certainty Answers, Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been met, $\chi^2(9) = 101.9$, $p < 0.001$; therefore, the degrees of freedom were corrected using the Greenhouse-Geisser estimates of sphericity ($\epsilon = 0.80$). The results show the expected two-way interaction between Age and Picture, $F(16.1, 576) = 2.97$, $p < 0.001$. This indicates that Positive Certainty Answers are modulated both by age and picture haziness. The ways of this interaction are shown in Graph 1. As we can see, Positive Certainty Answers are almost the totality for Picture 5 in all age groups (maximum expected = 6, observed means ranging from 5,76 to 6, according to age), while for pictures 1, 2 and 3 there are clear age differences. Three-year-olds show the highest level of certainty for all pictures, and make little difference between them. On the contrary, the answers of ten-year-olds are clearly and finely modulated by the picture with the lowest frequency of certainty answers for the most blurred pictures and the highest for the clearest ones. The others age groups lay in between.



Graph 1. Mean frequency of the Positive Certainty Answers for each Picture in the six age groups.

Similar results are observed for Uncertainty Answers, with a distribution that is opposite to the previous one. Also for this type of answer, Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been met, $\chi^2(9) = 113,6$, $p < 0.001$; therefore, the degrees of freedom were corrected using the Greenhouse-Geisser estimates of sphericity ($\epsilon = 0.80$). Also for Uncertainty Answers we observe a significant Interaction between Age and Picture $F(16.1, 576) = 5.96$, $p < 0.001$, which shows a different sensibility for the uncertainty in the various age groups. Graph 2 shows the means of Uncertainty Answers by Picture and Age. In the graph, we can easily observe that three- and four-year-olds are scarcely sensitive to uncertainty, while by the age of 5, children's answers are finely modulated by the picture, and this effect increases with age. Ten-year-olds are

even sensitive to the decreased intelligibility of picture three as compared to picture two.

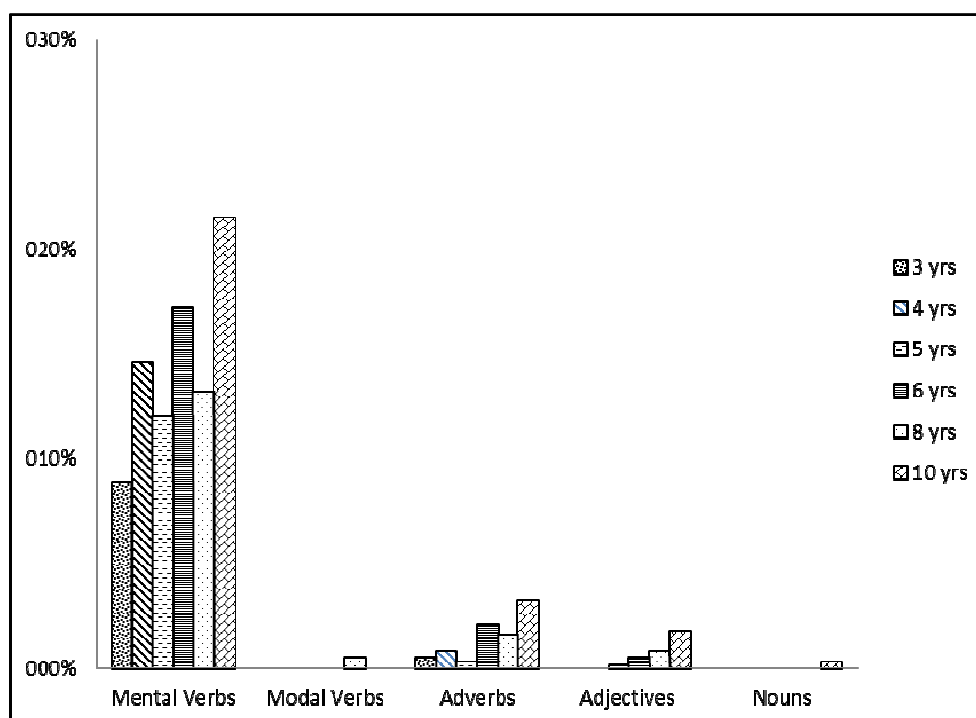


Graph 2. Mean frequency of the Uncertainty Answers for each Picture in the six age groups.

Altogether, the results concerning identifications show that children's sensitivity to uncertainty is scarce in three- and four-year-olds and increases progressively from five to ten year olds.

The second set of results concerns the linguistic forms used by children to express Certainty and Uncertainty. Children's expressions were coded according to the grammatical categories of the linguistic forms used to modalize the sentence. Then inside each grammatical category, the lexical items most frequently used were considered. For these sets of results simple frequency counts were used.

Graph 3 shows the percent distribution of the different grammatical categories for the modal expressions of Certainty.



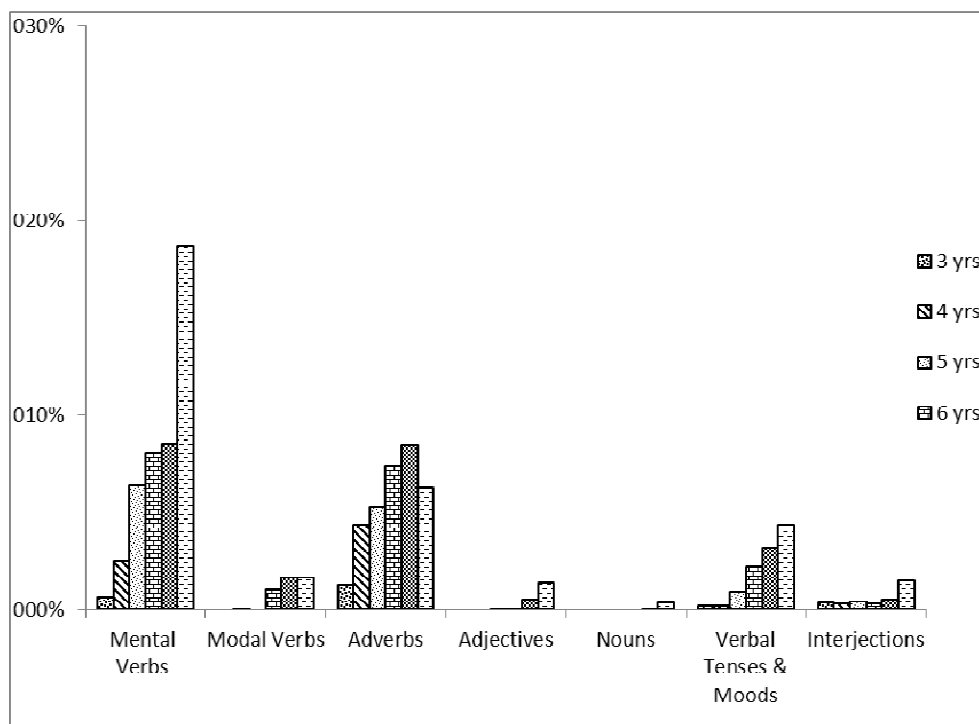
Graph 3. *Percent distribution of the different grammatical categories for the modal expressions of Certainty.*

Graph 3 shows that, at all ages, mental verbs are the preferred means to express certainty, and that all the other grammatical categories are much less frequent. Modal verbs are almost absent, at least as far as the expression of certainty is concerned.

The analysis of the lexical items appearing inside each grammatical category, shows that *sapere* “to know” e *capire* “to understand” are the most used Mental Verbs since very young ages. *Proprio* “indeed” is the most used adverb, followed by *veramente* “really”. Adjectives like as *vero* “true” and *sicuro* “sure” appear at about 6 years. The Modal Verb *dovere* “must” appears only at 8 years, and it is very scarcely used.

However, in communication, certainty does not require emphasis, unless challenged, while uncertainty deserves to be clearly stated. The expressions of uncer-

tainty includes the same grammatical categories as certainty, plus the use of Verbal tenses and moods and Interjections. The percent distribution of frequencies of modal Expression of Uncertainty is shown in Graph 4.



Graph 4. *Percent distribution of the different grammatical categories for the modal expressions of Uncertainty*

In Graph 4 we can observe that Mental verbs and Adverbs are still the grammatical categories most frequently used at all ages to express Uncertainty; all age groups use Mental Verbs and Adverbs with almost the same frequency, except the ten-year-olds who use Mental Verbs twice as much as all the other groups. In the expression of Uncertainty, Modal verbs appear at six years of age, therefore their use is earlier, and a little higher than for the expression of Certainty. Verbal tenses and moods already appear at five years but they are used in a different way at the various ages. Youngest children use the indicative imperfect of unreality and simple future, while Subjunctive and Conditional moods do not appear until 8-10 years of age.

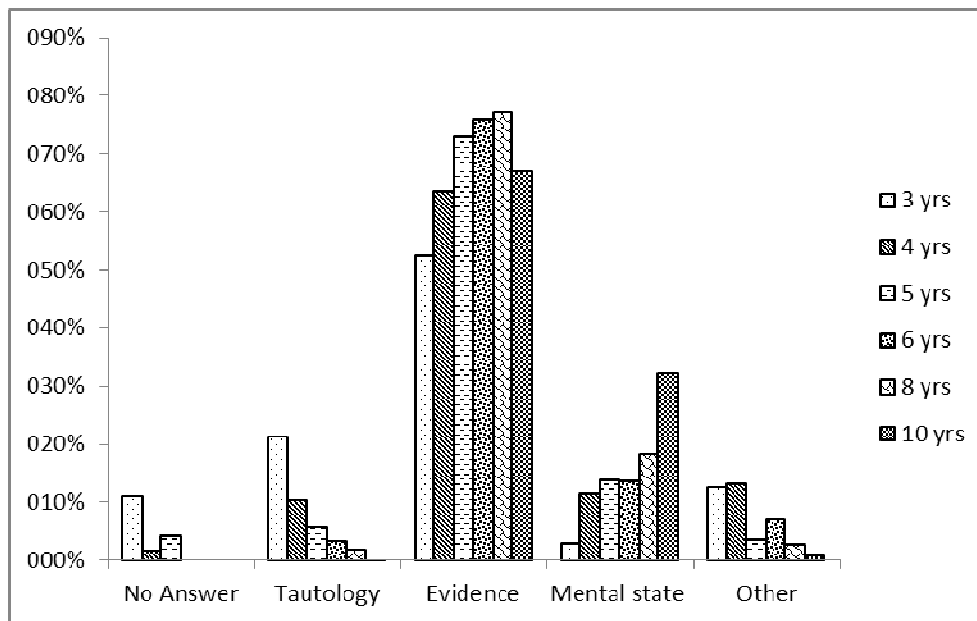
As for the lexicon of Uncertainty *sembrare* “to seem like”, *pensare* “to think”, *assomigliare* “to look like”, are the most frequent and appear respectively at three, four and six years of age. The adverb *forse* “perhaps” appears early and has a high frequency; other adverbial locutions appear after five years of age. The Modal Verb *potere* appears at 6 years, but it is used in the Conditional mood only at 8/10 years.

The analysis of the linguistic means used to express uncertainty shows a progressive enrichment of the epistemic lexicon and the use of an increasingly large number of lexical and grammatical categories appearing in the course of development in the following order: Mental Verbs; Future and Past tenses in the indicative mood; Adverbs; Modal verbs; Modal Adjectives: Conditional and Subjunctive moods.

Mental verbs and Adverbs remain the most frequent linguistic means used at all ages to express Uncertainty.

The sets of results presented till now concern the experience of uncertainty – the perception of something difficult to identify- and how children express it with words. The last set of results concerns a more sophisticated task, i.e. the request to children to monitor their own mental processes and to justify both, their own identification, and their states of mind relative to the confidence placed in their identifications.

The percent frequency distribution of the answers to the question *Why do you say it is a..?*, i.e. justifications of identifications, shows that the great majority of answers at all ages refers to Evidence and that only a few three- or four-year-olds do not respond or respond inappropriately in a tautological way (Graph 5). The great majority of children refer instead to evidence which is the correct answer to the question. Children justify their own identifications by referring to the object details they detect or think they have detected. In this analysis, the answers referring to mental states are of some interest. The frequency of these answers is about 10/15% at all ages, except in the group of the ten-year-olds where they amount to the 32% of all answers. In other words, ten-year-olds, when justifying their identifications, overwhelmingly refer to evidence, or to mental states.

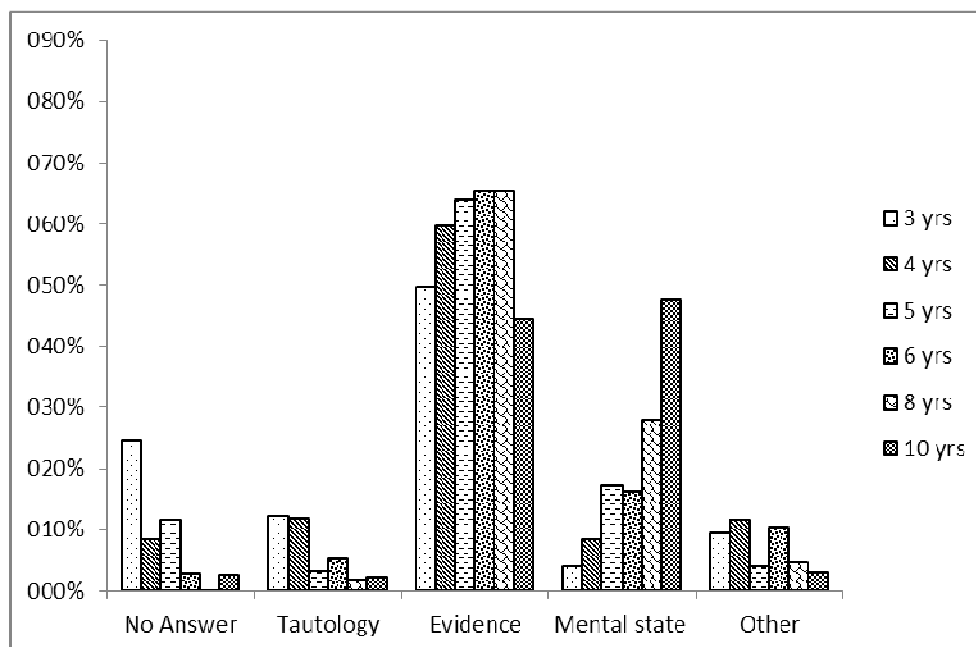


Graph 5. *Percent distribution of the Justifications of Identifications (Why do you say it's a...?) in the six Age Groups*

This result shows the older children's increasing awareness of their mental states. The last years of elementary school are in fact the years of developing metacognition, and school tasks increasingly require its use. However, this ability is not yet totally mastered and ten-year-olds seem to find it difficult to distinguish between questions referring to the external world –the object and its features- and questions referring to the mental processes that allow them to perceive, explore and evaluate the external world. The analysis of the justifications referring to the questions *Why are you sure it is...?* will make this point clear.

Compared to the previous one, in Graph 6 we observe a slightly higher amount of answers falling in the inappropriate categories (No Answers, Tautology, or Other which includes Function, Narrative, Personal). This indicates a general difficulty at understanding the question. The point is made even clearer when we observe the two categories of Evidence and Mental state. The expected answer to the question *Why are you sure it is...* is a reference to an Informative Access or a Mental State. But the children we have observed make no reference at all to informative access, and the reference to mental states reaches only the 48% at 10 years. In fact, until 8 years of age the majority of answers falls in the Evidence category, and only at 10 years children's answers are evenly divided between Evidence and Mental

State. In other words, children misunderstand the question and interpret it as if the question concerned the object and not their subjective feeling of certainty or uncertainty.



Graph 6. *Percent distribution of the Justifications of Qualifications (Why are you sure it is...) in the six Age Groups*

Conclusions

The aim of this study was to investigate the linguistic means used by typically developing Italian children, aged from three to ten years, to express certainty and uncertainty. To this purpose, a very simple task was used, where children had to identify the objects portrayed in six series of pictures blurred at various degrees. The task was well suited even for the youngest children and elicited a certain amount of production in all the age groups. The results show a progressive sensitivity to uncertainty, especially from five-year-olds on, together with a qualitative and quantitative development in production. We can observe an increasingly large number of lexical and grammatical categories used to express Certainty and Uncertainty and a growing enrichment of the epistemic lexicon. In the course of

development, the use of Mental Verbs comes first; followed by Adverbs, Modal verbs, Modal Adjectives, and, lastly, by Conditional and Subjunctive moods. Mental verbs and Adverbs remain however the most frequent linguistic means used in all the age groups.

To summarize, even if at the age of three we may observe the production of some expressions of certainty/uncertainty, the epistemic system undergoes a development consisting in the progressive ability to appreciate the continuum between certainty and uncertainty and in the enrichment of the linguistic means used to express it. Though the results of this study illustrate the main points of this progress, this development does not stop at ten years; on the contrary, it continues into adolescence and adulthood. In another study, Barbieri, M.S., Bascelli, E., De Castro, C. (2002) showed that adults as well use a great number of mental verbs, but they also use modal verbs and verbal moods much more than the twelve-year-olds, who, in turn, use more adverbs, and do not differ from the ten-year-olds in their distribution of the linguistic means used to express uncertainty.

One of the main results of this study is the preferential use of mental verbs and adverbs in all of the age groups observed, and the minor role played by modal verbs in the expression of epistemic meanings by children. Three explanations can be put forward, all of them arising from the observation that modal verbs are first used in development with a deontic meaning.

- A) Modal verbs with deontic meaning appear earlier in children's development because the human species is social by its very nature, and for young children it is more relevant to control and regulate people's actions than people's cognition.
- B) Epistemic meanings appear relatively late, because of the late understanding of the representational mind. The concept of mental representation is not grasped by children until the age of four; however the understanding of some mental processes, such as inference (Pillow, B.H., Hill, V., Boyce, A., and Stein, C. 2000), and the ability to monitor one's own mental states are a school age achievement.
- C) Once modal verbs are used to express deontic meanings they are no longer "available" to express epistemic meanings since children do not understand polysemy until about 8/9 years old (Markman, 1991, Mervis, C.B., & Bertrand, J., 1994), and therefore avoid it.

These explanations do not contradict each other, especially if we take a multi-causal perspective on the development of language and communication. However, it is important to be aware that each explanation corresponds to a different re-

search focus. If the researcher's main problem is to ascertain whether there is one out of the possible meanings of the modal verbs that children understand first, and, if so, which one and why, then the main focus is on semantics, and this corresponds well to the mainstream research in language development in the '80s and '90s of the past century.

The explanation focused on polysemy avoidance is an explanation based on developmental pragmatics, and the features of human mind that favour language acquisition in context; a line of research started in the '90s and still open.

The explanation based on the late understanding of the representational mind is psychological, and, more than any other, raises the issue of the relationship between language and thought, a problem dating back to Piaget and Vigotsky in the history of developmental psychology and still object of debate. While traditional solutions favour one or the other direction of this relationship, more recent research has considered the relationship between language and thought as a dynamic one, where known words can acquire new meanings when pre-existing concepts are redefined or new concepts acquired, but also where the acquisition of new words can elicit the revision of already existing concepts.

In this study, the choice of a perceptual task was precisely aimed at putting the lowest possible pressure on reasoning and cognition in order to obtain an ecologically valid description of the language used to express certainty and uncertainty. Of course, the language-thought problem cannot be completely avoided, and the analysis of justifications raises the issue of the awareness of mental states that children of different ages can develop. However the development of epistemic concepts is an issue that requires different methods.

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