

# START ARGUING TO SOLVE A TASK: PRESCHOOL CHILDREN ALREADY ENGAGED WHEN THE TEACHER PRESENTS THE ACTIVITY

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## Abstract

Studies of argumentation in education have increased in the last few decades, to analyze how people learn to argue, and how it is possible to improve practices of arguing to learn. Overall, these studies have shown that argumentation at school rarely occurs spontaneously, in contrast to the dialogical practices in informal settings, although the argumentative capacities of young children, even at preschool level, have been already highlighted. Other studies have been specifically devoted to examining the role of teachers in establish the conditions to engage pupils in argumentation: how to present instruction, how to motivate them to argue, how to guarantee a proper collaboration.

Although we recognize the interest of looking at the role of the adult (teacher) in designing argumentative activities at school, in this paper we intend to analyze whether the presentation of a task requiring argumentative exchange is taken by children as a useful occasion to start arguing. To attend this goal, we will refer to an interdisciplinary approach, combining the pragma-dialectics and a discursive perspective to analyze the children's reasoning emerging in the classroom while the teacher is presenting a task.

A total of 44 preschool children (3-5 years old) were asked to interact in small groups of two or three people at the kindergarten in order to solve three tasks (to build a tunnel, a bridge and an hourglass – by using different materials) supposed to solicit argumentative exchanges among the participants. The activities were video-recorded and the interactions transcribed. The qualitative analysis implied two steps: the identification of the argumentative structure of each exchange according to the pragma-dialectical approach; and the interpretation of the beginning of the argumentative discussions, through a discursive approach.

The findings show that, while the teacher is presenting the task and asking participants to solve it, the children already engage themselves in reasoning about some aspects of the activity (e.g., alternative ways to solve the problem, possible use of other tools, etc.). Beyond expectations, children immediately start to argue about the task, advancing their ideas and comparing the possibilities offered by the available objects. As a consequence, the teacher is requested to re-organize the plan, to consider the children's argumentative attempts, and to arrange the situation in order to pursue the goal and, at the same time, to take into account the children's interest.

As scientists in the field of teacher education, we suggest that teachers should consider not only their need to set out in advance the setting for the activity to be proposed at school, but also the opportunity to look first at what children already do when engaging in interactions. This will allow a better understanding of the relevance of cognitive-oriented argumentative activities in classroom, in which children can immediately enter and develop arguments even before the teacher manages to present the activity. Further studies should contribute to develop these aspects and to train pre- and in-service teachers to consider such a situation, to analyze it and to implement strategies devoted to favor cognitive argumentation at school.

Keywords: Argumentation, preschool children, problem solving, design.

## 1. INTRODUCTION

Studies of argumentation in education have increased in the last few decades, to analyze how people learn to argue, and how it is possible to improve practices of arguing to learn (Schwarz & Baker, 2017). Overall, these studies have shown that argumentation at school rarely occurs spontaneously, in contrast

to the dialogical practices in informal settings (Arcidiacono & Bova, 2017), although the argumentative capacities of young children, even at preschool level, have been already highlighted (Convertini, 2020; Pontecorvo & Arcidiacono, 2010). Other studies have been specifically devoted to examining the role of teachers in establish the conditions to engage pupils in argumentation (Duschl & Osborne, 2002; Miserez-Caperos & Arcidiacono, in press): how to present an activity, how to motivate them to argue, how to guarantee a proper collaboration.

Although we recognize the interest of looking at the role of the adult (teacher) in designing argumentative activities at school, in this paper we intend to analyze whether the presentation of a task requiring discursive exchanges is taken by children as a useful occasion to start arguing.

We already know that the relationships between the teacher and the pupils is mediated by different implicit premises that play as shared background in the classroom. In addition, the school context is characterized by rules and conducts that are accepted and everyday assumed by the interactants, such as the pupils' need to ask a permission for taking the turn of conversation in the classroom, or the dis-preference for interrupting the teacher's talk. This (often implicit) contract is always present within the classroom context, including the teacher's presentation of a task requiring pupils to engage in some unknow activities. In fact, a typical situation that we can observe in the classroom implies a request formulated by the teacher (for example, the presentation of an exercise), followed by the pupil's answer and then by a teacher's evaluation or follow-up (Mehan, 1979; Sinclair & Coulthard, 1975). Within this kind of discursive sequences, the child tends to accomplish the adult's request (Bell, Schubauer-Leoni, Grossen & Perret-Clermont, 1991) in the view of an evaluation as the final step.

The presentation of a task by the teacher and the effect on the pupil's answer have been studied by different authors (Selleri & Carugati, 2018), also within the field of research devoted to build argumentative designs at school (Schwarz & Baker, 2017). However, the specific moment of the task's presentation by the adult has been less investigated as a process per se within the educational activity (for instance, studies devoted to this aspect have recognized the relevance of that moment and its potential effect on students' learning and performance; see Chopin, 2010). The significance of the presentation of a task is not only connected to the cognitive development of children (in terms of understanding, memory, etc.), but also concerns the child's representation of the awareness of the activity (Iannaccone, Perret-Clermont & Convertini, 2019; Zerbato-Poudou, 2001). As children are able to play an active role within the classroom interactions, we recognize that they can make hypotheses and attempts to anticipate the teacher's goals and to act according to the expected tasks' logics. For this reason, we intend to study to what extent, within activities proposed to solicit discursive exchanges among children, the moment in which the adult is presenting a task should be taken by the pupils as an occasion to start arguing, even before the realization of the requested activity. We are interested in understanding in which circumstances the presentation of the task enables the child's argumentative thinking process.

## 2. METHODOLOGY

To conduct the study, we have combined analytical tools borrowed from modern and contemporary argumentation theories (the pragma-dialectical approach proposed by van Eemeren and Grootendorst, 1984, 2004) and from discursive perspectives (Arcidiacono, 2015). The analyses focus on the children's reasoning that emerges in the classroom while the teacher is presenting a task.

### 2.1 Participants and Procedures of Data Collection

The study was carried out in two kindergartens in Italy and in Switzerland (French-speaking part). A group of 44 children aged between 3 and 5 participated in the study (see table 1 for the composition of the sample). Prior to the data collection, a researcher participated with the children and the teachers in the daily activities of the kindergartens for a week. This period allowed children to become familiar with the observer and vice versa. Before the data collection, the researcher obtained all the necessary permissions, according to the principles of the ethical code, and guaranteed its respect throughout the entire research process.

Participants	Male	Female	Average age	TOT.
Italian sample	13	12	4,8	25
Swiss sample	11	8	4,4	19
TOT.	24	20	4.6	44

Table 1. Sample

According to the total number of participants and depending of the presence/absence of the children during the days of the video-recordings, various small groups (triads and dyads) were composed in the idea of soliciting the children's reasoning through situations of socio-cognitive conflict (Perret-Clermont, 1979/1996). Each group was asked to solve three tasks: building a tunnel with Lego® blocks in such a way that a specific toy car could drive through it (activity 1); building a bridge with Lego® in such a way that two friends (two LEGO® characters) who are on the opposite sides of the sea can meet each other (activity 2); building an hourglass with recycled materials (activity 3). These activities were inspired by the work done by Piaget (1974, 1980) and by the activities proposed by the foundation "La main à la pâte" (<http://www.fondation-lamap.org/en/international>, last view: June 2020).

The design was intended to invite children to adopt standard or innovative ways of using different tools (Lego® or recycled materials) to jointly solve a task. The activities were video-recorded (by placing a camera in front of the groups' worktable) to catch verbal and nonverbal elements useful for the following analysis performed by the researchers. In addition, an audio-recorder was placed on the worktable of each group to better capture the children's voices. At the end of the data collection, 43 recordings were at our disposal, for a total of about 24 hours of video.

## 2.2 Procedures of Data Analysis

The recorded data have been treated by using the software Transana Basic 3.10b, in order to identify and select the episodes of argumentative discussion. For the present study, we considered as argumentative discussions the episodes where an issue was discussed via the presentation of one or more argumentation. All the selected episodes (N = 80) were transcribed by using a simplified version of the system elaborated by Jefferson (2004), including verbal and non-verbal elements (such as the position of the tools and the participants' gestures).

We have performed the analysis by combining two perspectives: firstly, the pragma-dialectical model of a critical discussion (van Eemeren & Grootendorst, 2004) to establish the argumentative structure of each argumentation found within an episode; secondly, we adopted an idiographic, local approach (Arcidiacono, 2015; Salvatore & Valsiner, 2009) to access the participants' construction of their discourses, by performing a case-by-case argumentative analysis (Pontecorvo & Arcidiacono, 2007).

## 3. RESULTS

A total of 104 children's argumentations were identified in the corpus of data. As an illustrative case, we present an excerpt<sup>1</sup> (called "The submarines") concerning two children engaged in one of the planned activities.

The setting of the example is the following: the researcher proposed to the dyad to build a bridge by using the Kapla® bricks. The intention was to allow two characters (represented by men's silhouettes of the playmobil® collection) who were on the opposite sides of the sea (a blue cardboard) to cross the bridge and to meet. In the selected excerpt, the researcher introduces the activity and gives instructions to the dyad: she explains that the two characters are waiting on their cars on the opposite sides of the sea; as they want to meet, the children need to build a bridge.

Excerpt 1: The submarines; length: 3,3 minutes.

Participants: the adult and two children (Luc<sup>2</sup>, 4:4 years old; Victor, 5:1 years old)

1. Adult: So, do you have a lot of friends?
2. Luc: Yes ((Victor nods))
3. Adult: So, let's imagine that these ((she indicates the two playmobil characters)) are two friends, so that's okay? ((she raises a playmobil and looks at Victor))
4. Victor: Okay
5. Adult: Does he look a little bit like you?
6. Victor: Yeah(h)
7. Adult: Yes? (h) so, this is you ((she gives the playmobil to Victor)) and the other one is you ((the adult points to the other playmobil and looks at Luc)) okay?
8. Luc: And I have other playmobils, but with the hair.

<sup>1</sup> This excerpt was presented in Convertini (2019) with the aim of studying the adult's interventions and the implications of designing a task. The data have been collected within a research project on children's implicit argumentation. The research has been funded by the Swiss National Science Foundation (grant no. 100019\_156690) and carried out from 2015 to 2018 by the Institute of psychology and education (University of Neuchâtel) and the Institute of argumentation, linguistics and semiotics (Università della Svizzera Italiana).

<sup>2</sup> All names are pseudonyms. The symbols of transcription are reported in the Appendix.

9. Adult: Then
10. Luc: ((two young girls walk into the classroom)) You are not allowed to enter, girls, it's up to us.
11. Adult: So, you have two cars at your disposal, so this is yours and this is yours ((she points out the two cars)), so you have to meet each other with the car, but we have a problem (.) We have a problem because there is the sea ((she touches the blue papers representing the sea)) that separates you from each other. So, can the car cross the sea or not?
12. Victor: No
13. Luc: No, but I have something to tell you: sometimes there are cars that can go into the sea ((a child walks into the classroom again)) she is not allowed ((the young girl leaves the classroom))
14. Adult: How do you do it? And how do you do it? How does it work?
15. Luc: Because they have engines like submarines ((he lifts the car and touches it)).
16. Adult: Have you ever seen that? ((she looks at Victor))
17. Luc: [In the wrecks
18. Victor: [Never seen it
19. Luc: But, people
20. Victor: It's true, he's right
21. Luc: People actually they are on a boat, we pretend that this, like this ((he turns the car upside down and puts the playmobil character in the car)), it's a boat, and that and that and that he has something to breathe to go in the water, the man
22. Adult: It can be like this
23. Victor: Yeah
24. Adult: But, still, it's a bit weird
25. Luc: But there, but there is an engine ((he points out the car))
26. Adult: If not, what do you think if I give you the Kapla and we make a bridge?
27. Luc: Yeah
28. Adult: Do you agree?
29. Victor: Yes
30. Luc: Yeah:: good idea::

The reconstruction of the inferential configuration of the argumentation advanced by Luc, Victor and the adult is presented in Figure 1. The thesis, the arguments in support of the thesis and the relationship between these arguments are indicated.

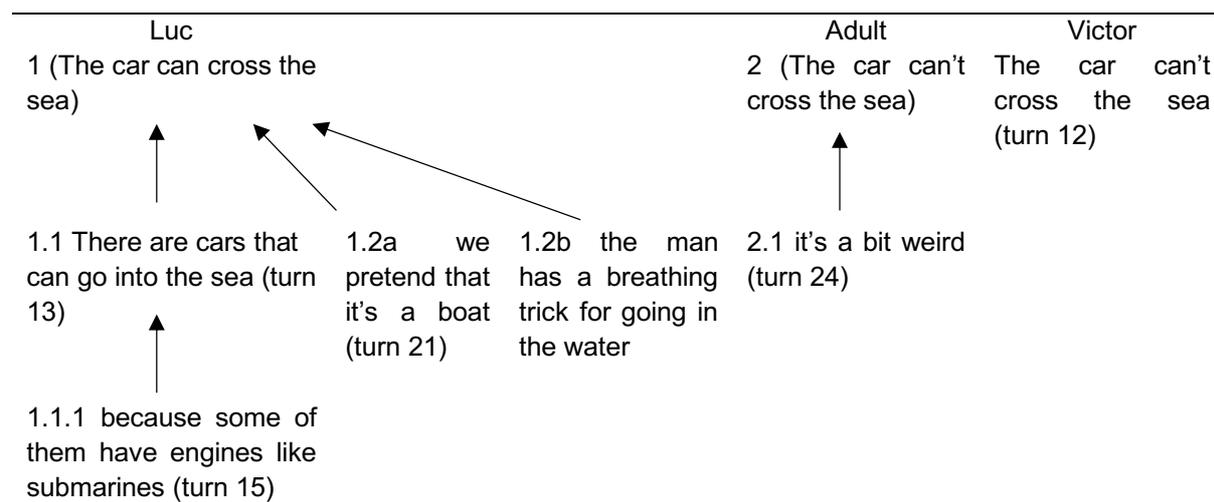


Figure 1. Analytical overview of the argumentation

After a short discussion about friendship, the adult introduces the issue in turn 11: can the car cross the sea or not? The adult tells the children that the two characters want to meet, although they are on the opposite sides of the sea. She presents this point as the problem children need to solve. While Victor states that the car can't cross the sea (turn 12), a difference of opinion quickly emerges between the children. This constitutes the stage of confrontation within the model of the critical discussion. In fact,

Luc anticipates the presentation of an alternative standpoint (the implicit standpoint “the car can cross the sea”) by using the adversative connective “but” (Rocci, Greco, Schär, Convertini, Perret-Clermont & Iannaccone, 2020) and by stating “I have something to tell you” (turn 13). He supports his standpoint by advancing the following argument: “there are cars that can go into the sea.” When the adult tries to push his reasoning further by asking “How does it work?” (turn 14), Luc presents another argument to the adult (“because some of them have engines like submarines,” turn 15) as a response to her request. These arguments indicate the argumentation stage in which participants are engaged.

It is interesting to note that Luc is able, through his answer, not only to present a valid argument in support of his standpoint, but also to assume the role requested by the adult (namely, the role of a critical discussant). In turn 17, the adult addresses a question to Victor: “Have you ever seen that?” potentially raising doubts about the Luc's standpoint. The children provide their answers at the same time (turns 17 and 18): Luc says “In the wrecks,” by proving once again his capacity to participate in a critical discussion; Victor replies to the adult by saying “Never seen it.” In turn 19, Luc seems about to anticipate another argument (“But the people”). He is interrupted by Victor that states “It's true, he's right” (turn 20) and thus he changes his standpoint in favor of the one taken by Luc. At turn 21, Luc continues to sustain his reasoning and tries to support again his standpoint (the car can cross the sea), by presenting two further different arguments: “we pretend that it's a boat” and “the man has a breathing trick for going in the water” (turn 21).

The argumentation of Luc is quite complex, because the structure is composed of multiple (see Fig. 1: 1, 2), subordinative (see Fig. 1: 1, 1.1) and coordinative (see Fig. 1: 1a, 1b) argumentation. Moreover, in contrast to the previous arguments (“There are cars that can go into the sea” and “because some of them have engines like submarines”), he expands his reasoning by taking into consideration both materials provided by the adult (the cars and the characters). He aligns himself to the presentation of the task made by the adult who requested to allow the characters to meet by car. Accordingly, the solution proposed by Luc is pertinent. In turn 23, Victor seems to accept the Luc's standpoint. However, in turn 24, the adult presents an argument (“But, still, it's a bit weird”) that, although the arguments provided by Luc are valid, is based on an ambiguous formulation. Luc continues to support his standpoint (“But there, but there is an engine,” turn 25). It is only in turn 26 that the adult makes explicit her aim and what the activity is expected to be: “If not, what do you think if I give you the Kapla® and we make a bridge?” It is only at this point that both children accept her suggestion and start accomplishing the task according to the request of the adult.

The selected excerpt shows how children were able to advance valid arguments and to manage different argumentative structures. They assumed the roles requested by a critical discussion and defended their reasoning, by proposing a solution allowing the characters to cross the sea and to meet (according to the task's request). However, the way to solve the task was not following the adult's intention (inviting the participants to build a bridge). By her discursive strategy, the adult was breaking some principles of reasonableness (van Eemeren & Grootendorst, 2003). In fact, she violated the rule of freedom (when she tried to prevent Luc from putting forward a standpoint), of conclusion (because she advanced her standpoint without defending it and doubting about the Luc's standpoint), and of language use (by using ambiguous formulations, such as in turn 24). Since the adult had her own purpose in mind, she tried to direct the discussion towards the construction of a bridge. However, the Luc's proposal to solve the task in a different way was at odds with the idea proposed by the adult. In fact, the two children gradually tried to propose to build a tunnel as a suitable solution.

#### **4. CONCLUSIONS**

The findings show that, while it is expected that the adult presents a task to fulfill a goal (e.g. to invite children to build a bridge), the children are already able to engage themselves in reasoning about all the elements of the activity and to consider the characteristics they judge relevant (e.g., alternative ways to solve the problem). Beyond expectations, we observed how children can immediately start to argue about a task that is going to be presented by the adult, and to what extent they are able to advance ideas and to propose different possibilities according to the material resources at their disposal.

In such a type of situation, the adult should consider not only his/her representation of the activity's setting, but also the possibility that children also have a representation of the task and can take the opportunity to engage in solving it in creative ways. The attention to both these aspects will allow a better understanding of the relevance of cognitive-oriented argumentative activities in the classroom, in which children can immediately develop a pertinent reasoning even before the teacher ends to present the task. Further studies should contribute to develop these features and to train teachers to consider such cases, in order to be able to analyze it and to implement the necessary strategies favoring the children's argumentation.

We suggest that more in-depth analyses of these aspects should focus on the interplays of cognitive, verbal and non-verbal resources that are embedded within children's argumentative activities. As we have observed a situation in which the task designed by adult should be intended in a different way by the children, the question of the participants' "degree of freedom" in interpreting a task is crucial. It is not new that pupils continuously tend to understand the adult's requests, although they have the capacity to manage a task in their own way (Arcidiacono & Neuenschwander, 2017). When engaging within a space allowing them the opportunity to freely express their points of view, children are naturally figuring out various ways of solving an activity, including the management of the relationship with the peers (Buđevac, Arcidiacono & Baucal, 2017). In this sense, the argumentative analysis of collective tasks is always a process of co-construction regarding one or more issues (Arcidiacono & Baucal, 2019; Nonnon, 1996): the understanding of this socio-cognitive complexity can help teachers to identify the requested resources and to optimize the children's efforts in engaging in various activities at school.

## REFERENCES

- F. Arcidiacono, "Argumentation and reflexivity," in *Reflexivity and Psychology* (Eds. G. Marsico, R. Andrisano-Ruggieri & S. Salvatore), pp. 169-193, Charlotte: Information Age Publishing, 2015.
- F. Arcidiacono & A. Baucal, *Le interazioni sociali nell'apprendimento*, Rome: Carocci, 2019.
- F. Arcidiacono & A. Bova, *Interpersonal Argumentation in Educational and Professional Contexts* (Eds.), New York: Springer, 2017.
- F. Arcidiacono & E. Neuenschwander, "Depiction in solving experimental tasks at primary school: An exploratory study," *Journal of Education Research*, vol. 11, no. 4, pp. 1-18, 2017.
- N. Bell, M.-L. Schubauer-Leoni, M. Grossen & A.-N. Perret-Clermont, "Transgressing the communicative contract," paper presented at the *Biennial Meeting of the Society of Research in Child Development*, Seattle, Washington, 1991.
- N. Buđevac, F. Arcidiacono & A. Baucal, "Reading together: The interplay between social and cognitive aspects in argumentative and non-argumentative dialogues," in *Interpersonal Argumentation in Educational and Professional Contexts* (eds. F. Arcidiacono & A. Bova), pp. 47-73. New York: Springer, 2017.
- M. P. Chopin, "Les usages du «temps» dans les recherches sur l'enseignement," *Recherches en éducation*, no. 170, pp. 87-110, 2010.
- J. Convertini, *Contributo allo studio dei tipi di argomento in situazioni di problem solving tecnico da parte di bambini in età prescolare* (Doctoral dissertation), 2019.
- J. Convertini, "An Interdisciplinary Approach to Investigate Preschool children's Implicit Inferential Reasoning in Scientific Activities," *Research in Science Education*, 2020. <https://doi.org/10.1007/s11165-020-09957-3>
- R. A. Duschl & J. Osborne, "Supporting and promoting argumentation discourse in science education," *Studies in Science Education*, no. 38, pp. 39-72, 2002.
- F. H. van Eemeren & R. Grootendorst, *Speech acts in argumentative discussions: A theoretical model for the analysis of discussions directed towards solving conflicts of opinion*, Dordrecht: Floris, 1984.
- F. H. van Eemeren & R. Grootendorst, "A pragma-dialectical procedure for a critical discussion," *Argumentation*, vol. 17, no. 4, pp. 365-386, 2003.
- F. H. van Eemeren & R. Grootendorst, *A systematic theory of argumentation: The pragma-dialectical Approach*, New York: Cambridge University Press, 2004.
- A. Iannaccone, A.-N. Perret-Clermont & J. Convertini, "Children as investigators of Brunerian "Possible worlds". The role of narrative scenarios in children's argumentative thinking," *Integrative Psychological and Behavioral Science*, vol. 53, no. 4, pp. 679-693, 2019.
- G. Jefferson, "Glossary of transcript symbols with an introduction," in *Conversation analysis: Studies from the first generation* (Ed. G. H. Lerner), pp. 13-23, Amsterdam: Benjamins, 2004.
- H. Mehan, *Learning lessons: Social organization in the classroom*, Harvard University Press, Cambridge, 1979.
- C. Miserez-Caperos & F. Arcidiacono, "Developing cognitive and knowledge-oriented argumentation in classroom: Perspectives" in *Education in Europe: Perspectives, Opportunities and Challenges*, New York: Nova Science Publishers, in press.
- E. Nonnon, "Activités argumentatives et élaboration de connaissances nouvelles: le dialogue comme espace d'exploration," *Langue Française*, no. 112, pp. 67-87, 1996.
- A.-N. Perret-Clermont, *La construction de l'intelligence dans l'interaction sociale*, Bern: Peter Lang, 1979/1996.
- J. Piaget, *La prise de conscience*, Paris: Presses universitaires de France, 1974.

- J. Piaget, *Les formes élémentaires de la dialectique*, Paris: Gallimard, 1980.
- C. Pontecorvo & F. Arcidiacono, *Famiglie all'italiana: parlare a tavola*, Milan: Cortina., 2007.
- C. Pontecorvo & F. Arcidiacono, "Development of reasoning through arguing in young children," *Культурно-Историческая Психология / Cultural-Historical Psychology*, no. 4, pp. 19-29, 2010.
- A. Rocci, S. Greco, R. Schär, J. Convertini, A.-N. Perret-Clermont & A. Iannaccone, "The significance of the adversative connectives aber, mais, ma ('but') as indicators in young children's argumentation," *Journal of Argumentation in Context*, vol. 9, no. 1, pp. 69-94, 2020.
- S. Salvatore & J. Valsiner, "Idiographic science on its way: Towards making sense of psychology," *Yearbook of idiographic science*, vol. 2, pp. 9-19 (Eds. S. Salvatore, J. Valsiner, S. Strout & J. Clegg), Rome: Firera & Liuzzo, 2009.
- B. B. Schwarz & M. J. Baker, *Dialogue, Argumentation and Education. History, Theory and Practice*, Cambridge: Cambridge University Press, 2017.
- P. Selleri & F. Carugati, "Errare humanum est! A socio-psychological approach to a 'Climbing Mount Fuji' PISA question," *European Journal of Psychology of Education*, vol. 33, no. 3, pp. 489-504, 2018.
- J. M. Sinclair & R. M. Coulthard, *Towards an Analysis of Discourse. The English used by teachers and pupils*, London: Oxford University Press, 1975.
- M. T. Zerbato-Poudou, "Spécificités de la consigne à l'école maternelle et définition de la tâche," *Pratiques*, vol.111, no. 1, pp. 115-129, 2001.

## APPENDIX

.	falling intonation	(h)	<u>aspiration</u>
?	rising intonation	:	prolonging of sounds
,	continuing intonation	(.)	pause (less than 0.5 seconds)
(( ))	segments added by the transcriber to clarify contextual aspects	[	overlaps