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# **CO-VIEWING AN EDUCATIONAL VIDEO: A PILOT STUDY ABOUT MOTHER-DHH CHILD INTERACTION**

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## **Abstract**

This study analyzes the mother-child interaction that takes place after co-viewing an educational video, comparing a group of 12 Spanish hearing mothers of deaf or hard of hearing (DHH) 7-9-year-olds, and a group of 12 Spanish mothers of an age-matched cohort of children with typical hearing (TH). The results show that, in order to ascertain what the children have understood from the video, the mothers of the DHH children ask significantly more questions than the mothers of children with TH. Regarding the strategies that they use to prompt their children to explain the video, the mothers of the DHH children make reference most of all to shared experiences and focus their attention on contents of the video, whereas the mothers of children with TH tend to encourage their children to begin or continue the explanation of the video. The age of the hearing mothers was not found to have any effect on these results.

Despite the importance of audiovisual media in our everyday lives, relatively few studies exist that attempt to answer questions related to family education, such as: How do adults contribute to the educational use of the audiovisuals that their children regularly consume? The role of adults in other interactive situations of joint attention which favor learning and language acquisition is comparatively well studied, with much of the literature following from the seminal 1962 work of Vygotsky (Carpendale & Lewis, 2004; Plessow-Wolfson & Epstein, 2005; MacGowan, et al., 2021). In this tradition, Bruner coined the concept of scaffolding to describe the structure of the interactions which an adult uses to facilitate a task for a child. Subsequently, he described some typologies of scaffolding, which he called formats, one of which is storytelling (Bruner, 1972, 1981). Currently, the conceptualization of scaffolding is also applied to other kinds of learning, such as that of prosocial behavior (Dahl et al., 2017).

Storytelling is one of the most studied formats for analyzing mother-child interactions (Bruner, 1981). It consists of looking at and commenting on illustrations in books, especially before the children have learned to read (Danis et al., 2000; Symons et al., 2005; Liable & Song, 2006; Garner et al., 2008; Korat & Or, 2010). In this context, the mother acts as a facilitator and conduit for the social, emotional and cognitive knowledge of her child (Carpendale & Lewis, 2004; Laible, 2004; Howe, 2010; Bakar et al., 2010; McGinty et al., 2012). In contrast, the act of watching television has aroused less interest among researchers, even though it is an activity that children spend more time doing (Rideout & Hamel, 2006). In fact, children usually watch television alone, in their bedroom or in non-common areas of their homes (Saxbe et al., 2011; Sormunen, et al., 2016). Parents might be around, but they rarely interact with children or talk about the

television program before, during or after viewing (Barkin, et al., 2006; Nathanson, 2001). According to Carson & Kuzik (2021), electronic devices (e.g., cell phones/smartphones, tablets, iPods, televisions, computers, and video game consoles) interrupt parents' conversations and activities with their preschool-aged children multiple times per day. In the same vein, the systematic review of studies about the impact of devices on parent-child language carried out by Ewin et al. (2020) showed that they have a negative impact on parent language. While parents were viewing media with children, they offered significantly less language, reduced language variation, reduced story-related comments and reduced verbal responsiveness to children's speech compared to toy play.

The difference between storytelling and watching videos is not only based on the nature of the contexts in which they take place, but also on the fact that during storytelling the parents can stop the story whenever they want to ask questions and make comments about the images in order to check comprehension. In contrast, watching a video at home is usually a dynamic process without pauses or interruptions.

Studies have shown that learning through a video is not automatic, especially when children are young (DeLoache et al., 2010; Kirkorian et al., 2016; Robb et al., 2009; Troseth et al., 2017; Troseth et al., 2018), and that adult mediation is necessary to focus a child's attention on certain contents of the video and help them to better interpret the information (Cambra & Silvestre, 2016). In a school context, teachers act as mediators, and thanks to their feedback skills, the students' self-regulated learning can improve (Linebarger, 2009; Baadte, 2019). At home, it is the parents who act as mediators, which they can do in different ways (Aierbe et al., 2006): restrictive mediation (regulation of the time and the types of programs); co-viewing (watching programs together and talking

about them); instructive mediation (explaining aspects of the program and its characters) and unfocused mediation (letting them watch any program at any time).

With the aim of investigating whether the same types of parental interactions that increased preschoolers' vocabulary learning from storybooks also increased vocabulary learning and story comprehension from videos, Strouse et al., (2013) trained 81 parents of 3-year-old children to use *Whitehurst's dialogic reading questioning techniques* when watching videos during 4 weeks. The parents watched the videos with their children in one of the following four conditions: dialogic questioning (pausing, asking questions, and encouraging children to tell parts of the story), directed attention (pausing and commenting but not asking questions), dialogic actress (showing the videos with dialogic questioning by an on-screen actress), or no intervention (showing the videos as usual). After 4 weeks, the results of the study indicated that preschoolers learned more from videos when adults scaffolded their learning by discussing the story and asking children questions (dialogic questioning).

A limited number of studies have explored parental mediation when viewing videos with children with disabilities, such as autism (Kuo et al., 2015). Nonetheless, as far as we know, besides the study cited above (Cambra & Silvestre, 2016), there are no studies about parents' mediation of educational videos with deaf or hard of hearing (DHH) children, in contrast with the investigations carried out in the context of storytelling.

In a school context, studies support the use of interactive videos and teacher mediation in teaching language and literacy skills to DHH children (Mueller & Hurtig, 2010; Golos & Moses, 2011; Ávila & Caica, 2011) and the benefits to learning that result from viewing educational programming (Loeterman et al., 2002; Golos, 2010).

The present study was conducted in an interactive context that is unique for two reasons. Firstly, an educational video with an expositive structure typical of academic content is used, as opposed to a picture book with a typical storytelling structure. Secondly, the video is not paused or interrupted during the viewing process, which is different from what occurs when parents start/stop during dyadic reading with their children (Lavelli et al., 2018).

The main objective of this study is to analyze the mother-child interactions of hearing mothers with their DHH children after viewing an audiovisual documentary, using mother-child interactions in families with TH as a control. It should be noted that the mothers have not participated in any previous specific training regarding the discussion of audiovisual content with their children, nor have they been advised about how to interact in that situation. The specific questions that the study aims to answer are as follows:

1. What kind of interaction is established between the mother and her child after watching the video?
2. What strategies does the mother use to discuss the video with her child?

## **Methodology**

### **Participants**

The sample consisted of 24 children aged 7-9 (Mean=7.83; SD=0.56) with hearing mothers, 12 of whom were DHH (9 girls and 3 boys) and 12 of whom had TH (6 girls and 6 boys). The DHH children had a severe or profound degree of hearing loss (hearing loss over 70 decibels); eight of them used hearing aids and four had cochlear implants,

and their aided thresholds were between 15 and 35 decibels. The DHH children from the sample did not have any additional disabilities which affected their language abilities and were schooled in regular inclusive schools following the same academic curriculum as their classmates with TH, without individual adaptations. They communicated orally in Catalan, and their language abilities were tested using *The Reynell Developmental Language Scales III* (Edwards et al., 1997). The DHH participants were selected from three CREDAS (Educational Resource Centers for Deaf or Hard of Hearing Children) in the geographical area of Barcelona (Spain). These centers are responsible for providing in-school speech-language pathology to DHH students and providing guidance on how to communicate with DHH children to families as well as teachers (e.g., preferential seating for DHH children, use of remote microphone systems, etc). The age of the mothers who participated in the study ranged between 34 and 53 (Mean=41.63; SD=4.35), and there were no statistical differences between the two groups of children (Table 1).

All families of the children were informed in writing of the objective of the research and gave their signed consent for their children to participate in the study, following regulations established by the Ethics Committee for Human and Animal Experimentation at the Universitat Autònoma de Barcelona.

## **Material**

The study featured an educational video about dolphins that lasted 110 seconds. The video was obtained from a documentary program from Channel 33 of the Catalan TV network (<https://www.ccma.cat/tv3>). It was broadcast in Catalan, the language used in the regular inclusive schools of the DHH children, and was open captioned in Catalan, word for word, in synchrony with the voiceover. The video begins with an introduction in which dolphins



are classified as mammals. Then, their physical characteristics are described (such as their skin, eyes, nose, and various fins) indicating their functionality. It ends with a sample of the different acrobatics that dolphins can perform as well as other facts about their diet and behavior.

## **Procedure**

The viewing of the documentary took place in the participants' family home, in a quiet place. The mother and her child were informed that they would watch a video and, at the end of the viewing, the mother was invited to discuss the content of the video with her child without giving any instructions about how to carry out the discussion.

The families viewed the documentary on a laptop and the situation was filmed from the moment they started watching it until they finished the discussion about it. During the viewing of the video, there were no interruptions or pauses by any of the families. The oral interventions between mothers and children were transcribed and classified into different categories which are specified below.

## **Measures**

Per the proposed objectives, the mother-child interventions that occurred after watching the educational video together were classified into two blocks of categories: those that refer to the type of interaction established between mother and child and those related to the strategies that the mother uses to discuss the video.

Regarding the first block of categories related to the type of interaction, three aspects were analyzed: a) if the mother commented on the video alternating her comments with questions (she comments and asks questions); b) if she only asks questions about the content of the video (she only asks questions); and c) if she only comments on the content

of the video without asking any questions (she only comments). In the second block of categories related to the maternal strategies for discussion of the video, the types of questions and prompts were analyzed. The five types of questions and the three types of prompts observed in the study are described and illustrated with examples in Table 2.

### **Data Analysis**

We carried out Pearson  $\chi^2$  tests to analyze the differences between the mothers of DHH children and the mothers of children with TH in the type of interaction they had with the children.

To analyze the differences between the two groups of mothers in the number of questions and the number of prompts, both by types and in total, Poisson regression models were adjusted according to the age of the mothers.

Lastly, the total number of questions and prompts carried out by the two groups of mothers was also compared by means of the intrasubject comparison with the Wilcoxon signed-rank test, and the linear relationship between the quantities of the two types of interactions was analyzed by means of the non-parametric linear Spearman correlation test.

All the statistical analyses were considered significant with the level  $P < 0.05$  and were carried out with Stata/SE v16 (StataCorp, 2019).

### **Results**

Table 1 shows the statistical description of the sex and age of the children and the age of the mothers from the study sample.

Even though the distribution of the boys and girls in the samples of each group was not homogeneous, the difference is not statistically significant ( $\chi^2 = 1.600$ ;  $P = 0.206$ ). With

regards to the age of the mothers, a statistically significant difference was not found either ( $t = 0.507$ ;  $P = 0.617$ ).

The results pertaining to each of the objectives of the study are shown here below:

### **Type of mother-child interaction**

Figure 1 shows the distribution of the types of interactions that the mothers used with their children after viewing the video. The type of interaction that was used most frequently by the mothers of the DHH children consisted of only asking questions about the video (50%), while 33.3% of the mothers commented and asked questions, and 16.7% only commented on the video. In the case of the mothers of the TH children, none of them only commented on the video, 50% commented and asked questions and 50% only asked questions. However, these differences are not statistically significant ( $\chi^2 = 2.400$ ;  $P = 0.301$ ).

### **Maternal strategies for discussion of the video**

Figure 2 shows the distribution of the different types of questions that mothers asked their children after viewing the video. The DHH children were asked an equal or greater number of questions across all question types, except for open questions. Semi-open questions were the most common for both groups, while questions containing the answer were the least common. In the case of the TH children, questions that laid out a cognitive conflict were also very rare. Nonetheless, the Poisson regression analysis shows that the differences do not reach the level of statistical significance, except for the higher total number of questions that the mothers of DHH children asked (IRR=1.612; 95% CI: 1.019, 2.550;  $P=0.041$ ).

Regarding the type of prompts (Figure 3), the mothers of the DHH children tended to refer to previous experiences or refer explicitly to content from the video. On the other hand, the mothers of the children with TH most frequently tried to encourage their child to continue explaining the video. However, Poisson regression analysis shows that these differences do not reach the level of statistical significance, either in the number of different types of encouragement or in the total number of prompts.

The intrasubject analysis via the Wilcoxon signed-rank test of the differences between the number of questions and the number of prompts carried out by the two groups of mothers does not show statistically significant results ( $P=0.751$ ;  $P=0.217$ ). The Spearman non-parametric rank-order correlation test on the relationship between the total number of questions and the total number of prompts that the mothers carry out does not show a statistically significant result either ( $\rho=0.164$ ;  $P=0.444$ ).

## **Discussion**

The objective of this study is to explore the mother-child interaction that is established after co-viewing an educational video.

The results show that the mother-child interaction did not vary significantly depending on whether the mothers have DHH children or TH children, nor depending on the age of the mothers. Despite this, as can be seen in figure 1, it was observed that among the mothers of DHH children, there were more who interacted with their children by only asking questions about the content of the video they had just watched than there were who combined questions and comments, while this disparity was not observed among the mothers of TH children. According to the results from the study by Strouse et al. (2013), this type of interaction that combines comments with questions to encourage children to

continue explaining what they have seen in the video is the most effective way to help them understand the video and increase their vocabulary.

Therefore, it seems that the mothers of DHH children show a maternal scaffolding style which is based on checking their children's comprehension through explicit questions about the content of the video. This result is similar to the one observed by Brown and Remine (2004) when they explored the interaction of mothers with their DHH children in a play scenario. In the study, the mothers of the DHH children tended to participate actively in the play, directly influencing the play objects and the script, and showing a controlling conduct during the interaction; while the mothers of the children with TH tended to observe their children's play while commenting, suggesting, describing, explaining, and directing, without directly influencing what their children did. This attitude of the mothers of DHH children in which they feel the need to influence their children's play, instead of adopting a more relaxed attitude of observation, is similar to that observed in the mothers of the present study who need to assess their understanding of the video by asking their DHH children questions, rather than letting them take the initiative to explain it. This overprotective style could be assessed negatively from an educational-constructivist point of view.

Regarding the strategies used by the mothers to interact with their children, the hearing condition of the children seemed to have no effect either on the type of questions asked or the type of prompts to explain the video employed, but it did affect the number of questions. 50% of mothers in both groups used questions only, but the mothers of DHH children asked a greater number of questions overall. Thus, DHH children were asked a significantly higher number of questions than the children with TH, which reduces the opportunities that they have to express themselves (Brown & Remine, 2004).

Semi-open questions, which limited the answer, were the most common type of question for both groups. The least frequently asked questions were those containing the answer. The mothers of the children with TH also asked questions that set out a cognitive conflict at a very low rate. All children should be prompted to think and reflect more often (Zhao & Phillips, 2013), especially DHH children, since mother-child conversation contributes to the socio-cognitive development of the child (Morgan et al., 2014).

Open questions were also rarely formulated by the DHH children's mothers. This could be interpreted as evidence that the mothers are conscious that their children have linguistic difficulties due to their hearing loss (Morgan et al., 2014) and, because of this, they want to avoid questions that require complex narrative speech to answer. However, in our view, the fact that the mothers of the children with TH did not ask many open questions either could indicate that the hearing condition of the children is not a determining factor, while the fact that the mothers perceive their children's linguistic skills as limited due to their age could be explanatory for both groups.

With regards to the prompts to explain the content of the video, the mothers of the children with TH encouraged their children to comment on the content of the video more often than the mothers of the DHH children. As mentioned previously, Brown and Remine (2004) obtained similar results in an interactive play situation in which the mothers of the children with TH often encouraged their children to continue playing to draw their attention and keep the game going. The mothers of the DHH children of the present study, on the other hand, were more likely to use other strategies to get their children to explain the content of the video. One of these is establishing connections with previous knowledge by referring to family experiences. In line with this observation, Yuen et al. (2022) emphasized the importance of sharing and commenting on leisure activities shared with the family to motivate DHH children to express their emotions.

Another prompting strategy that the mothers of the DHH children used was explicit references to the content they had observed. This is also a strategy that school teachers use (Paul & Wang, 2012). They may act like teachers because they assume that their DHH children will not be able to learn from the video without their intervention (Baadte, 2019; DeLoache et al., 2010; Robb et al., 2009). In our opinion, references to family experiences that are related to the contents of the video and explicit references to content in the video are good examples of the positive impact that mothers can have on the socio-emotional development of their children and of their role as educational mediators.

### **Limitations and Future Directions**

The small sample size should be considered a limitation of the study. Apart from that, in future investigations, it would be interesting to control for other characteristics of the mothers, such as their educational level, or of the DHH children, such as their age of amplification. It would also be interesting to use other types of video, including fiction videos or videos with scientific knowledge, which would allow us to verify the results obtained in this pilot study. Another future line of research could be to study the strategies used by DHH mothers to investigate whether the behaviour of DHH mothers of DHH children more closely resembles that of hearing mothers of DHH children or hearing mothers of hearing children.

### **Conclusions**

To sum up, the results of the study show that after co-viewing an educational video, the mothers of DHH children interacted via comprehension-checking questions, which were mostly semi-open, more than via comments, which were favored by the mothers of the TH children. The age of the mother was not found to alter this relationship. In addition,

to prompt their children to explain the video, the mothers of the DHH children focused their attention on specific contents and established connections to family experiences.

According to Morgan et al. (2014), the mothers of the DHH children would benefit from reducing the number of questions they ask during the interaction with their children, which would create a more conversational environment. A way to achieve this would be through specific intervention programs for families with DHH children, along the same lines as those applied by Strouse et al. (2013) in families of children with TH, which aim to balance the number of questions and prompts in these interactions. To this end, the interactive reading training programs for parents of young DHH children have proven effective in developing children's literacy (Wauters & Dirks, 2017; Dirks & Wauters, 2018). In this sense, the reading strategies used in programs for families with DHH children can serve as a model and provide conversational strategies that facilitate parent-DHH child interaction in a context of co-viewing a video.

In other words, the objective would be to reach a dialogue-like conversational style where the children could express their beliefs, emotions and thoughts, rather than an assessment by the mother of the child's level of comprehension of the video (Brown & Remine, 2004; Morgan et al., 2014; Desjardin et al., 2017). Therefore, a clear implication of the present study is the need to include guidelines that promote a sensitive maternal attitude towards the thoughts of the child in the orientation and counseling programs for families with DHH children (Lederberg & Prezbindowski, 2000).



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Table 1. Statistical description of the sample.

	Children with Typical Hearing (TH)	Deaf or Hard of Hearing Children (DHH)	Total sample
	n (%)	n (%)	n (%)
Gender of the children			
Male	6 (50)	3 (25)	9 (37.5)
Female	6 (50)	9 (75)	15 (62.5)
	Mean (SD) [Min.–Max.]	Mean (SD) [Min.–Max.]	Mean (SD)
Age of the children (years)	7.83 (0.56) [7–9]	7.83 (0.56) [7–9]	7.83 (0.56)
Age of the mothers (years)	42.08 (4.35) [37–53]	41.17 (4.49) [34–49]	41.63 (4.35)
Reynell (comprehension)		57.92 (2.50) [52–62]	
Reynell (expression)		52.50 (5.18) [44–59]	

Note: n: sample size; SD: Standard Deviation



Table 2. Maternal strategies for discussion of the video

<b>Strategies</b>	<b>Definition</b>	<b>Examples</b>
<b>Type of questions</b>	Open questions which allow the child to answer broadly	<i>What are dolphins like?</i> <i>What do they have?</i> <i>What do they do?</i>
	Questions which contain a wrong piece of information for the child to contrast with the correct one - questions that set out a cognitive conflict-	<i>Is the dolphin a fish?</i>
	Semi-open questions that restrict the breadth of the answer	<i>What is their skin like?</i> <i>What do they like doing?</i> <i>What do they do with their teeth?</i>
	Dichotomous questions which require a negative or positive answer	<i>Do they live with their mother?</i>
	Questions which contain one of the two possible answers	<i>Is their back smooth or do they have something else on it?</i>
<b>Type of prompts</b>	Referring to an experience previously lived by the child	<i>Dolphins don't like being alone, they like being with their group, just like you. What do dolphins like...something that your brother likes doing a lot...</i>
	Encouraging the child to start or continue her explanation	<i>...And what else?</i> <i>What did you like the most?</i>
	Explicitly referring to what was seen in the video	<i>Did they say anything about...</i>

## **Figures**

Figure 1. Type of interaction of the mothers with their children.

Figure 2. Types of questions asked by the mothers.

Figure 3. Types of prompts by the mothers.